



A People's Budget: The Environment
Joint Democratic Policy Committee Hearing
February 25, 2021, at 3 p.m.

Opening remarks

Senator Katie Muth, Senate Democratic Policy Chair
Representative Elizabeth Fiedler, House Subcommittee on Progressive Policies Chair
Senator Nikil Saval
Representative Rick Krajewski

Panel 1: Impacted Pennsylvanians

Lois Bower-Bjornson, Washington County
Rosemary Fuller, Delaware County
Sylvia Bennett, South Philadelphia
Ray Kemble, Susquehanna County

Panel 2: Communities, State Investment, and the Economy

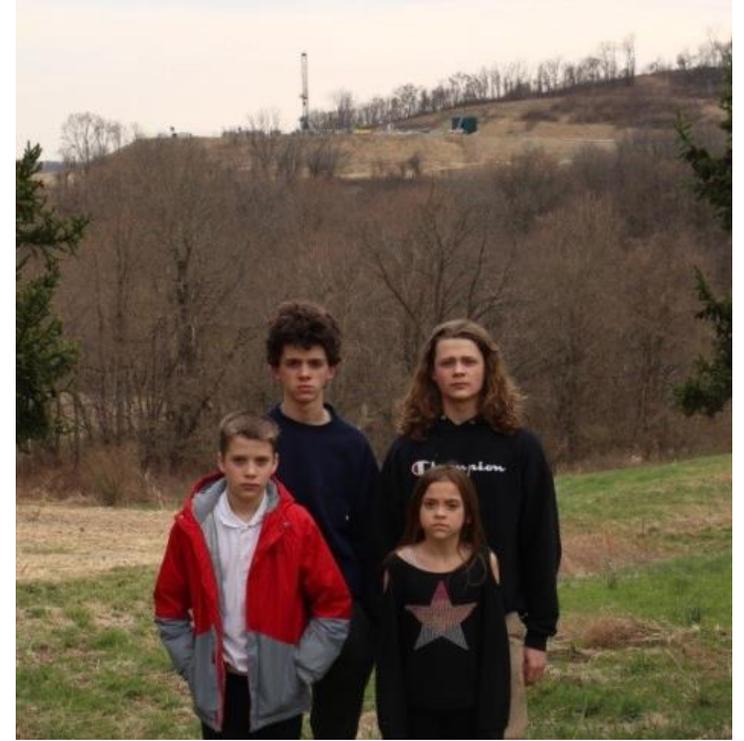
Bishop Dwayne Royster, POWER Interfaith
Ezra Thrush, PennFuture
Stephen Herzenberg, Keystone Research Center

Panel 3: Public Health

Dr. Edward "Ned" Ketyer, SWPA Environmental Health Project
Heaven Sensky, Center for Coalfield Justice

Closing remarks

Representative Elizabeth Fiedler, House Subcommittee on Progressive Policies Chair
Senator Amanda Cappelletti
Representative Danielle Friel Otten
Senator Katie Muth, Senate Democratic Policy Chair



Growing up with fracking

The Bjornson Bunch



Day care center





One of the wells that encompass our home.

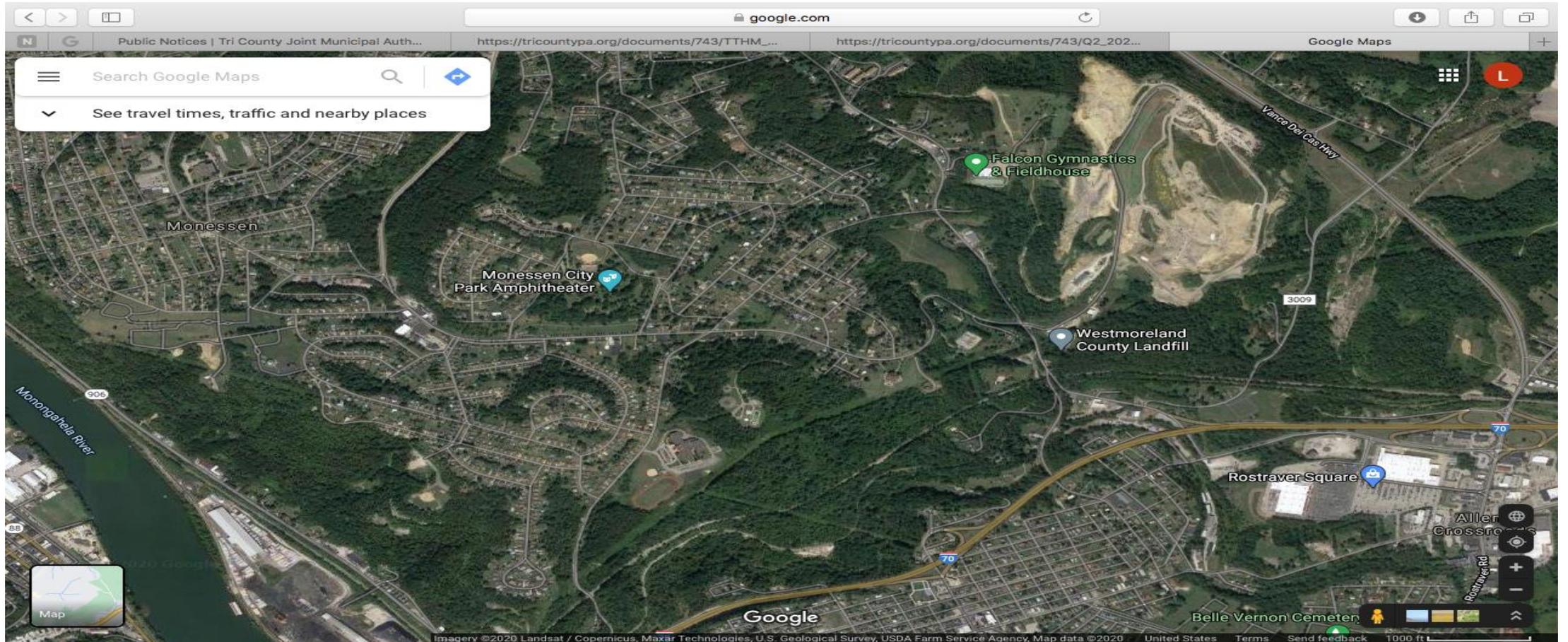
- *Our home in Washington county*



*Dave & Linda
King*

- *Linda's ancestral home next to the the full moon/blue moon compressor station.*
- *Dave has throat cancer.*

Falcon Gymnastics next to the Westmoreland landfill





Growing up with nose bleeds



WEBB

BALL

PETTIT

BREWER

Good afternoon my name is Lois Bower-Bjornson.

I wanted to thank you for the opportunity for allowing me to testify today.

I am the south western Pennsylvania field organizer with clean air counsel and I host frackland tours.

Some of you on the committee and some of you listening may have been on one of my tours.

If you have not I'd like to invite you to come out and get a first hand account of what it is like to live and grow up in the Shale fields of south western Pennsylvania.

I live and grew up in Washington County the most heavily fracked county in our state.

I wanted to begin my testimony today by telling you a story, the story of normalization.

I grew up along the Monongahela River in a once thriving coal town
Frederick town.

I am no stranger to industry.

As a child I swim in the river with raw sewage, and River rats. walking on the riverbank it was normal to see numerous barges loader with Coal going up and down the river.

It was common to see orange water or mine drainage.

From my grandparents hotel I would watch the Burning slate Bucket go to the dump.

All of my friends fathers worked in the mine.

We didn't think a thing of it. No one told us that something was wrong, or that any of this would harm us or those who work in the industry.

Now there's another industry the oil and gas industry, coming with the same promises normalizing things.

Do you know what it's like to be told that you are crazy, irrational, and just one of those environmental people. Or Worse being told you didn't see that it wasn't right no you must be misunderstanding?

You are the mouthpiece of Satan was one of the hate mails I received.

While working to protect a local community and their residents.

I was told by their solicitor "that I should watch myself I could be arrested for criminal trespass"

This, comment was made after showing representatives a well pad that caused a local road to cave-in.

Yes this work is not for the faint at heart.

I am a truth teller.

I'm able to bring a voice to the people who had none and tell their stories and mine.

I moved back to the area to raise my four children so they could run & play in the country and grow up in the outdoors and be near family.

I thought I was moving back to a better cleaner place for my children than the one I grew up in.

Anyone that's a parent realizes that we want the best for our children.
There's nothing worse than feeling guilt as a parent.

I can't express to you the guilt that I feel for raising my children in an environment that was not safe for them and has the potential to cause lifelong Health consequences.

All of my children have experienced health impacts from the Oil and gas industry.

On every level there are leaks from diesel trucks, to compressor stations, to fracking pads, to pipelines, to processing plants, to cryogenic plants, impoundments, everything.

Choosing alternate schooling for my artistic children seemed to be a plus.
Only to find out that they are next to a petrochemical hub and my two youngest are now attending a new school that has a cancer crisis.

Can you imagine helping your child through a nosebleed over and over again?

Do you know what it's like to not be able to leave your windows open in the warmer evenings because you know that there will be consequences in the morning that your children will suffer.

do you know what it's like that your children know to only drink from the good faucet?

do you know what it's like for your children to check the air quality before they go outside?

do you know what it's like to follow fracking trucks to & from school, and tell your new drivers don't get next to the trucks?

Can you imagine three of your four children had lymes disease due to climate change?

Do you know what it's like when you look over the horizon and you see fracking pads that completely encompass our home?

Can you imagine just for a minute having a consistent truck parade driving past your house all day long every day hauling hazardous waste and inhaling diesel fumes seven days a week for the past 10 years?

Have you ever had to put an air monitor on your child or have them give urine samples for a study to see how many Fracking chemicals are in their body?

This is not what we signed up for this is not our idea of our piece of heaven.

Why do we keep accepting this?

Why do we keep normalizing this?

**Along TESTIMONY BEFORE THE JOINT SENATE AND HOUSE DEMOCRATIC
POLICY COMMITTEE FOR A PEOPLE'S BUDGET**

I. Background

Name: Rosemary F. R. Fuller

Address: 226 Valley Road, Media, PA 19063

Family: Husband Gordon, 2 children

Education:

- BA (Hons) from the University of West London (Ealing College) in Modern Languages and South American Politics (1982)
- MBA from the University of Edinburgh (1987)

Career Experience:

1982 – Freight Forwarder with Simar Freight, Poole, Dorset UK

1983- 1984 Management Consultant with Metra Proudfoot, Brussels, Belgium

1984-1986 Signode GmbH, Dinslaken Germany

1988-1996 Financial Adviser, Allied Dunbar, Edinburgh

2008-2020 Rental Property Owner/Manager

Non-profit volunteer work:

Government relations advocacy work for JDRF (Juvenile Diabetes Research Foundation)

II. Objectives

The goal of my testimony is to share the negative impacts we have experienced as a result of Sunoco's Mariner East 2 drilling activities that have impacted my family's health, our home, our community and our environment. In doing so, I hope to bring to the attention of this Committee the failures in processes and oversight and the lack of funding and resources that have placed the residents of Pennsylvania, living along the line of Mariner East 2, in a dangerous and vulnerable

position, at the mercy of a pipeline construction company, with little or no representation or protection.

III. Proximity to Mariner East Pipelines

We have lived on Valley Road in Middletown Township, Delaware County, Pennsylvania, since 2003. We have 3 Mariner East highly volatile NGL pipelines (ME2, ME2X and the 1937 GRE) 150 ft in front of our home and Mariner East 1 behind us.

ME2X, was installed along Valley Road, our road, in the summer of 2019. This is what caused our well contamination.

The 82-yr old 12" Point Breeze to Montello also runs along Valley Road. It was repurposed from gasoline to highly volatile natural gas liquids in 2018. This old pipeline has leaked gasoline several times in our neighborhood before it was repurposed.

The proposed ME2 will also be installed in front of our home via HDD next to the ME2X any time soon. All 3 pipelines are approx. 150 ft in front of our property. The 88-yr old Mariner East 1, which was also repurposed to transport highly volatile natural gas liquids, is approx. 1100 ft behind our property. In total, therefore, we have 4 Mariner East pipelines around our property.

Our Story

In 2015 we were approached by Sunoco and asked to sign a permanent easement as shown in **Fuller exhibit 1**, giving Sunoco Pipeline a stretch of land running along the entire front of our property along Valley Road. The Percheron Field Services agent, who also happened to be a notary public, told us very clearly that “there would be no risk and we would never even know they were there”. Subsequently this statement proved to be untrue. After the results of two independent risk assessments we now know there is a huge risk with highly volatile natural gas pipelines. As far as “not knowing they are there” is concerned, we have had to witness our beautiful, quiet, and residential Valley Road being turned into a massive, dirty, noisy, potholed, construction site with a constant flow of water trucks, hazardous waste trucks, diggers, construction vehicles, workers vehicles, geologists, flaggers, not just for a week or a month but for years now since construction began in 2017. We were never told that this would happen.

We bought this property, our home, for many reasons and one was the location. It was quiet, peaceful and semi-rural. Mariner East construction has changed our environment beyond all recognition. We have had to suffer the dirt, the noise, the drilling fluid spills into the Rocky Run Creek and down Valley Road. Flooding where we had none before. We have had, during the course of this project, approximately half a dozen pipeline construction sites along this road with the pipelines stretching out along the side of the road. We have had helicopters and airplanes flying low over our property. Our local park, Sleighton Park (the site of four sinkholes), has been cordoned off with a huge construction wall surrounding an ME2 and 2X pipeline HDD entry/exit point (HDD #591). The park where children play, where our local sports teams play

their games, where I used to walk my dogs every day. For years now I have been unable to walk my dogs in a circuitous route because they took that whole section of the park walkway away from us. The construction site at the park is a daily and ugly reminder for years now of what they didn't tell us would happen when we signed the permanent easement in good faith in 2015.

We also were not warned about sinkholes. On April 24, 2019, a large sinkhole opened next to the State Police barracks on Route 1(Baltimore Pike) in Middletown Township, approximately a mile from our home. (See Middletown Township letter to Chairman Brown of the PA PUC - [Letter PA PUC - Subsidence Incident Mariner East Pipeline Installation 4.29.19.pdf](#) ([middletowndelcopa.gov](#)).

The sinkhole was in the right-of-way of the active "bypass" pipeline, the 1937 repurposed 12-inch Point Breeze to Montello (also known as the GRE). Granite Farms Estates, a retirement community, is directly across the road from where the sinkhole occurred, less than 1000 feet away. The YMCA is also approx. 1000 feet away. Glenwood Elementary School is within 2500 feet. All of these would have been endangered by a pipeline rupture or leak of the highly volatile NGL's.

The second sinkhole occurred on September 13, 2019 next to Sunoco's HDD drill site in Sleighton Park ([09.20.2019 Statement on September 13th Sleighton Park Event.pdf](#) ([middletowndelcopa.gov](#)). Sleighton Park, is just a half a mile away from our home. This is where I take my dogs every day. It is the route my daughter drove to college every day. This time the sinkhole exposed a section of the active 12" 1937 Point Breeze to Montello (GRE)

which was, again, transmitting Mariner East highly volatile natural gas liquids. A section of the pipe (approx. 2 feet) was suspended without support and more was exposed but not suspended.

The third sinkhole [Sunoco-Mariner East Update 10.17.2019.pdf \(middletowndelcopa.gov\)](#)

again, in Sleighton Park, a half a mile from our home, occurred on October 17, 2019. I was with my dogs in the park at the time. Again, approx. 3 feet of the old 1937 repurposed GRE was exposed and unsupported. This could have ruptured or cracked.

The fourth sinkhole, again at Sleighton Park, occurred on October 28, 2019 ([Sunoco-Mariner East Update 10.28.2019.pdf \(middletowndelcopa.gov\)](#)). Again, the old 1937 repurposed 12” GRE pipe was partially exposed within the void with a section of pipe unsupported.

The fifth sinkhole at the Sleighton Park HDD site location (HDD 591) occurred on November 18, 2019 at the junction of Valley Road and Forge Road. See [Sunoco-Mariner East Update 11.18.2019.pdf \(middletowndelcopa.gov\)](#). This sinkhole was approx. 20 ft in depth, 20 ft in width and 30 ft in length. This is just a half a mile from our home.

After all these sinkholes, I feel very anxious about the upcoming HDD for the larger 20-inch ME2 pipe. I fear other sinkholes will open up. That this will be another “Lisa Drive”, just one sinkhole after another.

In addition to the sinkholes, we also experienced the weird whistling noise which we thought might have been a leak ([Sunoco ETP UPDATE 9.28.20.pdf \(middletowndelcopa.gov\)](#)). This was apparently caused by a Smart Tool being pushed through the pipeline.

I have no idea whether the geophysical analysis over the length of the profile for Valley Road Crossing S3-0591 HDD was ever carried out, as required by the DEP. John Hohenstein's letter to Matthew Gordon dated 12/5/2018

(http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/HDD_Reevaluation_Reports/DEP_Response/ValleyRoadCrossing/Valley%20Road%20Crossing%20-%20DEP%20Final%20letter%20-%202012-5-18.pdf) confirms this requirement in order to minimize the risk of Inadvertent Returns and impacts to public and private water supplies. We have suffered both.

Unfortunately I was denied access to the complete Rettew Geophysical Survey for Valley Road. Instead Middletown Township posted a summary on its website that gives us no information as far as our property is concerned https://middletowndelcopa.gov/vertical/sites/%7BE08CD8FE-6BF2-4104-AF8F-C16770381A63%7D/uploads/HDD_591_Valley_Rd_-_Geophysics_summary_5-28-20.pdf. I appealed to the Office of Open Records and was still denied access to the complete report. No boring was carried out at our property.

On October 1, 2015, we signed the Permanent Easement Document (**Fuller Exhibit 1**) in good faith as, no doubt, many other residents have done along the 350-mile route of the Mariner East project. We obviously now wish, knowing what we do, that we had never signed that document

but am then reminded of the Percheron agent's statement "we don't have to ask you for this but we're trying to be a good neighbor". Public utility certification gives Sunoco the power to exercise eminent domain. We never really had a choice.

One of the old pipes Sunoco used for the "workaround" is the 12" Point Breeze to Montello which runs along Valley Road 150 ft past our house. This pipe is very old (installed in 1937) and corroded and has leaked multiple times in Edgmont Township just along the road from us – namely in 1988, 1992 and on Valley Road in 2015 as the **Fuller Exhibit 2** accident reports show. All these leaks were discovered by residents seeing and smelling the product being transported in the pipe which, at that time, was gasoline. All those leaks were NOT detected by Sunoco's leak detection equipment. Now the product in the pipe has been replaced with odorless and colorless highly volatile natural gas liquids through high consequence areas. We no longer have the ability to see or smell a leak when Sunoco's leak detection equipment fails as it did in the previous examples. In other words, we have now been placed at much higher risk.

This old 12" Point Breeze to Montello or, the GRE as it is also referred to, is the very same pipe that Administrator Elliott referred to as "compromised" in his letter to the West Whiteland Board of Supervisors on Sept. 4, 2018:

<https://www.westwhiteland.org/DocumentCenter/View/1027/PHMSA-response-to-BOS-9-4-18>)

This is the repurposed pipe that runs along Valley Road and in front of our property. This is the very same pipe that leaked 33,000 gallons of petroleum into Darby Creek in June of 2018. On the final page of the letter in Point 6, Administrator Elliott states that "the compromised section

... will continue to transport refined products”. When I asked Ian Woods, lead Community Liaison for PHMSA to define “compromised” he stated that it meant “corroded”.

Despite the SCADA and CPM leak detection equipment being operational and functional at the time, it failed to detect this leak at Darby Creek. Notification came once again from the public noticing a petroleum odor on June 19. On June 16 a private citizen had noticed a sheen on Darby Creek. It took until June 26 for Sunoco to confirm that the source of the leak was the Point Breeze to Montello pipe. One whole week.

Despite undergoing inspections with in-line tools in 2016, despite Sunoco spending \$30 million in 2016 to upgrade the 12-inch line, the fact is that this pipeline still failed in a high consequence area in 2018. If this had been a week-long natural gas liquids leak instead of gasoline the consequences would have been very different and far more serious. Sunoco’s claim to go “above and beyond” is clearly not guaranteeing the safety of its infrastructure.

Once construction of Mariner East 2 began in 2017, articles started to appear in the news about the Mariner East 2 pipeline. There were reports about damage to private wells from punctured aquifers, water contamination, inadvertent returns, drilling fluid spills, contamination to wetlands and rivers, the list goes on. Sunoco racked up more than 800 state and federal permit violations and fines for Mariner East have now exceeded \$13 million.

I became extremely concerned. I started to do some serious research and spoke with people in the industry. They all told me the same thing. That these highly volatile natural gas liquid

pipelines shouldn't be brought through densely populated high consequence areas and that the HDD was more than likely going to damage my well. I was devastated. The integrity of our well and maintaining the purity of our water was paramount to the health and safety of my family. Two members of my family have seriously compromised immune systems. We were never informed this might happen when we signed the Permanent Easement Agreement in 2015.

We started receiving Horizontal Directional Drilling Reevaluation Reports from the DEP early 2018. Residents were invited to submit comments. February 1st, 2018 I submitted our first comments to Karen Yordy of the DEP as shown in **Fuller Exhibit 3**. I shared my concerns and asked for answers. I received none. The only thing that was addressed was the incorrect distance of our well to the proposed HDD which Sunoco had measured as 490 ft away when it was, in fact, 150 ft away.

Despite all my concerns I expressed about HDD drilling and the impending damage to our well if the HDD went ahead, despite all my written response comments to each Sunoco Horizontal Directional Drilling Reevaluation Report to the DEP, despite my letter to Karen Yordy of the DEP, my letter to Mr. John Hohenstein, P.E. of the DEP as shown in **Fuller exhibit 4**, my third set of Reevaluation Report comments in **Fuller exhibit 5** (comment No. 6), the HDD went ahead along Valley Road for ME2 and ME2X.

In July of 2019, as predicted, our private water well, our sole source of water, suffered major bentonite and quartz contamination and our drinking water major E Coli and fecal coliform contamination along with other “unidentified” contaminants (Fuller Exhibit 6).

My daughter sadly became very sick and had to go to the gastroenterology department of our local hospital. We still have no idea what the “undetermined” contaminant was or is. That was never explained by Sunoco.

I let it be known at the beginning of this project, before the HDD, that two members of my family have seriously compromised immune systems. I asked for a solution to this problem before HDD began because any risk of contamination could be fatal for both. I received no response from either Sunoco or the DEP about my concerns regarding contamination.

Sunoco’s Water Supply Assessment, Preparedness, Prevention and Contingency Plan

(<http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Water%20Supply%20Assessment,%20Preparedness,%20Prevention%20and%20Contingency%20Plan%20w%20appendices%20-%20Revised%20080817.pdf>) outlines the risks HDD poses to private groundwater wells and the risks of inadvertent returns. Point 5.2.1 under “Potential HDD Impacts” clearly states that “While the path of least resistance is typically the bore hole itself, it may instead be an existing fracture ... When this happens ... drilling fluid could enter the groundwater table that could be used by private groundwater wells.” It is unconscionable to think that Sunoco was prepared to take a risk with my family’s health. This is a total disregard of foreseeable consequences and reckless endangerment of life and totally disproves what Sunoco says about “putting safety first” and “being a good neighbor”.

As I started to hear about negative impacts from the Mariner East pipeline project, I also learned that construction had apparently gone ahead without any independent risk assessments having

been carried out. The only risk assessment that had been conducted was apparently by Sunoco but no-one was allowed to see it. We had been placed in danger but didn't know how anything would impact us or what to do in a negative impact situation. All these facts had been kept from us when we signed that Permanent Easement Agreement.

I started to speak out at public meetings – Delaware County Council, Middletown Township, Edgmont Township, concerned citizens meetings, etc.- joining other residents calling for independent risk assessments to be carried out so that we, the residents along the line, understood what dangers we had been placed in. This shouldn't have been our responsibility. This should have been the responsibility of our public officials, the regulatory agencies, our Governor and Sunoco. All those overseeing this construction project should have made sure this was available for the public.

Delaware County Emergency Services Director also told me that the situation with the NGL pipelines would be safer if there was an early warning system along the route of the pipeline to indicate a leak or problem. He mentioned discussing this with Chester County Emergency Services. Why isn't there such a system in place? Sunoco's Supervisory Control and Acquisition (SCADA)-based system doesn't work effectively. This system is supposed to assist with alarms, alerts and volume calculations. Although the SCADA system was operational and fully functional at the time of the April 2015 leak of the old, corroded 12" Point Breeze to Montello on Valley Road where I live, it did not assist with the detection or confirmation of the leak. Neither did Sunoco's Computational Pipeline Monitoring (CPM) System. It, too, was operational and fully functional at the time of the 2015 gasoline leak on Valley Road and did not

assist in the detection of confirmation of the leak. The same applies to the 33,500-gallon leak in Darby Creek last year. The leaks were, in fact, detected by local residents in both cases. They could see and smell the gasoline. This would not be the case in the event of an HVL leak. These highly volatile natural gas liquids have no odor or color.

So, if Sunoco's SCADA and CPM systems are ineffective and if the product has no odor or color ... how is a leak to be detected and how are we protected from danger? I started looking at the history of other leaks, accidents and incidents near me over the last few years on the PHMSA database. Again, I was shocked. I found a long list of leaks, accidents and incidents near me where Sunoco's leak detection systems,- the SCADA-based system and the CPM system - only worked in a few cases.

PHMSA's NPMS Public Viewer shows Sunoco Pipeline and Pipeline Facility

Accidents/Incidents near me in Delaware County, approximately 8 miles down to Marcus Hook and 12 miles across to Darby Creek. By going onto the PHMSA analytics dashboard I was able to pull up the individual accident reports for each accident near me. I started at 2002 and this is what I found:

1. Valley Road, very near me, April 10, 2015, Incident Report No. 20150163, gasoline leak due to corrosion on the old 12" Point Breeze to Montello pipeline. The leak detection systems, both SCADA and CPM, failed. It was under cathodic protection at the time.
2. Incident Report No. 20040090, March 19, 2004, leak due to corrosion. No leak detection equipment. This was at Lima, just a mile from me. The leak was detected by the smell of petroleum in the sewer line.

3. Incident Report No. 20020422, November 16, 2002, cause material, weld, equipment failure at Marcus Hook. Gasoline leak. No leak detection equipment.
4. Incident Report No. 20133006, December 16, 2012, cause material, weld, equipment failure. Marcus Hook. High consequence area. Leak detection failed.
5. Incident Report No. 20090152, May 8, 2009, NRC Report No. 905083, cause material, weld, equipment failure. Aston. HCA. Gasoline odors detected by passing motorists.
6. Incident Report No. 20160192, Aston Twin Oaks Valve Station, May 27, 2016, HVL or other flammable commodity, cause material, weld, equipment failure. HCA. Leak detection system failed.
7. Incident Report No. 20150095, Aston Twin Oaks Pump Station, 2015, leak, cause connection failure. HCA. Leak detection system failed.
8. Incident Report No. 20150145, AGAIN Aston Twin Oaks Pump Station, NRC. Report No. 1111777, product overflow, cause material/weld/equipment failure. HCA. Leak detection system failed.
9. Incident Report No. 20170040, Aston Valve Station, a leak due to a crack. HCA. Leak detection system failed.
10. Incident Report No. 2013, August 19, 2013, Marcus Hook. Refined and/or petroleum leak due to corrosion. HCA. Discovered by operator not leak detection system.
11. Incident Report No. 20030412, October 29, 2003, Aston, Marcus Hook tank. Gasoline leak due to corrosion. No leak detection system.
12. Incident Report No. 20100193, August 5, 2010, NRC Report No. 950024, refined and/or petroleum leak due to material/weld/equipment failure. This report is missing from the PHMSA analytics dashboard.

13. Incident Report No. 20110401, September 26, 2011, NRC Report No. 990838. Marcus Hook Tank Farm. Refined and/or petroleum leak due to cracked valve. No leak detection system in place.
14. Darby Creek Area, Report No. 20020438, February 21, 2002, NRC Report No. 594688, mixed petroleum products, leak due to corrosion on the 12" Point Breeze to Montello. Odors detected by property owner. No leak detection equipment.
15. Darby Creek, Report No. 201802015, NRC Report No. 1215816, June 16, 2018, over 33,500 gallons of gasoline leaked into the Creek. It took 7 days to determine the source of the leak. It was discovered by a private citizen not the leak detection equipment, caused by a crack in the pipe. This is again the same 12" Point Breeze to Montello pipe that runs in front of our home, filled with HVL's, that leaked gasoline on Valley Road in 2015 (undetected) and in West Whiteland Township, Chester County spilling 70,000 gallons in 1987. It was constructed in 1937. This was an HCA. Leak detection system failed.
16. Incident Report No. 20110080, February 8, 2011, Darby Township near the John Heinz National Wildlife Refuge, NRC Report 967232, crude oil spill due to corrosion. SCADA and CPM systems failed to detect the leak although both were operational and functional.
17. Incident Report No. 20030077, February 5, 2003, Darby Creek Tank Farm. Crude oil spill due to corrosion. No leak detection equipment.
18. Darby Creek Tank Farm. Incident Report No. 20050373, November 23, 2005, NRC Report No. 780385, bass river crude oil spill due to incorrect operation.
19. Darby Creek Tank Farm. Incident Report No. 20170036, January 10, 2017, cause of incident corrosion. HCA. Leak detection system failed.

20. Darby Creek Tank Farm. Incident Report No. 20120268, August 19, 2012 Crude oil spill due to corrosion. HCA. Leak detection system failed.

21. Darby Creek Tank Farm. Crude oil leak from crack in valve. Incident Report 20150098-21025. Occurred March 2, 2015. HCA. Leak detection system failed.

This is a snapshot of an abysmal record of accidents and equipment failure which can be found on PHMSA's NPMS Public viewer site. I have many more examples – too numerous to mention here. Existing regulations should be revised and stepped up in order to keep us all safe. The facts and the statistics show that the current level of leaks, violations, sinkholes, private well contaminations, incidents and accidents is too high and that therefore our health and safety cannot be guaranteed.

The failure of Sunoco's SCADA and CPM leak detection systems must be addressed in order to prevent future leaks.

Lawmakers must immediately address the gaps in existing law that have prevented the executive and independent agencies charged with protecting public health, safety and the environment from doing their job. The inability of these agencies to be able to do that has placed the general public in an extremely vulnerable and dangerous position.

During a February 21, 2019 Energy Transfer quarterly earnings conference call, Energy Transfer's chief executive, Kelcy Warren, admitted "We've made mistakes and we are correcting

those mistakes and will not make those mistakes again”. He acknowledged the problems the Mariner East project has faced in Pennsylvania. However, the mistakes continue.

In his August 2nd, 2018 quarterly earnings conference call Kelcy Warren joked that “A monkey could make money in this business right now.” This is hardly the mission statement of a public utility. Making a corporate profit should not be at the expense of people’s health, safety and property or by exploiting those unable to defend or protect their right to clean air and water.

Despite being told by Sunoco that there was "no risk" we have suffered greatly:

- Our daughter had to be admitted to hospital due to the E Coli and fecal coliform contamination.
- Our well and water incurred "major" contamination according to Sunoco's and the DEP's test results.
- We now have to abandon our well and disclose these facts on our Seller's Disclosures if ever we wish to sell, which we cannot just now.
- Our internal plumbing lines have to be replaced due to heavy sediment throughout the entire house, along with plumbing fixtures, appliances, water heater, etc.
- Our water supply, for the last 17 months, has been heavy 5-gallon containers which I have to haul into the house on a regular basis, despite having suffered a semi-herniated disc.
- Our plumbing malfunctions day and night, causing us sleepless nights and continual stress. We can no longer use one of the showers.
- Prior to COVID we could not have family come to stay due to our living conditions.

The bentonite mix contains category 1A a human carcinogen. We have no idea what danger we have been exposed to by the crystalline silica in our water vapor. Can this be inhaled in the shower? Neither the DEP nor the DOH has supplied an answer to that question despite my emails (**Fuller Exhibit 7**) Were we exposed to the crystalline silica dust in the park during HDD activities while all the workers were wearing PPE and taking precautionary measures as per OSHA guidelines.

To summarize, I submitted public comments to all 3 DEP HDD Reevaluation Report public comment periods, with concerns about what may happen to us and highlighted the fact that insufficient in-depth geophysical studies had been carried out prior to commencement of construction. I was right. Our well was contaminated and we suffered 4 sinkholes a half a mile from our home.

Now we are seeing more sinkholes appearing in Exton, despite further geophysical surveys, which is why I requested to see the Rettew Geophysical Survey for Valley Road. This Mariner East construction immediately impacts our home which has already been damaged by Sunoco's HDD activities.

In addition to the well contamination and the sinkholes, we suffered 3 inadvertent returns on Valley Road, spilling industrial waste into our groundwater and potentially all our wells.

The PA DEP's Mission Statement is "**to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner**

environment. We will work as partners with individuals, organizations, governments and businesses to prevent pollution and restore our natural resources". In view of all that has occurred with Sunoco's Mariner East project, I ask myself whether the DEP has lived up to this mission statement with regards to the health and safety of Pennsylvanians.

Article 1, Section 27 of the Pennsylvania Constitution, states:

"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."

It seems to me that one of our basic rights has been taken away from us.

To summarize:

October 1, 2015 we were presented with a Permanent Easement Agreement. We were told by the Percheron Field Services agent, contracted by Sunoco that there would be "no risk and that we wouldn't even know they were there." This proved not to be true. We were also told that we really had no choice but to sign it because otherwise Sunoco could exercise eminent domain due to their public utility certification, even though this project was primarily for the export of ethane used in the manufacture of plastic.

We signed the document in good faith. There were no written or verbal communications from Sunoco to notify us of the potential adverse impacts to our well caused by Sunoco's horizontal directional drilling (HDD).

However, after signing this document we found out that there were, indeed, risks to our well and water. These are highlighted in the following documents (which provide for the Chapter 102 and Chapter 105 DEP Permits) which were produced after we signed the Permanent Easement Agreement. For example,

1. Sunoco's **Water Supply Plan (full name, Water Supply Assessment, Preparedness, Prevention and Contingency Plan)** appeared **December 2, 2016. It was revised February 6, 2017 and August 8, 2017.** ([Plan for Minimization of Environmental Impact from HDD Drilling Fluids \(cleanair.org\)](#)). See risk to private water supplies on page 5, section 5.2.1. Page 3, Section 5.0 "Risk Assessment", states "Public and private water supplies may be impacted by hazardous material spills ..."

2. Sunoco's **Operations Plan** for the Pennsylvania Pipeline Project, dated **January 2018**, page 16, Section 4.3.3. "If any impact to a private water supply attributable to pipeline construction is identified after post-construction sampling, SPLP will restore or replace the impacted water supply to the satisfaction of the private water supply owner".

3. Sunoco's **HDD Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan**, see page 18, Section 6.6. "Special Water Supply Procedures", dated **December 2, 2016, revised February 6, 2018** ([HDD Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan - revised 2-6-18.pd.pdf \(state.pa.us\)](#)) See also Section 5.1.2. "Water Supply Protection".

These documents were not available to us when we signed the Permanent Easement Agreement in 2015. These documents clearly show there was a risk to our water supply. These documents state that a negative impact situation must be resolved to OUR (the impacted well owner) satisfaction in order to comply with the Chapter 105 and 102 permits.

When **construction of Mariner East 2 began in 2017** reports of negative impacts to private water wells and sinkholes on private property started to hit the headlines. On Lisa Drive in Exton, families were forced to permanently abandon their homes due to sinkholes.

This is an important letter (**May 21, 2018**) from Energy Transfer's Larry Gremminger (V.P. Environmental) in response to public comments regarding the DEP's Reevaluation Report. He makes several comments about potential risks and impacts that we were never warned about:

[http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/HDD_R
evaluation_Reports/Sunoco_Response/Sunoco%27s%20Response%20to%20DEP%20-%205-
21-18%20-%20Valley%20Road%20Crossing.pdf](http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/HDD_R
evaluation_Reports/Sunoco_Response/Sunoco%27s%20Response%20to%20DEP%20-%205-
21-18%20-%20Valley%20Road%20Crossing.pdf)

Page 17, Point 27, concerns our well and the fact that Sunoco measured it as being 490 ft from the HDD, not the 150 ft away that it actually is.

Page 19, half way down "The best means to protect a water well during the HDD is non-use". We were never told this.

And again, in the event of a negative impact, the resolution must be "to the satisfaction of the private water supply owner".

July 2019 our well and water was contaminated with Sunoco's carcinogenic bantonite mix, Cetco Super Gel-X. **We are still showering in this water after 17 months**, despite medical letters alerting "to whom it may concern" that family members with severely compromised immune systems should not be exposed to any water contaminants.

An exhibit from the recent Environmental Hearing Board meeting between Sunoco and the DEP. This is how many wells are still impacted and issues unresolved.

The major problems we have faced:

1. A lack of truth and transparency about potential impacts to our water from both Sunoco and the DEP before HDD activities began.
2. The inability of our Sunoco ROW agents to interpret water testing results and answer questions. They are not qualified to carry this out which is totally unfair to well owners and means we do not get the answers we are looking for.
3. Not being told what the “undetermined” contaminant was.
4. The lack of answers from the DEP to questions/concerns raised in our DEP HDD Reevaluation Public Comments to the DEP about risk to private wells, the need for further geophysical studies to mitigate negative impacts, the question of what legal help or resources are available to us in the event of negative impacts, the need for hydrogeological testing, etc. The Public Comments become a meaningless formality.
5. The inability to test for bentonite in our area or to get support/help for testing. Our results came back from Sunoco with “major” bentonite contamination but other well owners outside of the 450 ft limit were unable to test for bentonite themselves.
6. The cost of undertaking our own water tests repeatedly were prohibitive.
7. The Sunoco water tests fail miserably with poor Chain of Custody (all tests marked “pre-construction”), no Maximum Contamination Levels, revisions with no explanations, and no clarification of results. No help from the DEP here either. Well owners are left clueless.

8. The denial by the Township to see the Rettew geophysical survey of our road after all the sinkholes we experienced.
9. Sunoco's refusal to settle our water contamination issues to our satisfaction despite the conditions of the permits insisting on this.
10. The fact that no independent risk assessment was made available to the public prior to us signing the Permanent Agreement.
11. No potable water for 17 months
12. Having to haul huge containers of water into the house every two weeks.
13. Having to bathe in contaminated water for 17 months.
14. Being offered a temporary (no definition of time) water supply with a water buffalo for which there was no protection agreement for us, the well owner, in the event of any damage to our well, well pump, plumbing or appliances.
15. The promises made by Sunoco's ROW agent that the water buffalos would only be installed by qualified professionals and that they would acquire the necessary permits. Samantha Reiner, the zoning officer for Edgmont Township, tells a different story **(Fuller Exhibit 8)**.
16. Not receiving any response or update to a drilling fluid spill on Valley Road on June 20, 2019, after informing the DEP Emergency hotline and registering the complaint with Rex Miller. The drilling fluids entered a tributary to the Rocky Run right next to our home (I have photos and video which I showed Sunoco).
17. Suffering 3 inadvertent returns on Valley Road
18. Suffering 4 sinkholes a half a mile from our home
19. Suffering well contamination and living from bottled water for 17 months

20. The damage to our property, our plumbing, our appliances.
21. The fact that our daughter became seriously ill after E Coli and fecal coliform contamination.
22. That informing the DEP of two family members with severely compromised immune systems made absolutely no difference to our risk of contamination.
23. That our nearby Sleighton Park is no longer a recreational pleasure but an eyesore and depressing daily reminder of what has happened to us.
24. The high volume of construction traffic related to the construction of the pipeline.
25. The dirt, the noise, the dust, the overhead helicopters and planes, etc.
26. The fact that we fear for our safety, our health and our lives.
27. The fact that we have had to live like this for years and the anxiety and depression this has caused our family.
28. Feeling bullied to accept a resolution agreement from Sunoco that was not to our satisfaction, despite the permit conditions.
29. The fear that this will all happen again as soon as the HDD activities for the 20-inch ME2 pipe commence.
30. The loss of value to our property, our main asset for which my husband has worked hard for all his life. Our home has been semi-destroyed by this project which has impacted the quality of life for this family.
31. The fact that well owners in Pennsylvania have no representation and no protection.
32. The fact that there is no siting authority for pipelines like this, so they can pass through densely populated high consequence areas, within feet of people's homes, damaging their properties, their wells, exposing residents to carcinogenic dust, preventing night workers

from sleeping during the day, destroying the local environment, causing stress, anxiety and depression to all those who have been forced to live with the construction.

I believe that all the regulatory agencies – PHMSA, the PA PUC and the PA DEP have all been overwhelmed by the Mariner East 2 pipeline project. The number of negative impacts, construction delays, “willful and egregious violations” (in the words of the DEP), contaminated private wells, sinkholes, drilling modifications, damage to private property, construction and safety concerns, and lawsuits filed against Sunoco, etc., have placed intense pressure on these agencies to address a multitude of issues and concerns. They do not have the personnel, the funding or the resources to deal with this. This has to change otherwise Pennsylvanians impacted by a project like this will not receive the help, the protection or the support they need. They will simply end up being the collateral damage. **Fuller Exhibit 11** shows the outstanding number of well supply issues as of Sept. 30, 2020.

My friend, Erica Tarr, in neighboring Edgmont Township, lives in an area contaminated by previous Sunoco gasoline leaks (1988, 1992 and 2015). She is in what is known as an area of legacy pollution. She believes her well was impacted by Sunoco’s Mariner East HDD activities. The inadvertent return at HDD #570 June 2019, required weeks of vacuum trucks continually sucking up the groundwater, introduced previous spill contaminants into her water (**Fuller Exhibit 9**). Since she is beyond the 450 ft boundary for Sunoco’s water testing she would need to do all the hydrogeological studies herself. The cost is prohibitive. The DEP is aware of her story and of the previous leaks. However, Rick Staron (DEP) told her that they do not have the resources or the funding to help. This is unfair. This contamination impacted numerous residents in the Township. Some have moved out. Some have installed whole house reverse

osmosis systems and UV lights to kill off bacteria. All at their own cost. Erica and her family have spent over \$40,000 trying to resolve this but to no avail. The reality is that drilling a new well won't solve the problem. Even soil remediation cannot eradicate the damage to the groundwater below. There is no access to public water and this is what the people need. They need help and funding to make this happen. This is the kind of environmental issue that needs to be addressed in A People's Budget. Everyone should have a right to clean water.

In order to enforce regulations the regulatory agencies need to be well staffed. They need to have the right resources and equipment to conduct inspections and investigations to ensure that companies are complying with the law.

More funding needs to be made available for universities and colleges with grants for scientific research. An example is the West Chester University Water Quality Research Initiative (**Fuller Exhibit 10**)

More funding needs to be available for environmental justice where victims of contamination do not have the financial resources to seek justice from corporate polluters.

Drinking water, whether public or private well water, needs to be regularly monitored, tested and remediated if necessary. The location of all private wells should be in a data base.

More funding needs to be available for clean-up projects or the creation of infrastructure, like public water, at those sites where clean-up is no longer an option, like Edgmont Township.

Funding helps ensure financial support for water infrastructure improvements and safe drinking water programs.

Funding is required to provide the science and technology needed to effectively respond to, and recover from, intentional or accidental environmental catastrophes.

We have suffered 3 Sunoco pipeline gasoline leaks in our neighborhood. Just one gallon of gasoline can contaminate 750,000 gallons of water. We have suffered 3 inadvertent returns on Valley Road. HDD bentonite industrial drilling fluids have contaminated dozens of private wells. People have become sick. This is not acceptable and must be challenged and rectified.

Submitted by Rosemary Fuller, February 22, 2020

DEP Permit # E23-524
DEP Permit HDD Reference # PA-DE-0046.0000-RD
DEP HDD # S3-0591
Township – Middletown
County - Delaware
HDD Site Name – Valley Road Crossing

1st Public Comment Period

Commentator ID #	Name and Address	Affiliation
1	Marion Yaglinski Media, PA	
2	Gene Lo Conte	
3	Raymond Weinmann 327 Forge Road Glen Mills, PA 19342	
4	Rosemary and Gordon Fuller 226 Valley Road Media, PA 19063	
5	Ira Dunoff 1005 Birchwood Lane Glen Mills, PA 19342	
6	Beth and Frank Revenis 157 Valley Road Media, PA 19063	
7	Jane McBride Glen Mills, PA	
8	Melissa Marshall, Esq. P.O. Box 408 1414-B Indian Creek Valley Road Melcroft, PA 15462	Mountain Watershed Association
9	Aaron J. Stemplewicz, Esq. 925 Canal Street 7 th Floor, Suite 3 Bristol, PA 19007	Delaware Riverkeeper Network
10	Joseph Otis Minott, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
11	Alexander G. Bomstein, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
12	Kathryn L. Urbanowicz, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
13	George Alexander Media, PA	

1. Comment

I am outraged that these two hazardous liquids pipelines were allowed in a highly populated area close to schools, businesses and in the backyards of homes. Everyone living in the explosion/blast zones of these pipelines are in danger. This project should NEVER have been approved. It needs to be shut down permanently. Sunoco has the WORST safety record in the industry. It is a morally bankrupt company that puts its own profit above the residents of PA. (1)

2. Comment

I support Mariner 2 east. These people who object are just mis informed and bored. (2)

3. Comment

My family lives in a home located at 327 Forge Road in Glen Mills, Pennsylvania.

We, and every neighbor I speak to, strongly disagree with this project. The dishonest manner in which the project was revealed to the public is striking. I won't get into that.

My dire concern is the clear and omnipresent danger this pipeline would pose to our community. We can all agree there is an existing pipeline in our community that has operated safely. However, the M2E pipeline is different. It brings to our community a unique catastrophic risk due to the enhanced pressure of this line. The thought that anyone could unknowingly ignite a vapor cloud at any time, is horrifying. With this pipeline, ETP/Sunoco has essentially usurped the safety and well-being of Pennsylvania's citizens. When deciding live here, we did not agree to this risk.

Finally, the pipeline runs beneath a popular youth soccer facility in the Sleighton Park. One mile away from this park there is a large quarry operation that regularly detonates explosives to produce crushed stone product. Homes a mile away, like ours, feel our homes shake whenever the detonation occurs. I have read that these blast-induced seismic wave transmission stresses can be cushioned by back-fill soil in the case of trenched pipe. However, this is not the case with pipe that is laboriously bored in place. Nobody from ETP/Sunoco can guarantee the safety of this project. Money is money. Lives are lives. Please do what is right and mothball this time-bomb. Accountability must start now. (3)

4. Comment

We are submitting these questions and comments, as requested, in response to the January 24, 2018 correspondence received from Sunoco Pipeline L.P., regarding the proposed horizontal directional drilling (HDD) required to advance their Mariner East 2 Pipeline Project. Please note that we are submitting these comments as laypeople, unfamiliar with the technical terms, details and scientific/engineering knowledge required for a project of this scale and complexity – as used in the report – and as homeowners whose private well is located within 150-200 feet (not the 490 feet as specified in the report) of the proposed drilling area based upon the engineering plans provided. On the Well Location Map our well is marked as WL-08102017-604-01

and from the scale of the map can be seen to be approximately 150 feet from the proposed HDD. We measured this ourselves to confirm the mistake by Sunoco. Additionally, our son has T1D (Type 1 diabetes) which, unlike type 2 diabetes (a metabolic disorder), is an incurable, life-threatening auto-immune disease. This results in him having a weakened immune system, making the supply of fresh, clean, potable water necessary to his continued health and wellbeing.

As mentioned previously, our private well is located approximately 150 feet from the proposed pipeline not 490 feet as incorrectly stated on the Well Location Map in the report. For the public record please note that our well is 150 feet deep with the pump set at 100 feet, according to our well company, Powell Pump and Well Drilling of Aston, Pa. Based upon our interpretation of the proposed engineering drawings, our well and pump is within the drilling zone. This clearly causes us some concern when reviewing the discussion regarding inadvertent returns (or IR's as identified by Sunoco) regarding groundwater management. My review of the geological information provided concludes that our groundwater is likely originating from within the "fractures and joints that provide secondary porosity in bedrock". The report mentions that the potential exists that "turbid water ... or dilute drilling fluids" may be "discharged to the waters of the Commonwealth" and that Sunoco DOES anticipate that "HDD activities could affect individual well use during active drilling for wells located within 150 linear feet" of the HDD, which would include OUR private well.

Additionally, the information provided by Sunoco indicated that "drilling fluids under pressure migrated into open fractures at depth within bedrock and traveled to the surface" ... and "these discharges, if large enough, can affect the local water table and possibly affect domestic water supply yields".

Our concerns are further confirmed by the development of a "contingency plan" to address these potential technical issues. Given this technical information we must conclude that this drilling WILL affect the quality and potentially quantity of water within our private well. This begs the question regarding what safeguards will be employed to protect the quality of our private well and resulting groundwater? Additionally, what recourse does my family have WHEN, not IF the quality of my water is impacted by this drilling program, based upon our interpretation of the information provided? That is not specified or clearly stated within this Sunoco Report.

The document further mentions establishing "a communication and response plan to respond to complaints from well owners during HDD activities upon confirmation of any impact from drilling operations and provide alternative water supplies where needed (page 10, point 2). Isn't this like the proverbial closing of the stable door after the horse has bolted? As mentioned previously, our son has a weakened immune system and cannot tolerate any potential contamination or reduction of quality to our water. Additionally, it is not clear what constitutes "alternative water supply" and how this would impact our quality of life, let alone our property value. Please define the State's approach to this process, understanding that our interpretation of the proposed plan is that any water quality impacts will be mitigated or addressed after

they have been identified. We are formally noting on the record that a plastic tank or bottled water is NOT acceptable to us given our concern for the health and wellbeing of our son.

Although not germane to this technical discussion, it is not clear what legal recourse we have should this drilling activity impact our well. We understand that our well is likely constructed within some type of fractured rock. The Sunoco document mentions the use of drilling fluids and grout which, it appears to us as laymen, are designed to be injected into the rock to impede any lost water, which, in our minds, could dry within the fractures providing water to our well, potentially affecting the quantity and quality of water that is provided by our well.

It is also not clear what health risk is associated with this drilling process, let alone the material that may be transported within and through the pipelines. We have seen news reports from other areas where there have been fires, explosions and other issues associated with this drilling methodology and gas/oil transport. We would like to understand what safety measures are being employed to protect the health and safety of our family and neighbors, as that is not clearly stated or discussed. (4)
Letter – [Rosemary and Gordon Fuller](#)

5. Comment

In addition to the certified first-class letter we sent you on February 1, 2018, we would also like to email you our questions and comments, as requested, in response to the January 24, 2018 correspondence received from Sunoco Pipeline L.P., regarding the proposed horizontal directional drilling (HDD) required to advance their Mariner East 2 Pipeline Project. As you may be aware, Sunoco has filed revised construction plans for two stretches of the Dragonpipe (Mariner East 2) and there is a public comment period ending on February 6, 2018. One of the two stretches with revised construction plans is in Chester County and the other is in Delaware County, along Valley Road, south of Sleighton Park, which is where we live (No. 226).

Please note that we are submitting these comments as laypeople, unfamiliar with the technical terms, details and scientific/engineering knowledge required for a project of this scale and complexity – as used in the report – and as homeowners whose private well is located within 150-200 feet (not the 490 feet as specified in the report) of the proposed drilling area based upon the engineering plans provided. On the Well Location Map our well is marked as WL-08102017-604-01 and from the scale of the map can be seen to be approximately 150 feet from the proposed HDD. We measured this ourselves to confirm the mistake by Sunoco. Additionally, our son has T1D (Type 1 diabetes) which, unlike type 2 diabetes (a metabolic disorder), is an incurable, life-threatening auto-immune disease. This results in him having a weakened immune system, making the supply of fresh, clean, potable water necessary to his continued health and wellbeing.

There are several things that we find troubling about these plans, but we are most perturbed by the cavalier attitude that Sunoco are taking toward local wells and aquifers.

FULLER EXHIBIT 4

**DEP HDD REEVALUATION REPORT
2ND PUBLIC COMMENT PERIOD
HDD #S3-0591 VALLEY ROAD CROSSING**

DEP Permit # E23-524
DEP Permit HDD Reference # PA-DE-0046.0000-RD
DEP HDD # S3-0591
Township – Middletown
County - Delaware
HDD Site Name – Valley Road Crossing

2nd Public Comment Period

Commentator ID #	Name and Address	Affiliation
1	Margaret Quinn 503 Carmarthen Drive Exton, PA 19341	
2	Lora Snyder Edgmont Resident	
3	Linda Yu Edgmont Township Home Owner	
4	George Alexander Media, PA	
5	Melissa Marshall, Esq. P.O. Box 408 1414-B Indian Creek Valley Road Melcroft, PA 15462	Mountain Watershed Association
6	Aaron J. Stemplewicz, Esq. 925 Canal Street 7 th Floor, Suite 3 Bristol, PA 19007	Delaware Riverkeeper Network
7	Joseph Otis Minott, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
8	Alexander G. Bomstein, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
9	Kathryn L. Urbanowicz, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
10	Judith Kay McClintock 1601 Harvey Road Ardentown, DE 19810	
11	Marcia Gentry 211 Locust Lane Exton, PA 19341	
12	Rosemary Fuller 226 Vally Road Media, PA 19063	
13	Catherine Moran	

5 {

6-

7-

8-

The DEP messed up the commentator ID numbers.
I am #8 not 12.
#₅ 5-9 = 5.

The DEP has the power to revoke Sunoco's drilling permits, and now is the time to begin applying that leverage.

I live in the state of Delaware, but only 5 miles from the Mariner pipelines' endpoint, Marcus Hook. This is why I care deeply about what happens in nearby Pennsylvania. Thank you very much for reading and considering my views. (10)

7. Comment

I want to encourage the DEP to INSIST that Sunoco follow its stipulations for safety, not simply acknowledge them. Sunoco has played fast & loose with the safety and environment in our neighborhoods. Once our environment is ruined, it is not easily restored. It is clear that Sunoco, in its greed will do as little as possible to save money. Our neighborhoods demand more than that! Please defend our environment-insist on thorough geophysical studies, 20 foot pipe liners and constant monitoring of water purity. Bentonite drilling mud is often contaminated with lead. PLEASE PROTECT US, OUR CHILDREN AND OUR ENVIRONMENT. NEVER assume that Sunoco has the best interest of our environments at heart. Past experience teaches us NOT to trust them! (11)

8. Comment

I am submitting our comments in response to Sunoco's letter to you, dated May 21, 2018, in response to your March 23, 2018 letter, requesting further information from Sunoco on the above-referenced horizontal directional drilling.

First, I would like to express our disappointment that, in the spirit of transparency and cooperation, this letter from Sunoco was not sent out to all the residents impacted by Sunoco's HDD along Valley Road. Had it not been for an accidental glance at the DEP's website, we would never have known this letter had been sent out to you, thereby losing the opportunity – as those directly impacted by this drilling – to express our comments on Sunoco's responses. It also only gives a 5-day period to respond which is not enough time. We all received the original Reevaluation Report so why not the second? This change in communication means Sunoco can make comments to the DEP without giving residents adequate chance to counter-respond. In other words, this part of the reevaluation process gives Sunoco an advantage.

After reading Sunoco's responses to your March 23 letter, it becomes immediately apparent that Sunoco is attempting to ignore the Department's requests on a variety of issues using the argument that what they are doing is "more than adequate", that the DEP's requests are "not needed" or Sunoco simply does not commit to the request. This leaves the residents watching this process wondering who the regulatory authority is ... Sunoco or the Department of Protection? Surely the requests made by the DEP have some purpose that needs to be met, otherwise the requests would not have been made in the first place? For Sunoco to simply not agree to those requests is tantamount to non-compliance which should result in the DEP revoking the drilling permits. The DEP has been tasked with overseeing this construction in the manner it deems necessary in agreement with its mission. It has the authority to insist on those

standards of construction being carried out. It has the authority to revoke permits if those standards and requirements are not met.

These are some examples of Sunoco's non-compliance with the DEP's requests:

1. On page 1, the DEP says that "surface geophysics should be employed to provide evidence of the top of bedrock along the whole run...". Sunoco refuses to do these tests, saying "the five geotechnical bores provide more than adequate information."

I disagree with Sunoco and agree with the DEP for the following reasons:

Typically, pipeline engineers and horizontal drillers will have the same four questions:

- At what depth is the top of bedrock?
- What lithology is the overburden?
- What lithology is the bedrock?
- Is bedrock fractured?

Irregular bedrock relief may lead to the horizontal drill intersecting overburden. Should bedrock be too deep, horizontal drilling may be impractical. Granular overburden creates challenges for mud containment. Highly permeable bedrock may offer no better containment than granular overburden. Similarly, highly fractured or karsted bedrock may create high permeability zones in lithologies that normally have very low hydraulic conductivities.

While most geophysical methods may offer some insight into answering the above four questions, four methods are particularly useful, and are routinely applied. These include electrical resistivity tomography (ERT), seismic refraction, ground penetrating radar (GPR), in addition to borehole geophysics.

In view of all the problems with Sunoco's drilling to date, we, as residents who will be directly impacted by Sunoco's HDD, also insist, along with the DEP, that complete and comprehensive surface and near-surface geophysics be applied to this construction to prevent the negative incidents of the past being repeated.

2. On page 3, the DEP requests a plan for monitoring wells along the HDD. The response is that Sunoco "implements regular monitoring of adjacent water wells", but it does not say what "regular" means nor does it agree to provide a plan.

On the subject of monitoring water wells along the HDD I am saddened and, quite honestly, astounded at Sunoco's response. That wells will be "regularly monitored" tells us nothing!

The history of Sunoco contaminating water wells along the 350-mile path of ME2 is there for all to see. I would have thought they would want to do everything in their power to monitor well contamination continuously. Sunoco states it implements

“regular” monitoring. It was only the end of 2017 that it became apparent to us that there truly was a risk to our private water well being contaminated. Our sole source of water. We have a child with an incurable auto-immune disease. We cannot take even the slightest risk of water contamination.

At this point I contacted Percheron Field Services to discuss my concerns. Despite numerous promises to get back to me “asap” after speaking with “upper management” my concerns were never addressed. I never heard back from Sunoco until 6 months later (in the form of an email), when I was informed that there was no contract or agreement to sign for the “temporary” water supply they were offering. My actual fears were never addressed. No-one ever picked up the phone to talk to me. Is that the behavior of a company that has been granted public utility status? I don’t believe so. Sunoco should have that status removed.

So, of ALL the areas that should have a plan for monitoring wells, this should be it. Why? Because in 2015, a gasoline pipeline leak was discovered at the junction of Valley Road and Gradyville Road which we were never informed of. Sunoco’s sophisticated “leak detection system” which they promise will keep us safe with these highly volatile NGL’s, had failed to detect the leak. It was a passerby that noticed it and no-one knows how long it had been leaking. The result was that the gasoline additive, MTBE, leaked into local water wells – again, something Sunoco never told us. MTBE is water soluble so it can travel through an aquifer and affect other areas. It’s not clear what the health implications are but my family is not prepared to take that risk. For these reasons alone, I say NO to further HDD by Sunoco. This area is still highly contaminated (according to PHMSA) and HDD along Valley Road will only serve to spread Sunoco’s previous contamination of our water.

Reasons why pre-drilling, during drilling and post-drilling water monitoring are important:

- Soils can be excavated or eroded, disturbed and compacted, or contaminated, which can impact water quality or flow patterns.
- Geology and topography can be altered, leading to landslides and increased sedimentation.
- Water quality and quantity can be impacted by sedimentation from erosion and excavation.
- Herbicides used to manage vegetation growth on the pipeline right-of-way may contaminate water resources.
- Fish and macroinvertebrate habitat quality may be diminished by removal of vegetation, disturbance of substrate, grading of the channel, and placement of structures.
- Grading could alter surface and groundwater flow due to an increase in fractures.
- Exposed geology could erode and leach acid, poisons such as arsenic, metals and previous pipeline leak products such as MBTE (near us) and others.

And it all affect us, the residents living on their private properties along the line of Sunoco’s pipeline construction.

For all these reasons, we need to know EXACTLY what form of well monitoring Sunoco proposes to use and what EXACTLY Sunoco's plan is. "Regularly" means nothing.

3. On page 4, the DEP says that "specific points of potential weak bedrock and soils were not individually identified. This should be done." Sunoco responds that this is not needed because the driller will know when weak spots are encountered by monitoring the pressure of the drilling mud.

This response by Sunoco is totally unacceptable and leaves me wondering if they really know what they're doing. In fact, the wake of destruction, devastation and damage Sunoco has left behind for homeowners in the form of contaminated wells, sink holes, house evacuations, flooding in basements due to compacted soil around the pipeline and a multitude of negative impact incidents only serves to convince me they don't.

Pipeline design, pipe jacking, directional drilling and foundation studies require detailed subsurface soil and bedrock testing. To properly identify specific points of potential weak bedrock and soils, Sunoco needs to fill in the gaps between borings with geophysical seismic refraction, electrical resistivity and GPR data to provide a continuous soil and bedrock profile between borings and minimizing the risk of missing a costly subsurface anomaly. How is it that Sunoco is unwilling to do this? Permits should be declined.

4. On page 6, the DEP asks Sunoco to address the possibility of IRs ("inadvertent returns", or frac-outs) where there is weak soil. Sunoco talks about the possibility that drillers could use minimum drilling-mud pressure in such locations, but does not commit to requiring drillers to do that.

Well, they should. The drilling fluid usually escapes the borehole due to a fissure in the soil. The drilling fluid is under some pressure produced by an injection pump at the HDD rig as well as head pressure from the weight of the fluid itself in the borehole. In addition to potential negative impacts on the wetland (opposite us and further down Valley Road adjacent to Wawa University) the drilling fluid is considered a contaminant or a "dredged or fill material" as defined by Section 404(b)(1) of the United States Federal Clean Water Act. Deposition of the drilling fluid in the wetland is a violation of the wetland-crossing permit. As such, every effort must be made to minimize the release of drilling fluid. Furthermore, when drilling fluid is released a great deal of effort must be put into evaluating the situation, containing the released drilling fluid and ultimately remediating the location, if appropriate. Frac-outs are more common in soil types that contain preferential liquid flow paths, such as gravel or cobble deposits, and are less common in soils that are homogeneous, such as pure sand or clay deposits. Another factor in frac-outs is the depth of the HDD. The deeper the crossing the lower the likelihood of experiencing frac-outs. The likelihood of a frac-out is also increased if either the entry or exit point is significantly different in elevation. In this case, the head pressure is increased at the lowest elevation - usually the wetland or other sensitive receptor you are attempting

to avoid. Another major factor in some frac-outs is the pressure exerted on the drilling fluid by the HDD rigs hydraulic system (Reid et al, 1998.). If the pressure produced by the HDD rig is excessive it may force fluid through the soil profile, even consolidated or homogeneous soils, eventually breaking through to the ground surface. The importance of having a regulatory approved contingency plan is imperative. While no plan can foresee all contingencies the mere fact that a plan exists will provide the regulators, contractor and the company with assurances that the possibility of a frac-out has been considered and response actions considered, to the extent possible. For this reason, Sunoco must commit to requiring drillers using minimum drilling mud pressure in such locations and, if necessary, have the drilling overseen by the regulatory agency.

5. On page 7, the DEP asks how Sunoco will deal with groundwater emerging at the HDD site if its grouting plan for plugging the HDD hole is inadequate. Sunoco responds that it has “not had a failure” of this kind on the ME2 project.

But there was such a failure at the Shoen Road site last summer, and it has yet to be fixed. The groundwater is not emerging through the bore hole, but it is emerging on a property across the road. Sunoco needs a better answer.

6. On page 8, the DEP asks Sunoco to notify the Department during critical drilling phases so that “DEP regional staff will be provided with adequate advance notice to allow DEP staff to be present” in case there is groundwater following back to the borehole. Sunoco refuses, saying only that it will provide the DEP with “advance notice of commencing all HDDs, project wide”.

Sunoco once again, being non-compliant with the DEP’s requests. Sunoco **MUST** allow DEP inspectors to be present during critical drilling phases. In view of the long list of drilling catastrophes, Sunoco’s refusal is once again tantamount to non-compliance and therefore permits should be revoked.

7. On page 11, the DEP says that, given the frac-out problems in the past, drilling contractors should be required to use a casing (i.e. a pipe liner) in the pilot hole at the entry and exit points. Sunoco refuses, saying that its HDD plan for this site doesn’t require it.

I wonder why. Contractors often use a short section of casing that is ‘dug in’ at the start of construction. This casing is intended to prevent inadvertent near-surface returns, and allows for easy monitoring of drilling mud return levels. Where unconsolidated deposits represent a risk of inadvertent returns on the entry side, the casing may need to be more extensive. Wouldn’t you think Sunoco would want to take the ultimate precautions to avoid any more future problems? It seems to me that Sunoco is taking shortcuts wherever it can at our expense. Non-compliance must result in revoking permits.

On page 13, the DEP again requests geophysical studies to determine where the bedrock is, to identify soft soils, and finding rock fractures. Sunoco refuses, saying these studies “will provide no functional data” at this location.

How can they possibly refuse when we know that Sunoco's statement is simply not true. As stated previously, pipeline engineers and horizontal drillers will have the same four questions:

- At what depth is the top of bedrock?
- What lithology is the overburden?
- What lithology is the bedrock?
- Is bedrock fractured?

Irregular bedrock relief may lead to the horizontal drill intersecting overburden. Should bedrock be too deep, horizontal drilling may be impractical. Granular overburden creates challenges for mud containment. Highly permeable bedrock may offer no better containment than granular overburden. Similarly, highly fractured or karsted bedrock may create high permeability zones in lithologies that normally have very low hydraulic conductivities.

While most geophysical methods may offer some insight into answering the above four questions, four methods are particularly useful, and are routinely applied. These include electrical resistivity tomography (ERT), seismic refraction, ground penetrating radar (GPR), in addition to borehole geophysics.

In view of all the problems with Sunoco's drilling to date, we, as residents who will be directly impacted by Sunoco's HDD, also insist, along with the DEP, that complete and comprehensive surface and near-surface geophysics be applied to this construction to prevent the negative incidents of the past being repeated.

8. On page 13, the DEP asks Sunoco for "well depths, casing depths, and water-level depths (based on a water-level survey)" on the cross-section diagrams of the HDD. Sunoco claims to have done this, but no water-level survey was apparently done. As far as I can see, the water levels shown in the cross sections are only those encountered in Sunoco's five boreholes, not in local wells. And in the list of 32 private wells given in Attachment 1, 30 of them have a water level of "unknown".

Sunoco's incorrect and insufficient data for private wells once again highlights the company's incompetence.

Sunoco had our well tested and measured. The measurement from the proposed HDD was totally and startlingly incorrect. They measure 490 ft instead of 150 ft from the proposed HDD. Mention of this correction is mentioned as item 27 in Sunoco's letter to which we are responding. I also informed them of the depth of the well and the depth of the well pump. Why are they not recording the correct information and how can they be allowed to proceed with simple mistakes like this and insufficient data of private wells? This also totally highlights the lack of interest or concern for people's private water wells which are mostly their sole water sources, as in our case. Our wells do not appear to be a high priority on their data collection list. This HAS to change.

9. On page 16, the DEP recommends that Sunoco use 20 feet of grouting (instead of the 15 feet in its plan) when plugging to stop groundwater flow. Sunoco's response is a curt "[Sunoco] appreciates the Department's recommendation." It will clearly be ignored.

We do not need Sunoco to appreciate a recommendation. We need Sunoco to commit to it, as required by the DEP and to be compliant. The DEP is not a consultancy agency, it is a regulatory agency and Sunoco needs to start respecting that.

10. On page 17, we once again address the issue of water supplies. I have commented on this several times now and am still not satisfied with Sunoco's replies or provisions. I ask the DEP to please ONLY ALLOW SUNOCO TO PROVIDE PERMANENT ALTERNATIVES so that private wells HAVE NO CHANCE OF BEING IMPACTED. They need to hook all those with private wells up to public water. If public water lines do not exist, then they can lay the infrastructure.

After hearing of contaminated and negatively-impacted water wells and the consequences my family has decided that Sunoco's offer of a "temporary" water buffalo is totally unacceptable. Sunoco obviously realizes that their drilling has caused many problems and, by offering these so-called water buffalo's, residents will be perfectly happy with this solution.

As I have repeated many times, this is NOT a solution for us. First of all, Sunoco does not define "temporary". Days, weeks, months ... years? Secondly, I have spoken with residents in Edgmont Township who suffered numerous problems with these water buffalo's. Please refer to the comments on the original Reevaluation Report for Edgmont Township to understand the numerous problems residents encountered. We will NOT be allowing our property to be put to that risk. I asked Sunoco if I could see a water buffalo contract or agreement and Stephen Sanders of Percheron Field Services emailed me that there was no contract or agreement (I have that email) so how on earth can they be offering "agreements" as specified in Item 29? And what protection does "no agreement" offer the homeowner in the event of Sunoco damaging the private well, the homeowner's internal filtration system, pinhole leaks in pipes and damage to appliances in the event of sediment or contamination? EVERYTHING IS GEARED TOWARDS SUNOCO DRILLING ON WITHOUT ANY REGARD FOR THE SAFETY, WELLBEING OR HEALTH OF THE PROPERTY OWNERS OR RESPECTING THE PROPERTY OF THOSE HOMEOWNERS. NOTHING IS GEARED TOWARDS PROTECTING THE HOMEOWNER FROM DAMAGE OR HAVING SOMETHING IN PLACE TO PROVIDE COMPENSATION OR REMEDIATION IN THE CASE OF DAMAGE CAUSED BY SUNOCO. How many times and how many dollars do impacted homeowners have to spend on lawyers to fight for their right to clean water? I thought this was in Pennsylvania's Constitution?!

It is, in short, disgraceful that a company making billions is putting the residents of these townships through all this when THESE RESIDENTS DON'T EVEN WANT THE PIPELINE.

I was assured by our Percheron Field Agent, Lance Vaught, that Sunoco would supply the qualified contractors to install the water buffalo and would see to all the required paperwork and permits. But an email from Edgmont Township's zoning officer told me this, again, WAS NOT TRUE. This is the email from Edgmont Township's Zoning Officer on April 18, 2018:

Ms. Fuller: What I know is this:

- Edgmont discovered, during this fall, that Sunoco had installed alternative water supplies to properties near its Mariner East II HDD drill easement area without first contacting authorities for advice, permits, or regulations
- Edgmont researched the matter fully with code officials, electricians, building officials, property owners and water scientists and Aqua public water company to become educated on the topic
- Edgmont's staff developed a protocol to provide for the permitting of temporary water supply facilities, commonly called water buffalos in an effort to protect the safety, health and welfare of its residents
- Edgmont has struggled with Sunoco to gain compliance and get permits issued and safety inspections completed for the temporary water facilities already installed
- Edgmont has discovered improperly installed electric line in at least one of the temporary water supply systems, once it was able to get the work inspected
- Edgmont has learned that Sunoco has now disconnected some of these alternate water supplies and reconnected households to previously abandoned wells, again without first contacting the authorities for advice, permits or regulations
- Edgmont researched the matter and developed a series of dormant well testing criteria that it required Sunoco to perform, with satisfactory results, prior to any future reconnecting of residences to their previously abandoned wells and has requested this testing from Sunoco
- Sunoco is resisting furnishing the township with the well testing results it requires and continues to re-connect residences to their former drinking water well supplies

This is very concerning to your elected officials, the Township Manager and administrative staff, who will continue to try to gain compliance from Sunoco. I have copied this e-mail to your state representatives, the PaDEP and the Public Utility Commission for their information. If you have any questions or concerns, you may also direct them there.

Samantha Reiner
Zoning Officer
Edgmont Township

P.O. Box 267
Gradyville, PA 19039
sreiner@edgmont.org

The penalty for Sunoco behaving like this? Twice the cost of the permit! That is not a deterrent.

So, to summarize, Sunoco has chosen the route for the ME2 and ME2X to run down Valley Road. We know that this is a bad route for three important reasons:

1. Most of the homes in this residential area are on Valley Road and the pipeline will be within a few feet of them, as is the case with us.
2. It endangers most of the wells in the area which are near these homes, as is the case with us (150 ft).
3. It sends the drill directly through an area where the ground is known to be polluted with the chemical MBTE from a previous undetected Sunoco leak, thus further spreading the pollution throughout the area.

Here is the issue. Sunoco was required, by the August 9, 2017 agreement, to consider alternative routes for many sections of the pipeline. The potential problems with this route, compared to any other, are huge. There is much more open space on either side of this route where the environmental consequences of construction, or the risks from a leak or rupture, would be far less. Sunoco's response to this legal requirement set forth in the August 9 agreement is simply to respond that other routes were "impracticable". We all know that Sunoco favors this route for its own convenience since the easement already exists for Mariner East 1. We must remember, however, that when ME1 was constructed along this route there were no homes here. It was a rural area. That is not the case now. This is now a highly-populated residential area which should not be used for industrial pipelines. The fact that ME1 – an 87-year old pipeline – was repurposed to carry these highly volatile NGL's without any notification to residents (non-compliance with Title 49, Part 195 of the Code of Federal Regulations for Pipeline Safety) 150 ft from my home already fills me with horror.

The DEP must insist on proof from Sunoco that it did, in compliance with the August 9, 2017 agreement, analyze alternative routes and exactly why this route was preferable. For it to be more "convenient" to Sunoco is simply not sufficient justification.

One last point I wish to make – an important point – is that since Sunoco has been given public utility status, the Mariner project is subject to Title 49, Part 195 of the Code of Federal Regulations regarding Pipeline Safety. Why, therefore, in keeping with Part 195.440 regarding Public Awareness, were the residents of Middletown Township:

- not informed of the dangers, the risk or any kind of Emergency Evacuation or Safety Plan that would protect us?
- not informed that the ancient 87-year old Mariner East 1 had been re-purposed?

- not informed by Sunoco that this 87-year old and narrow 8" pipe was now transmitting highly volatile NGL's at high pressure - namely propane, ethane and butane - in the opposite direction to the original flow of petroleum product it used to transport, through our densely populated areas - the areas that were more or less uninhabited back in 1931?

Non-compliance by Sunoco means that we were:
not informed of the possible hazards, associated with unintended releases from a hazardous liquid pipeline facility.

- not informed of the physical indications that such a release may have occurred
- not informed of the steps that should be taken for public safety in the event of a hazardous liquid pipeline release
- not informed about the procedures to report such an event

<https://www.gpo.gov/fdsys/pkg/CFR-2010-title49-vol3/pdf/CFR-2010-title49-vol3-sec195-440.pdf>

According to the Code of Federal Regulations, the program and the media used must be as comprehensive as necessary to reach all areas in which the operator transports hazardous liquid. There is absolutely nothing on the Delaware County Emergency Preparedness Guide for NGL Pipeline leaks/ruptures -
<http://www.co.delaware.pa.us/depts/2016emergencyPlanningGuide.pdf>

Overall, Sunoco's responses in this document suggest to me that Sunoco has decided it is fine to ignore the DEP's requests, it is fine to ignore the rules and regulations of a Township, it is fine to ignore the requirements of Title 49, Part 195.440 of the Code of Federal Regulations for Pipeline Safety with respect to Public Awareness and it is fine to collect incorrect or insufficient data with respect to people's properties – especially private wells – which will be directly impacted by the proposed HDD along the already contaminated Valley Road... contaminated by Sunoco by an “undetected leak” back in 2015.

The company is determined to do as it pleases and it will continue to do so unless it is stopped. It is the duty and the mission of the regulatory agencies, the public officials and Governor Wolf himself to ensure that it doesn't continue. Only they have the authority and the power to stop this. (12)

Letter – [Rosemary Fuller](#)

9. Comment

Please protect the water supply at all costs. The existing drilling damage as well as future risk, to Aqua's and to private wells, is too much for residents, to pay in costs. Contamination risk and loss of this precious resource is very concerning. Threats to the environment and human life provoke this comment as well.

Following the numerous detriments to West Whiteland homeowners and their water, for example, DEP is justified in demanding detailed answers regarding Valley Road

FULLER EXHIBIT 5

DEP HDD REEVALUATION REPORT
3rd PUBLIC COMMENT PERIOD
HDD #S3-0591 VALLEY ROAD CROSSING

DEP Permit # E23-524
DEP Permit HDD Reference # PA-DE-0046.0000-RD
DEP HDD # S3-0591
Township – Middletown
County - Delaware
HDD Site Name – Valley Road Crossing

3rd Public Comment Period

Commentator ID #	Name and Address	Affiliation
1	Holly Devine 1006 Birchwood Lane Glen Mills, PA 19342	
2	MaryAnne Troy 1002 Birchwood Lane Glen Mills, PA 19342	
3	Melissa Marshall, Esq. P.O. Box 408 1414-B Indian Creek Valley Road Melcroft, PA 15462	Mountain Watershed Association
4	Aaron J. Stemplewicz, Esq. 925 Canal Street 7 th Floor, Suite 3 Bristol, PA 19007	Delaware Riverkeeper Network
5	Joseph Otis Minott, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
6	Alexander G. Bomstein, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
7	Kathryn L. Urbanowicz, Esq. 135 South 19 th Street, Suite 300 Philadelphia, PA 19103	Clean Air Council
8	George Alexander 437 East Franklin Street Media, PA 19063	
9	Linda Yu 1510 Middletown Road Glen Mills, PA 19342	
10	Rosemary Fuller 226 Valley Road Media, PA 19063	
11	Jennifer Berlinger P.O. Box 1043 Westtown, PA 19395	
12	Lora Snyder Edgmont Resident	

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6. Comment

On October 31, 2018, Sunoco submitted a supplemental letter to the Department in response to the Department's March 23, 2018 request for additional information regarding horizontal directional drilling (HDD) Site PA-DE-0046.0000-RD. My comments first address Sunoco's letter and then additional matters of importance, including some comments I made in my last response submission which appear to have been completely ignored. I was under the impression that the reason for this extremely short comment period was to give the residents impacted directly by Mariner East 2 the opportunity to voice their environmental concerns and highlight issues that the DEP may not be aware of that need to be addressed. In my case, several of these issues have not been addressed. It is the responsibility of the DEP to obtain these answers and to ensure SPLP comply with the DEP's requirements before issuing any permits.

1. Geophysics Analysis

Sunoco's previous stance that "geophysics will provide no functional information at this non-karst HDD location" was outrageous and incorrect. It is more than somewhat concerning that we have to insist on geophysical and geological surveys for HDD drilling along these HCA's. It is critical for mitigating failure and negative impact incidents. In view of previous HDD failures in this area (drill running off course in Edgmont Township and bore hole failure at Tunbridge Apartments in Middletown Township) I request that both the raw data and the expert analysis of the results (including any construction recommendations) be made available to the public with an opportunity to comment - especially the residents like myself whose property is 150 ft from the proposed HDD.

I note that the DEP previously requested that SPLP perform a series of downhole geophysics and caliper testing at this site. These are different survey techniques that provide different and more in-depth data to surface geophysics. The DEP needs to insist on these additional tests. Sunoco has not agreed to perform them and given no valid reason as to why they are not agreeing to this. For our safety and the safety of the environment, Sunoco must be required to conduct downhole testing.

2. Proactive Measures to Prevent Inadvertent Returns and Annulus Subsidence

All the proactive measures Sunoco mentions – APM, tool face pressure and tracking of cuttings removal – are standard operating procedures for HDD drilling, not additional preventive measures which have proved to be totally inadequate by themselves in preventing IR's or annulus subsidence as we know only too well. This therefore begs the question as to why Sunoco is even mentioning this in the Supplemental Information? The question the DEP should be asking is what additional proactive methods can be put into place to prevent IR's and annulus subsidence in the future?

3. Proactive Treatment by Annulus Grouting

Sunoco here mentions the use of 1) grouting using “neat cement”; and 2) grouting using a sand/cement mixture. However, Sunoco’s May 21, 2018, Response to Comments mentions “bentonite chips” for fractures. This is confusing. Which of these methods are to be used?

Additional Comments

4. Arsenic Contamination at Sleighton School

It recently came to my attention that the Sleighton School property and playing fields are contaminated with arsenic. The levels were very high. This can find its way into aquifers if paths are created with HDD drilling. Sunoco needs to provide testing of our private wells for this before and after drilling.

5. MBTE Contamination from Sunoco leak on Valley Road April 2015

In addition, the 12” Point Breeze to Montello leaked here on Valley Road in April 2015 contaminating the soil and wells with MBTE. There has been remediation but to reassure residents Sunoco needs to re-test wells and soil for MBTE, a carcinogenic. This could find its way into aquifers if paths are created with HDD drilling.

6. Private Water Well Protection Guarantee from Sunoco

Despite numerous comments by residents in the previous Reevaluation Report Responses, Sunoco has still not addressed this issue.

A temporary water supply via a “water buffalo” is totally out of the question for our property. There is no contract or agreement with Sunoco to protect the residents from shoddy work. The water buffaloes installed in Edgmont Township were installed by uncertified contractors. Contrary to what we were told by Percheron Field Services, Sunoco did not apply for the necessary permits. They did not furnish the Township with the necessary water tests. They did not have certified contractors reconnecting the wells.

The offer of a “temporary water supply” is, in itself, an indication that Sunoco expects private well water issues. We now also have proof of the damage this HDD drilling has done to residents’ water wells. As we already know, Sunoco has left numerous destroyed and contaminated private wells in its wake, as well as sink holes and flooding issues. If Sunoco is unable to furnish us with a guarantee that there will be no damage to our well then it must offer us a permanent solution in advance of any trouble, danger or inconvenience to our household. As another resident so clearly stated “Water well contamination and impairment is not a temporary matter that always resolves, leaving the supply owners free to start using their water supply good as new”. There can be long-term and irreparable damage to in-house filtration systems, domestic appliances, water quality, water flow and quantity. In our family’s case, from a medical health standpoint, any contamination could be life-threatening.

Putting us at this risk is totally unacceptable and we need the DEP to support and protect us on this.

The DEP asked Sunoco for “well depths, casing depths and water-level depths”. Sunoco claims to have done this but no water level survey seems to have been done. In the list of 32 private wells given in Attachment 1, 30 of them have a water level of “unknown”.

Sunoco cannot be allowed to destroy people’s sole water supplies. There is absolutely no guarantee of remediation by Sunoco in the event of any negative impact to our property or our well. I have spoken with my neighbors who have had to resort to hiring attorneys. The DEP should have the authority and the power to protect residents from damage and contamination to clean water supplies. This is a violation of our Rights under Article 1, Section 27 of the PA Constitution. The DEP needs to enforce that.

This is the 3rd time we have submitted comments regarding this issue. I would like to see this addressed in the response by the DEP to Sunoco’s letter. The DEP needs to require Sunoco to offer a permanent solution to any problems prior to the start of HDD.

7. Weld X-Ray Falsification Allegations

I understand there is a joint investigation into the alleged weld x-ray falsification allegations. I have requested details of this investigation via an FOIA Request from PHMSA. Until this matter is resolved, the DEP cannot allow Sunoco to commence with HDD.

8. Coating Flaws

Coating flaws were discovered on newly-installed sections of the ME2 20-inch pipe. Some of these sections have been excavated and have been replaced by new pipes. I am awaiting the details of this investigation via an FOIA Request from PHMSA. Until this matter is resolved, the DEP cannot allow Sunoco to commence with HDD. It is possible that the coating damage may have been caused by HDD installation.

9. Failure of Leak Detection Equipment to identify Leaks in Other Pipes

The residents in this area have already suffered the damage from a leak on Valley Road in April 2015. This went undetected for some time. The cause of the leak was galvanic corrosion. The leak was from the 12-inch Point Breeze to Montello pipe carrying gasoline. The pipe had been tested hydrostatically the previous year and had cathodic protection. Since this will now be part of Mariner East 2 and run alongside the 20-inch and 16-inch pipes, I am seriously concerned that this adds to the risk that my family and all the residents in the “buffer zone” are faced with. PHMSA advised against using these old pipes for HVL’s in guidelines it issued in September 2014. A totally different product than that intended for the pipe, at a much great pressure and

in reverse flow. We, the residents of Valley Road, would like to see the hydrostatic testing results for the 12-inch Point Breeze to Montello pipe.

My question is why should the leak detection equipment that hasn't worked for four other leaks in recent times, suddenly work now on the pipes they are proposing to install via HDD which is known to sometimes cause damage to coatings during installation?

10. Pipe Bending in the Field

An example of my concerns is PHMSA Case File CPF-1-2018-5002 and the Notice of Probable Violation and Proposed Compliance Order dated January 11, 2018 from Robert Burrough, Director, Eastern Region, Pipeline and Hazardous Materials Safety Administration. This occurred in Ohio during the week March 27-31, 2017. Sunoco failed to provide inspection that ensured that the installation of pipe or pipeline systems was in accordance with the requirements of Subpart D of part 195. Specifically, Sunoco failed to adequately inspect pipe bending during the ME2 project to ensure it was in accordance with Section 195.212(b). Several segments of pipe had severe coating damage and at least one joint of pipe had a gouge that extended into the wall of the pipe. Markings on the pipe identified the segments has having been subjected to field bending.

Therefore, Sunoco failed to provide adequate inspection of the field bending of pipe during the ME2 project to ensure compliance with Section 195.212(b). I would like to know what the results of this incident were and what precautions will be taken in the future to ensure that adequate inspection takes place and how that will be monitored and controlled.

11. Failure to Self-Report a Negative Impact Incident

There are numerous other incidents/events on Valley Road that compromised the safety of the residents or had a negative impact on the environment and our Wetlands. I have pictures of many of these. The conclusion from these incidents, violations and improper construction practices points to a total disregard for conditions and requirements set forth by all the regulatory agencies.

For example, on 9/9/18, on the property near the Wawa Wetlands, the barrier broke holding the IR which then flowed toward Rocky Run. A Percheron Field agent was notified at 9 a.m. By 3 p.m. still no action had been taken. There was heavy rain. A video of this was taken. I have a copy of that video.

The truth of the matter is that despite the \$12.6 million fine Sunoco received from the DEP for "willful and egregious violations", the company will continue to rampage through these densely populated areas with no regard for anyone or anything except getting the product through the pipes so the dollars can start rolling in. The fine should have been a warning to Sunoco that there are rules and regulations as well as restrictions to its construction practices. But Sunoco does not heed warnings or follow rules and regulations. And it does not self-report incidents. The DEP needs to

step in here if the residents along the path of Mariner East 2 are to be protected according to the DEP's mission statement – The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment.

Thank you for considering these comments. Please keep me apprised of your next steps on this HDD Site. (10)

7. Comment

I want to provide a public comment regarding the HDD drilling by Sunoco.

Watching Sunoco operate outside my kitchen door and in my neighborhood for the last 18 months, I am concerned in regards to their level of planning and care when operating. I have lived here for 10 years, and have noticed the following since they have prepared for HDD next to my property, made changes to a valve site in my development, and prepared for open trenching.

- Two sink holes opened up above the current 90 year old pipes, and were not addressed.
- EXTREME flooding that never occurred before has happened in various parts of the neighborhood, and as this was previously an orchard, there is a very real danger of chemicals moving from the areas they have disturbed (that were not touched by the developer) into areas where our children play.
- Their sound barriers were not even put up correctly, with pieces flying off and hitting houses – so how do we trust their operation methods?

Thank you in advance for addressing the danger they are bringing to my neighborhood. (11)

8. Comment

I am a homeowner in the very near vicinity of this proposed HDD site at Valley Road Crossing (S3-0591) DEP PERMIT # E23-524. I continue to have grave concerns with HDD drilling at this site due to the following factors:

1. This HDD proposed drilling area is in a very large wetland area. Any IR return of "industrial waste" would spread contamination to all wells and waterways in the area. This HDD site would greatly impact the ROCKY RUN stream which runs through the WAWA ROCKY RUN preserve area adjacent to drilling area. ALL homeowners in this drilling area are on private wells for water supply.
2. The geology of this area allows high risk for sinkholes due to "weak soil" regions etc. This shifting of the soil and changes in the soil erosion will place stress to current ME1 pipeline which is currently transporting the explosive NGL materials. We do not need a repeat of the sinkholes that occurred in West Whiteland to occur in this wetland area nor a catastrophic explosion from ME 1 pipeline.

FULLER EXHIBIT 6

**July 2019 Well Water Contamination
From Sunoco's HDD activities**

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	16.1		1	07/20/2019 14:00	WG1315718
Fecal Coliform	8.4		1	07/20/2019 14:30	WG1315722
Coliform, Total	224.7		1	07/20/2019 14:00	WG1315718

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	315		10.0	1	07/21/2019 17:13	WG1314958

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	07/21/2019 15:03	WG1314952

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	128		30.0	1	07/23/2019 13:44	WG1315418

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	ND		0.300	1	07/20/2019 18:49	WG1314842

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	79.9		20.0	1	07/22/2019 14:50	WG1315264

Sample Narrative:

L1120697-01 WG1315264: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.59	TB	1	07/21/2019 16:25	WG1315042

Sample Narrative:

L1120697-01 WG1315042: 6.59 at 23C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	533		10.0	1	07/20/2019 15:45	WG1314871

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	07/20/2019 19:10	WG1314733
Chloride	86.5		1.00	1	07/20/2019 19:10	WG1314733
Sulfate	25.1		5.00	1	07/20/2019 19:10	WG1314733

Client Sample No.: 07192019-611-01
 RJ Lee Group Sample No.: 001

Phase*	Approximate Composition**	Estimated Concentration†
Montmorillonite/Bentonite	$(\text{Na,Ca})_{0.3}(\text{Al,Mg})_2\text{Si}_4\text{O}_{10}(\text{OH})_2 \cdot n\text{H}_2\text{O}$	Major
Quartz	SiO_2	Minor
Mica/Illite	$\text{K}(\text{Al,Mg,Fe})_2(\text{AlSi}_3\text{O}_{10})(\text{F,OH})_2$	Minor
Feldspar	$(\text{K,Na})\text{AlSi}_3\text{O}_8$	Trace
Chlorite Group	$(\text{Mg,Al,Fe,Ni,Mn})_6\text{Al}(\text{Al,Si}_3\text{O}_{10})(\text{OH})_8$	Trace
Monoclinic Amphibole***	$(\text{Na,Ca,Fe,Mg})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$	Trace

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+ database may remain unidentified.

**Compositions are approximate and represent an idealized formula for that structure, not including possible elemental substitutions into that crystal structure.

***Further testing is necessary to confirm amphibole phases.

†Estimated concentration is based off of the dried solid material.

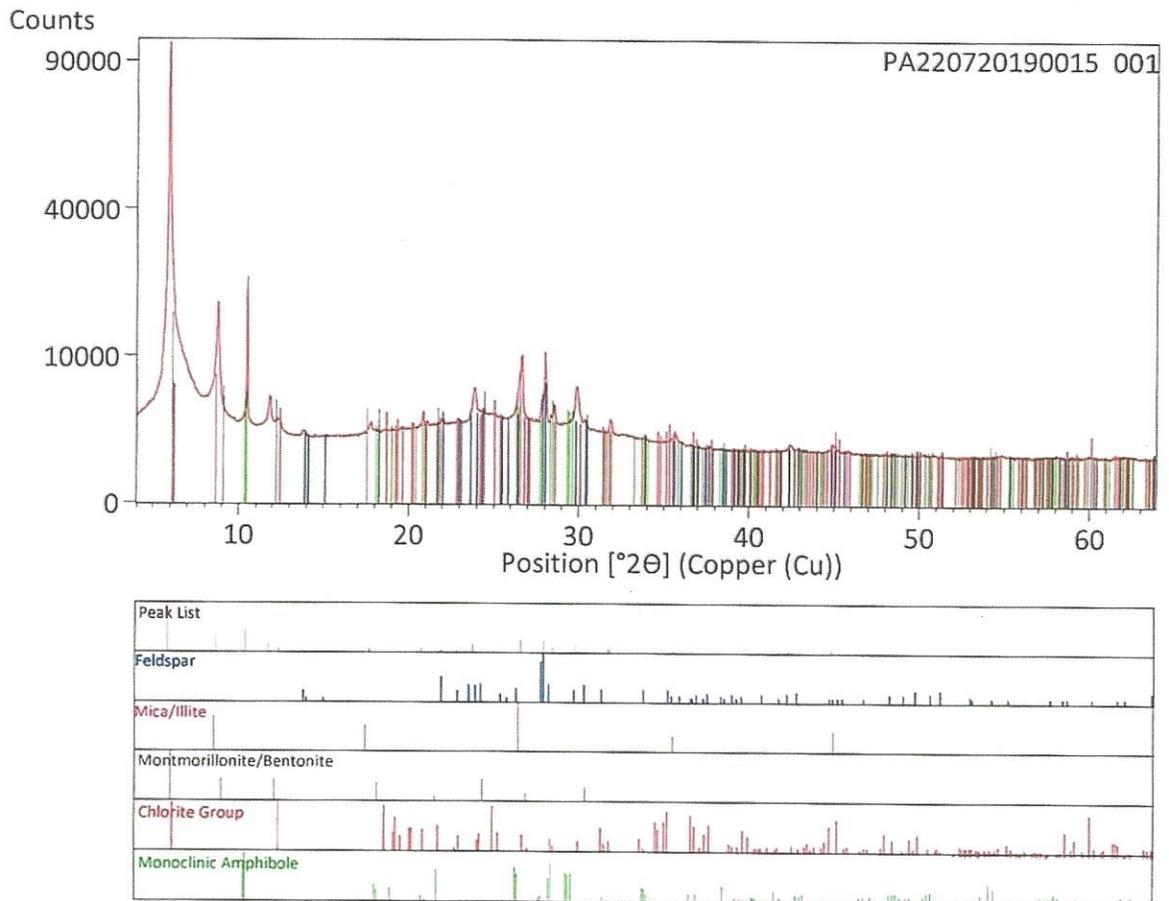


Figure 1 –X-ray diffraction pattern of as-received specimen “07192019-611-01”, with position (degrees 2θ) along the x-axis and intensity (counts) along the y-axis (top). Corresponding legend denoting phase matches (bottom).

Table 1. Phase identification of "10102019-520-02" (RJLG Sample 10489244) by XRD

Phase*	Approximate Composition**	Estimated Concentration ⁺ (weight %)
Quartz	SiO ₂	>20
Chlorite Group	(Mg,Al,Fe,Ni,Mn) ₆ Al(Al,Si ₃)O ₁₀ (OH) ₈	5 -20
Mica/Illite	K(Al,Mg,Fe) ₂ (AlSi ₃ O ₁₀)(F,OH) ₂	<5
Feldspar	NaAlSi ₃ O ₈	5 - 20

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+ database may remain unidentified.

**Compositions are approximate and represent an idealized formula for that structure, not including possible elemental substitutions into that crystal structure.

+Estimated concentration is based off of the dried solid material.

Note: Bentonite/montmorillonite was not detected. An unidentifiable phase is present in sample.

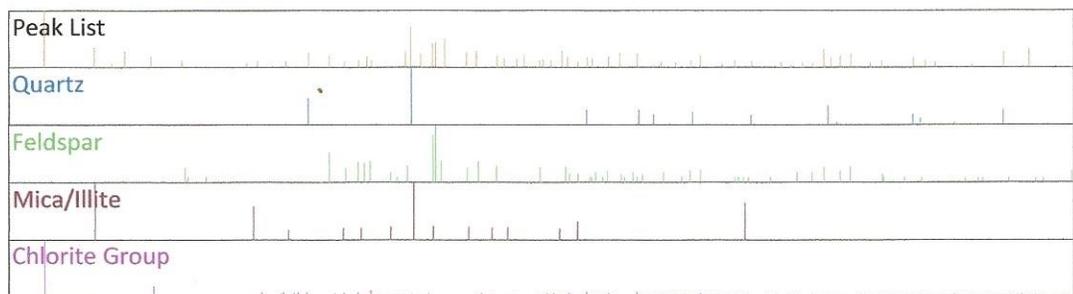
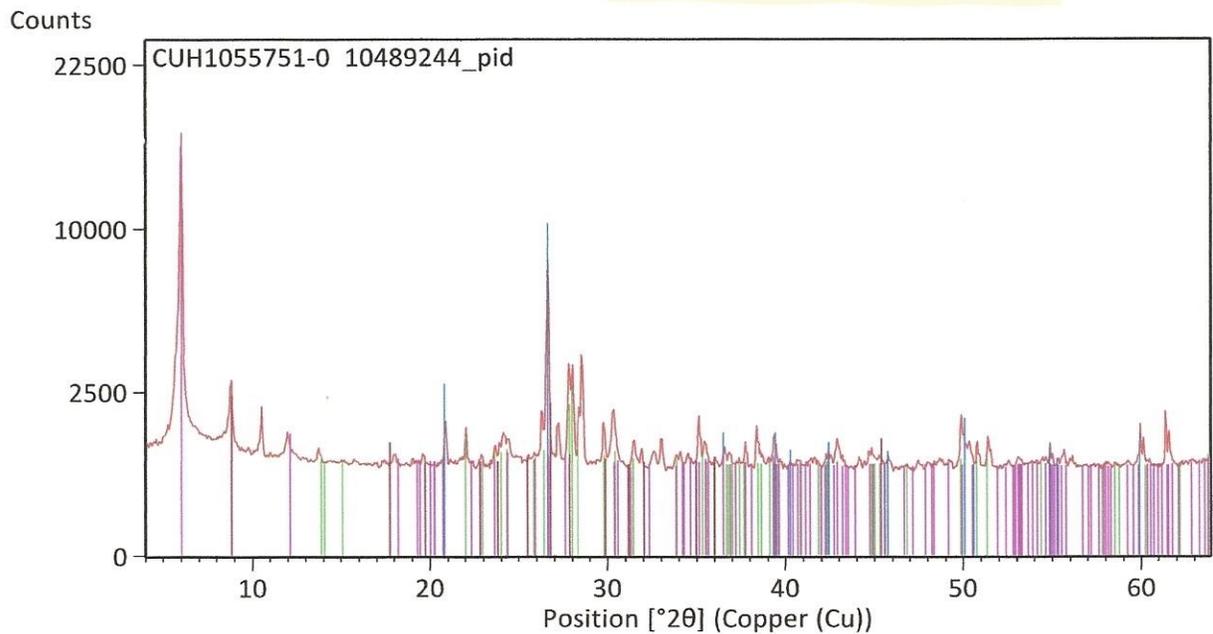


Figure 1 –X-ray diffraction pattern of as-received specimen "10102019-520-02", with position (degrees 2θ) along the x-axis and intensity (counts) along the y-axis (top). Corresponding legend denoting phase matches (bottom).

Client Sample No.: 07192019-611-03
RJ Lee Group Sample No.: 003

Phase*	Approximate Composition**	Estimated Concentration†
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Undetermined

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+ database may remain unidentified.

**Compositions are approximate and represent an idealized formula for that structure, not including possible elemental substitutions into that crystal structure.

†Estimated concentration is based off of the dried solid material.

Note: Large unidentifiable peak located at 10.6 °2θ. Bentonite/montmorillonite was not detected.

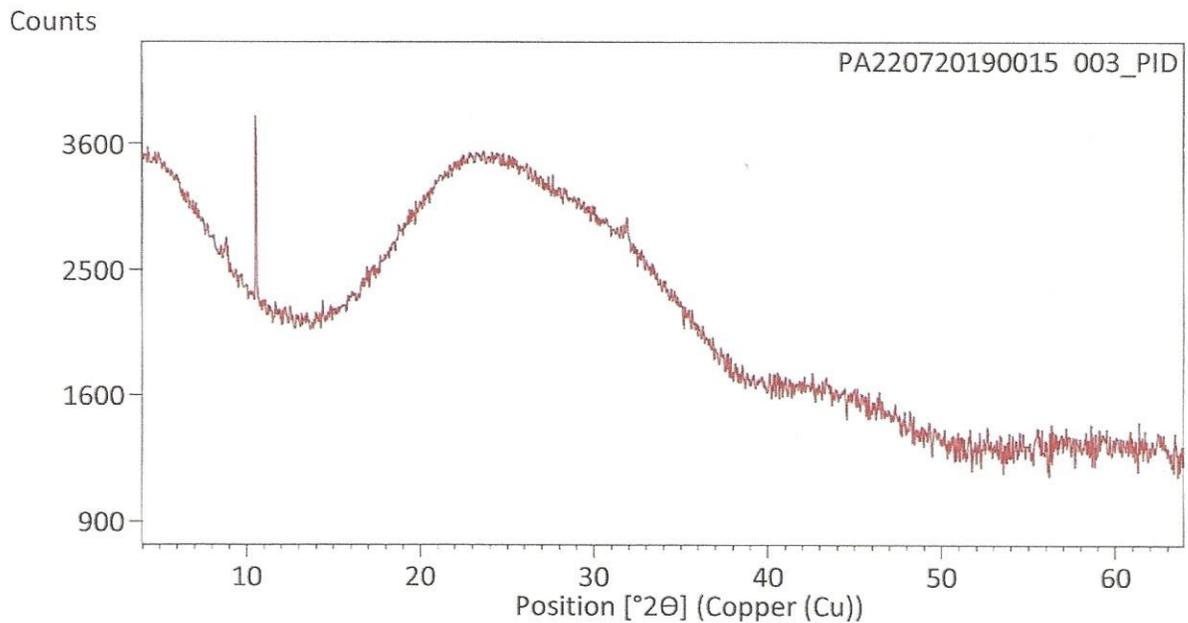


Figure 1 –X-ray diffraction pattern of as-received specimen “07192019-611-03”, with position (degrees 2θ) along the x-axis and intensity (counts) along the y-axis (top).

“Undetermined” contaminant
from sample No.
07192019-611-03.

- No raw data
- No approximate composition
- No estimated concentration
- No information at all
WHY?

Sarah Candiello

Date 07/29/19

Sarah Candiello
Scientist, X-ray Diffraction Group

with ISO 17025:2017 guidelines, and holds a limited scope of accreditations under different
<http://www.rjlg.com/about-us/accreditations/> for more information and current status.

ad, Monroeville PA, 15146 | P 724.325.1776 F 724.733.1799

WWW.RJLEEGROUP.COM

FULLER EXHIBIT 7
JULY 23 2020 LETTER TO JOHN HOHENSTEIN
DEP

Rosemary Fuller
226 Valley Road
Media, PA 19063

John F. Hohenstein, P.E.
Environmental Program Manager
Department of Environmental Protection
Southeast Regional Office
Waterways and Wetlands Program
2 East Main Street
Norristown, PA 19401

July 23, 2020

Dear Mr. Hohenstein,

I still have not heard back from you regarding my questions about the water testing. My question, again, was why does Sunoco test for Bentonite, Quarts, Feldspar, Mica/Illite, Chlorite Group, etc. I am told that this is to comply with DEP requirements.

WHY WERE THESE SOLIDS CHOSEN FOR TESTING?

In your last response of July 3, you directed me to the following “Scroll about 1/4 of the way down the page after the bold lettering “Statement on Settlement of Suspension of Drilling.” See Section 6/1 and Appendix B. This is the **Well Test Plan** of the Water Supply, Assessment, Preparedness, Prevention and Contingency Plan.

<http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Water%20Supply%20Assessment,%20Preparedness,%20Prevention%20and%20Contingency%20Plan%20w%20appendices%20-%20Revised%20080817.pdf>).

The Well Testing Plan states that water test samples will be sent to an SXL-approved laboratory for analysis of the following:

purging, GES will collect one sample at each well location and submit to an SXL-approved laboratory for analysis of the following:

	Parameters
Inorganics	pH
	Specific Conductance
	Turbidity
	Total Dissolved Solids (TDS)
	Total Suspended Solids (TSS)
	Hardness
	Anions: Bromide, Chloride, Sulfate
	Total Alkalinity
Trace Metals	Metals Analysis: (Ba, Ca, Fe, K, Mg, Mn, Na)
Organics	BTEX
	Light Gas Analysis [Methane, Ethane, Ethene, Propane]
Bacteria	Total coliform, E. coli, Fecal Coliform

Field equipment will consist of a YSI water-quality meter, turbidity meter, photo-ionization detector

I do not see Montmorillonite/Bentonite, Quartz, Mica/Illite Feldspar, Chlorite Group or Monochlinic Amphibole on this list.

In July of last year, our well was contaminated with various drilling fluid-related contaminants, including Montmorillonite Bentonite (Major):

RJ Lee Group
 Project Number: PA020720190016
 Page 2 of 3

Client Sample No.: 07012019-642-02
 RJ Lee Group Sample No.: 001

Phase*	Approximate Composition**	Estimated Concentration
Quartz	SiO ₂	Trace
Montmorillonite/Bentonite	(Na,Ca) _{0.3} (Al,Mg) ₂ Si ₄ O ₁₀ (OH) ₂ ·nH ₂ O	Major
Mica/Illite	K(Al,Mg,Fe) ₂ (AlSi ₃ O ₁₀)(F,OH) ₂	Trace
Feldspar	NaAlSi ₃ O ₈	Minor

Client Sample No.: 07192019-611-01
 RJ Lee Group Sample No.: 001

Phase*	Approximate Composition**	Estimated Concentration†
Montmorillonite/Bentonite	$(\text{Na,Ca})_{0.3}(\text{Al,Mg})_2\text{Si}_4\text{O}_{10}(\text{OH})_2 \cdot n\text{H}_2\text{O}$	Major
Quartz	SiO_2	Minor
Mica/Illite	$\text{K}(\text{Al,Mg,Fe})_2(\text{AlSi}_3\text{O}_{10})(\text{F,OH})_2$	Minor
Feldspar	$(\text{K,Na})\text{AlSi}_3\text{O}_8$	Trace
Chlorite Group	$(\text{Mg,Al,Fe,Ni,Mn})_6\text{Al}(\text{Al,Si}_3\text{O}_{10})(\text{OH})_8$	Trace
Monoclinic Amphibole***	$(\text{Na,Ca,Fe,Mg})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$	Trace

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+ database may remain unidentified.

And our well continues to have Montmorillonite/Bentonite contamination since our last test taken in October of last year.

We have also suffered Major Quartz Contamination:

Client Sample No.: 07192019-611-02
 RJ Lee Group Sample No.: 002

Phase*	Approximate Composition**	Estimated Concentration†
Quartz	SiO_2	Major
Mica/Illite	$\text{K}(\text{Al,Mg,Fe})_2(\text{AlSi}_3\text{O}_{10})(\text{F,OH})_2$	Minor
Feldspar	$(\text{K,Na})\text{AlSi}_3\text{O}_8$	Trace
Chlorite Group	$(\text{Mg,Al,Fe,Ni,Mn})_6\text{Al}(\text{Al,Si}_3\text{O}_{10})(\text{OH})_8$	Trace
Monoclinic Amphibole***	$(\text{Na,Ca,Fe,Mg})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$	Trace

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+

Still present during our last tests in October of 2019:

Table 1. Phase identification of "10102019-520-02" (RJLG Sample 10489244) by XRD

Phase*	Approximate Composition**	Estimated Concentration† (weight %)
Quartz	SiO_2	>20
Chlorite Group	$(\text{Mg,Al,Fe,Ni,Mn})_6\text{Al}(\text{Al,Si}_3\text{O}_{10})(\text{OH})_8$	5 - 20
Mica/Illite	$\text{K}(\text{Al,Mg,Fe})_2(\text{AlSi}_3\text{O}_{10})(\text{F,OH})_2$	<5
Feldspar	$\text{NaAlSi}_3\text{O}_8$	5 - 20

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD

In addition to this, we have had the presence of an “undetermined” phase in our water also since our well was contaminated in July of last year:

RJ Lee Group
Project Number: PA220720190015
Page 2 of 2

Client Sample No.: 07192019-611-03
RJ Lee Group Sample No.: 003

Phase*	Approximate Composition**	Estimated Concentration†
Undetermined	-	-

*Amorphous content, crystalline phases present at trace levels and phases that are not currently part of the ICDD PDF 4+ database may remain unidentified.

**Compositions are approximate and represent an idealized formula for that structure, not including possible elemental substitutions into that crystal structure.

†Estimated concentration is based off of the dried solid material.

Note: Large unidentifiable peak located at 10.6 °2θ. Bentonite/montmorillonite was not detected.

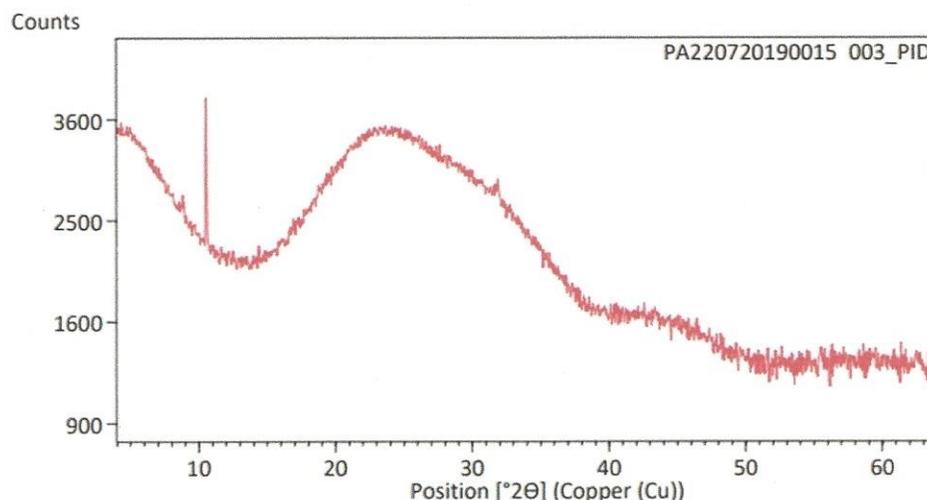


Figure 1 –X-ray diffraction pattern of as-received specimen “07192019-611-03”, with position (degrees 2θ) along the x-axis and intensity (counts) along the y-axis (top).

The peculiar fact about this analysis is that THERE IS NO ANALYSIS. This is a “large Unidentifiable peak” and yet there is no “Phase description”, no “Approximate Composition” and no “Estimated Concentration” which should be present. Is this a Trade Secret additive in the bentonite mix? I believe I have a right to know what this is. This is in OUR water.

Just to clarify, the ICDD PKF 4+ file database contains 1,004,568 unique material data sets. That a “large” peak cannot be identified is difficult to understand. See <https://www.icdd.com/>

I again sent two further requests for an explanation of why these solids are tested for. Both received only an automatic reply and no answers. Still, despite several requests, I have received no answers either from you or from Sunoco.

This is a family in suffering. We predicted the contamination of our well from drilling fluids before ME2 construction began. **Please see our public comments to each of the three comment periods for the HDD Reevaluation Reports.** I spoke out at **Delaware County Council.** I made public comments at **Middletown Township.** Nobody responded to my concerns about our predicted well contamination or the fact that insufficient geophysical surveys had been completed, or the fact that no independent risk assessment was available for the public.

The end result is that our well is contaminated, we have 4 sinkholes within half a mile of our property due to insufficient geophysical data and now Sunoco is telling me that the topographical photographs, which show a fracture line coming straight from the HDD to our property and used for their permit application are wrong too. Please see the conditions of the Water Obstruction and Encroachment Permit No. E23-524 (page 2, Point 3) which states that “No changes in the maps, plans, profiles, and specifications approved shall be made except with the written consent of the DEP”. Did the DEP agree that the photogeological mapping submitted in the permit application and indicating a fracture line through our property was incorrect and, on that basis, did the DEP give Sunoco written consent for those changes?

We were told “there is no risk” and “you won’t even know they are there” by the Percheron Field agent and notary who got us to sign the permanent easement, explaining, at the same time, that we really had no choice because if we didn’t the company could exercise eminent domain.

We are at risk. We have been with our water, despite me highlighting the fact to all those responsible for allowing this project to go ahead, that two members of my family are seriously at risk with their severely compromised immune systems. My daughter got so sick from the E Coli and fecal Coliform contamination she had to go to hospital:

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
GES, Inc - Sunoco	0205254-1116-206-XX	L1120697	07/23/19 16:25	4 of 21

07192019-611-03	SAMPLE RESULTS - 01	ONE LAB NATIONWIDE
Collected date/time: 07/19/19 18:20	L1120697	

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	161		1	07/20/2019 14:00	WG1315718
Fecal Coliform	8.4		1	07/20/2019 14:30	WG1315722
Coliform.Total	224.7		1	07/20/2019 14:00	WG1315718

Gravimetric Analysis by Method 2540 C-2011

Result	Qualifier	RDL	Dilution	Analysis	Batch
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We now know from the independent risk assessments carried out that living 150 ft from the 3 NGL pipelines in front of our home (ME2, ME2X and the old repurposed 12” Point Breeze to Montello that has leaked several times on Valley Road) is putting us at risk, contrary to what we were told when we signed the Permanent Easement.

We now know that Sunoco's geophysical analyses were insufficient (despite my constant requests for more in-depth analyses) to prevent sinkholes here and in Chester County. We know that despite Kelcy Warren admitting to having made mistakes in Pennsylvania, Sunoco continues to make mistakes and new sinkholes keep appearing one after the other (this week in Chester County more than 10!) that are putting people's lives at risk.

We now know that negative impacts to private water supplies were a potential risk - see both;

1. Sunoco's Water Supply Assessment, Prevention, Preparedness and Contingency Plan <http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Water%20Supply%20Assessment,%20Preparedness,%20Prevention%20and%20Contingency%20Plan%20w%20appendices%20-%20Revised%20080817.pdf>
2. Sunoco's HDD Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan (IR Plan) <http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/HDD%20Inadvertent%20Return%20Assessment,%20Preparedness,%20Prevention%20and%20Contingency%20Plan%20w%20appendices%20-%20Revised%20080817.pdf>

The purpose of these plans was supposed to be the protection of surface and groundwater resources project-wide. Sunoco has failed to do that.

Just a reminder, Sunoco's Preparedness, Prevention and Contingency Plan was prepared in order to satisfy the requirements set forth in **25 Pa. Code Section 78a.68a and Section 102.5(I)** and was supposed to be in general accordance with PADEP's Guidelines for the Development and Implementation of Emergency Response Plans.

Sunoco Pipeline (SPLP) developed 4 plans that accompany the Erosion and Sedimentation Plan (E & S Plan):

1. The PPC Plan is provided as Attachment A of **the Mariner East 2 Project's Chapter 105 Joint Application for Permit**
2. The Water Supply Plan is provided as Attachment B
3. The IR Plan is provided as Attachment C
4. The Karst Plan as Attachment D.

These four plans also accompany every E & S Plan developed for the Project under the **Chapter 102 regulations**.

The reason I am spelling this out is for all to see what is required of Sunoco **and the DEP** and what we, the impacted land and well-owners expect of you.

On page 16, Section 4.3.3. of Sunoco's Pennsylvania Pipeline Project's Operations Plan (http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Summary_of_Order/Para%209%20-%20Exhibit%20E%20-%20Operations%20Plan.pdf), it clearly states "*If any impact to a private water supply attributable to pipeline construction is identified after post-construction sampling, **SPLP will restore or replace the impacted water supply to the satisfaction of the private water supply owner***".

Sunoco has not done this.

In Sunoco's Water Supply Plan

(<http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Water%20Supply%20Assessment,%20Preparedness,%20Prevention%20and%20Contingency%20Plan%20w%20appendices%20-%20Revised%20080817.pdf>), **the risks to private groundwater wells is highlighted in Section 5.2.1., page 7: Potential HDD Impacts:** *“While the path of least resistance is typically the bore hole itself, it may instead be an existing fracture, fissure, or formation opening in the soil or rock substrate. When this happens, circulation can be lost or reduced and drilling fluid could enter the groundwater table that could be used by private groundwater wells.”*

On February 13, 2017, the DEP issued Sunoco's State Water Obstruction and Encroachment Permit No. E23-524 for several townships including ours, Middletown Township.

<http://files.dep.state.pa.us/ProgramIntegration/PA%20Pipeline%20Portal/MarinerEastII/Permits/E23-%20524%20-%20Delaware%20County/PPP%20E23-524.pdf>

This permit has several conditions and requirements:

Page 2, Point 3, **“This permit does not give any property rights ... neither does it authorize any injury to private property or invasion of private rights”**

We believe that Sunoco has contaminated our well, damaged our internal plumbing, our property and made us sick. This contamination now has to appear on any Seller's Disclosures in the future.

Page 4, Point A., 1. **“If the project results in a pollution event which may impact any public or private water supplies, the permittee shall immediately notify the Department and the potentially affected public or private water supplies of the pollution event”**.

The June 20, 2019, drilling fluid spill on Valley Road near my property was reported by me to Rex Miller on the DEP Emergency hotline. I have pictures and videos of the drilling fluid entering a tributary of the Rocky Run just near my property. As far as I know, this was never self-reported by Sunoco.

Page 4, Point B, **“In the event the permittee's work causes adverse impacts to a public or private water supply source, the permittee shall also immediately notify the Department and implement a contingency plan, to the satisfaction of the public and private water supply owners that addresses all adverse impacts imposed on the public and private water supply as a result of the pollution event, including the restoration or replacement of the impacted water supply.”**

Sunoco has not restored our water supply to our satisfaction despite us submitting the requested “substantiating documentation” for our requests April 3, 2019. We have not heard back from Sunoco since we submitted this “substantiating documentation” despite my numerous requests for an answer from Percheron Field Services, through whom this was submitted.

Dominic Rocco's Testimony (<http://pasenategop.com/consumer/wp-content/uploads/2018/03/dep.pdf>), Joint Hearing on Pipeline Safety, Senate Environmental Resources and Energy and Consumer Protection & Professional Licensure Committees, March 20, 2018, was powerful. As the Acting Environmental Program Manager for the DEP's Regional Permit Coordination Office he testified on the DEP's role in regulating pipeline construction.

He stressed that the DEP has four main regulations that relate to pipeline construction – Chapter 102 regulations, Chapter 105 regulations, Chapter 93 requirements and Chapter 106 regulations.

A Joint Water Obstruction and Encroachment Permit combines into one DEP authorization both Ch. 105 and 106 activities, as well as a U.S. Army Corps of Engineers Clean Water Act Section 404 dredge and fill permit.

These permit conditions include the protection of private water supplies that may be impacted by regulated Chapter 105 activities to ensure drinking water sources are protected from pipeline construction activities. In our particular case, these permit conditions have NOT protected us.

Regarding Compliance and Enforcement, Domenici Rocco states that **“The Department will continue to include permit conditions that require work to stop when violations occur and require the violation to be resolved before work can resume.”**

Regarding Legislation, he adds that **“under the Clean Streams Law, the DEP can, and does, respond when informed of private water supply impacts. ... The Department can require termination of the activity causing private well impacts and can require restoration or replacement of the supply under most of our statutes. ... The permit terms and conditions require immediate cessation of drilling activity until and unless impacts are resolved.”**

He concludes **“The Department will continue to respond to and require restoration of private well impacts.”**

I implore the Department to help us. We received a letter recently informing us of the upcoming HDD for the 20-inch ME2. We are at our wits' end. Another phase of HDD drilling will only mean additional contamination and sediment in our already clogged and damaged system. It will continue to endanger us, our health, our home and our family.

I have not been allowed to see Sunoco's consultant's report on our internal plumbing. We allowed Dan Paulson complete access to every corner of our home but have not been allowed to see the report he compiled. When I asked about the sediment testing, Sunoco's answer was that they were “unusable” without any explanation. When asked about the “undetermined contaminant” I get no answer.

Now I have been asking you about the specific solids tests and I get no answer. I have asked Middletown Township for the complete geophysics report after the series of sinkholes near our home and it is not available to me. The whole system, the whole process of installing these pipelines, is geared towards placing residents at a disadvantage, not privy to important information that directly impacts our situation.

Domenic Rocco concluded in his Testimony “the Department suggests that it would be much more effective to authorize the Department to protect private wells in permits rather than waiting until they are impacted... **The Department reiterates that there is a need for a more comprehensive and effective approach to private well protection and regulation.**”

In the spirit of that last statement I am asking the DEP to please help us. I ask Middletown Township to help us. I ask Delaware County Council to help us. Senator Killion please help us. Rep. Chris Quinn told me last year there was nothing he could do. Now that Sleighton Park has been riddled with sinkholes and our water and well is totally contaminated maybe he could help us now?

I don't believe anyone can imagine how living like this has impacted us as a family. The feeling that we are showering in contaminated water every day, the damage to our internal plumbing and constantly flushing toilet mechanisms at all times of the day and night after 12 months of heavy sediment running through the system, having to haul into the house half a dozen 5 gallon tanks of water every two weeks (for me, resulting in a semi-herniated disc), knowing the value of our property has been badly impacted, not being able to move away since no-one would buy our property in its current state (nor would we be allowed to sell it like this), feeling trapped in a land of sinkholes in the park I used to walk my dogs every day. Here are some pics of the water supply we live on (and we ran out of today) and of the still heavy sediment in our internal plumbing system:



Can anyone tell me why we should be expected to live like this ... for over a year?! This is the “major Quartz contamination”, the heavy sediment we have going through our internal plumbing system. I have supplied Percheron Field Services dozens of pics and videos of our contamination, the sediment and the malfunctioning plumbing mechanisms. I had Master Plumbers from Philadelphia inspect our issues. They couldn't believe it. They told us they won't replace anything until we are on public water because the issue of the sediment remains.

Finally, this is now an additional concern. As I drove past St. Simon and Jude Church and School, the site of an ME2 HDD entry/exit point, I noticed the pallets of Bentonite mix that Michels is using:



This is Cetco Super Gel-X. These are the Safety Data Sheets for Cetco Super Gel-X:

https://www.mineralstech.com/docs/default-source/performance-materials-documents/cetco/drilling-products/sds/sds---us/sds-us---super-gel-x.pdf?sfvrsn=25cc0ad3_8

The Safety Data Sheets for Cetco Super Gel-X are alarming, to say the least. The signal word is “Danger”. The Hazard Statement is that it “May cause cancer”. “Causes damage to organs through prolonged or repeated exposure”.

The Hazard Identification, Section 2 on the SDS, lists the Health Hazards as 1A for Carcinogenicity and category 1 for Specific target organ toxicity, repeated exposure. However, the Global Harmonized System (GHS) of Classification and Labeling of Chemicals states that Category 1, Specific target organ toxicity, single exposure, causes damage to organs.

Our water test results show an extremely high concentration of quartz (SiO₂) since our well suffered drilling fluid contamination.

Montmorillonite/Bentonite has the component SiO₂, known as silicon dioxide, silica, quartz, crystalline silica. The Safety Data Sheet for Cetco Super Gel-X states in Section 8 gives the exposure limits for Silica, Crystalline, Quartz (CAS 14808-60-7). The Safety Data Sheets for Cetco Super Gel-X give exposure limits for both the silica, crystalline, quartz (CAS 14808-60-7) as well as the “Trade Secret”. We do not know what the trade secret component is. We do know from the SDS that it is inhalable and respirable. We also know from the U.S. National Toxicology Program (NTP) Report on Carcinogens that Silica, Crystalline, Quartz (CAS 14808-60-7) are “known to be a human carcinogens”.



Michels, Sunoco's contractors for the HDD, have a Contingency Plan For Inadvertent Release of Non-Hazardous Drilling Fluid:

<https://puc.sd.gov/commission/dockets/HydrocarbonPipeline/2014/HP14-002/contingency.pdf>

It states that "Michels has access to several different brands of bentonite. The selection of which brand to use is typically based on price, availability and proximity to the proposed drill site. The following brands all have similar characteristics providing the same results as listed above. ATTACHMENT Potential Bentonite Brands - MSDS • Max Gel • Super-Gel X • Bara-Kade. The Safety Data Sheets for each are:

1. Max Gel -
http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/IndustryResources/InformationalResources/HDD_Safety_Data_Sheets/M-I_MAX%20GEL_MSDS.PDF
2. Cetco Super Gel-X - https://www.mineralstech.com/docs/default-source/performance-materials-documents/cetco/drilling-products/sds/sds---us/sds-us--super-gel-x.pdf?sfvrsn=25cc0ad3_8
3. Bara-Kade -
http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/IndustryResources/InformationalResources/HDD_Safety_Data_Sheets/BENTONITE%20Performance%20Minerals_BARA-KADE_SDS.pdf

Our Quartz and Bentonite contamination has now become potentially carcinogenic contamination. The Safety Data Sheets for each one of these bentonite products warns "Danger", "May Cause Cancer", "Health Hazard: Carcinogenicity". "Routinely wash work clothing and protective equipment to remove contaminants". "Warning: This product can expose you to Quartz (SiO₂) which is known to cause cancer". These are the contaminants that Richard King maintains do not exist.

The Toxicological Information of the Cetco Super Gel-X bentonite Safety Data Sheet for Quartz (SiO₂) (CAS 14808-60-7) includes:

- **IARC Monographs. Overall evaluation of Carcinogenicity:**
Quartz (SiO₂) (CAS 14808-60-7) – 1 Carcinogenic to humans
- **OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053):**
Quartz (SiO₂) (CAS 14808-60-7) – Cancer, lung effects, immune system effects, kidney effects
- **U.S. National Toxicology Program (NTP) Report on Carcinogens:**
Quartz (SiO₂) (CAS 14808-60-7) – Known to be Human Carcinogen
- **U.S. Federal Regulations: This product is a "Hazardous Chemical"** as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200

For all of us who were near to HDD sites while these products were being used, we have something to worry about. We were not offered protective equipment. Every day I walked my dogs at the HDD drill site at Sleighton Park, the site of 4 sinkholes. I have no idea what my level of exposure to the carcinogenic dust was or how harmful it has been to me or my family. We were never informed, warned or protected.

These carcinogens in my water present another problem. One potential source of human exposure to environmental pollutants is through chemically contaminated domestic tap water. The most obvious route of exposure to contaminants is by ingestion. However, dermal and inhalation exposure may also occur within the home. Several studies have shown that showering increases the likelihood that an organic compound will be volatilized, resulting in human exposure through the skin or by inhalation (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2874882/?report=reader>). Showering produces respirable droplets that may serve to deposit pollutants within the respiratory tract (attachment 7). My family and I have been showering in this water containing crystalline silica every day for over a year since we were contaminated with HDD drilling fluid.

I have been given to understand that certain parties, intervenors in the Safety 7 case, have been invited to Settlement Talks with Sunoco. As you may know, I am one of the Safety 7 but we have not been invited to any talks or meetings. I still believe this project should never have been allowed to come through densely populated, high consequence areas. I ask any of you involved in these talks to consider what is at stake here. Mistakes have been made in the construction of this pipeline and continue to be made. Please look at the history of willful and egregious violations, the insufficient geophysical analyses that have resulted in sinkholes and contaminated wells, the sheer misery that this project has brought to so many residents of Chester and Delaware Counties who have had to live for years, not weeks or months, with construction sites on their doorsteps – the noise, the dust (potentially carcinogenic), the damage, the danger and the ugliness. Please spare a thought for us, the residents, who have had to live on the thin line of this Mariner East project, placed within the blast zone of a potential catastrophe, with absolutely no choice in the matter.

I would very much appreciate a response to this letter and answers to my specific questions.

Sincerely,

Rosemary Fuller

Cc: **Buterbaugh, Thomas D.** tbuterbaug@pa.gov,

Harr, Doreen dharr@pa.gov,

Patterson, Patrick patpatters@pa.gov,

Henning-Dudley, Desiree dheningdu@pa.gov,

Cain, Virginia vicain@pa.gov

Brian P. Zidek, ZidekB@co.delaware.pa.us

Monica Taylor, TaylorM@co.delaware.pa.us

Kevin M. Madden, MaddenK@co.delaware.pa.us

Elaine Paul Schaefer, SchaeferE@co.delaware.pa.us

Christine A Reuther, ReutherC@co.delaware.pa.us

Eleanor DiMarino-Linnen, edimarino@rtmsd.org

Meredith Merino, mmerino@middletowntownship.org

Rep. Mary Gay Scanlon, RepScanlon@mail.house.gov

Senator Tom Killion, tkillion@pasen.gov

RTM - School Board, SchoolBoard@rtmsd.org,

PA Senate - Andy Dinniman andy@pasenate.com

Debra Ciamacca, debraciamacca@gmail.com

Gov. Tom Wolf, govcorrespCRM@pa.gov

From: johohenste@pa.gov,

To: rosemaryfuller@aol.com,

Cc: tbuterbaug@pa.gov, dharr@pa.gov, dhenningdu@pa.gov, rofogel@pa.gov, vicain@pa.gov, ZidekB@co.delaware.pa.us, TaylorM@co.delaware.pa.us, MaddenK@co.delaware.pa.us, SchaeferE@co.delaware.pa.us, ReutherC@co.delaware.pa.us, tkillion@pasen.gov, debraciamacca@gmail.com, RA-GVGOVCORRESPCRM@pa.gov, gordon.fuller@us.ibm.com,

Subject: RE: [External] Re: Mariner East Carcinogenic Bentonite Mix

Date: Thu, Oct 8, 2020 5:53 pm

Attachments: SDS US - SUPER GEL-X®.pdf (414K), Environmental Effects of SuperGel-X.pdf (281K), SUPER GEL-X - Microtox and Metals.pdf (217K), PA DOH Incident Report and Recommendations.pdf (150K)

Ms. Fuller

Thank you for conveying your concerns regarding the use of Cetco Super Gel-X. I am not aware of the specifics of the “trade secret” ingredient other than what is described as sodium poly-acrylate in the attached file, *Environmental Effects of SuperGel-X.pdf*. Permit Condition NN of Permit E23-524 specifies that additives used in the drilling process must have NSF-60 approval in order to be acceptable for use. This material has NSF-60 approval; NSF-60 approval is the baseline the Department uses for materials in contact with drinking water.

The use of Cetco Super Gel-X has come up on other sites related to the Sunoco ME2 project, specifically the issues surrounding the inadvertent return at the HDD 290 site in Upper Uwchlan Township at Marsh Creek Reservoir. The concern at that site was related to airborne dust and effects on the reservoir. The PA Department of Health (DOH) reviewed the SDS sheets along with additional files that were made available by Cetco. I have attached their response to that review. You have presented an additional scenario involving water vapor. I have forwarded your concerns to the DOH to review that aspect of contact with this material.

Thank you,

John F. Hohenstein P.E. | Environmental Program Manager

Department of Environmental Protection | Southeast Regional Office

Waterways and Wetlands Program
2 East Main Street | Norristown, PA 19401

Phone: 484.250.5171 | Fax: 484.250.5971

www.dep.pa.gov

In order to prevent the further spread of COVID-19, all DEP offices will remain closed until restrictions are lifted. In the meantime, I will be working remotely and responding to email.

PRIVILEGED AND CONFIDENTIAL COMMUNICATION The information transmitted is intended only for the person or entity to whom it is addressed and may contain confidential and/or privileged material. Any use of this information other than by the intended recipient is prohibited. If you receive this message in error, please send a reply e-mail to the sender and delete the material from any and all computers.

From: rosemaryfuller@aol.com,

To: env.health.concern@pa.gov,

Cc: johohenste@pa.gov, drocco@pa.gov, patpatters@pa.gov, tbuterbaug@pa.gov, dharr@pa.gov, dhenningdu@pa.gov, vicain@pa.gov, zidekb@co.delaware.pa.us, taylorm@co.delaware.pa.us, maddenk@co.delaware.pa.us, schaefer@co.delaware.pa.us, reuther@co.delaware.pa.us, cquinn@pahousegop.com, jmcnullan@middletowndelcopa.gov, mkirchgasser@gmail.com, dusslingcouncil@gmail.com, bokread@gmail.com, gordon.fuller@us.ibm.com,

Bcc: rua690plumber@aol.com, debraciamacca@gmail.com,

Subject: Carcinogenic Concerns

Date: Fri, Feb 12, 2021 3:31 pm

Attachments: PA DOH Incident Report and Recommendations (3).pdf (150K), HohensteinOct8.pdf (397K),
PA DOH Incident Report and Recommendations (3).pdf (150K)

Attn. Rachel Levine, MD
Secretary of Health
Pennsylvania Department of Health

Please cc to:

Sarah Boateng
Executive Deputy Secretary
Pennsylvania Department of Health

Sharon Watkins, PhD.
Director, Bureau of Epidemiology
State Epidemiologist

Anil Nair, PhD, MPH
Division Director
Environmental Health Epidemiology

Governor Tom Wolf

Subject: Category 1A Human Carcinogen used in Mariner East's HDD negatively impacting homeowners and private well owners

Dear Dr. Levine,

I am writing to you to express a serious concern I have had for many months regarding the use of Sunoco's drilling products and their potential carcinogenic impact on the residential population of Pennsylvania. The products I am referring to are:

1. Super Gel-X - [SDS US \(mineralstech.com\)](https://www.mineralstech.com)
2. Plugz-It Max - [SDS_Plugz-It_Max.pdf \(wyoben.com\)](https://www.wyoben.com)

As Mr. Hohenstein, Environmental Program Manager, DEP Southeast Regional Office, and Mr. Patterson, the Regional Director of the DEP's Southeast Regional Office, are aware, our private water well was contaminated by Sunoco's HDD activities in July 2019. Since then we have been living off bottled water, like hurricane victims. The contamination and sediment went through our entire plumbing system and has caused a huge amount of damage. We still continue to shower in this contaminated water after 17 months.

Despite reassurances from Energy Transfer's Larry Gremminger that our water was fine to shower in, we now find out that, in fact, we have been potentially exposed to the crystalline silica in the bentonite mix. We suffered both "major" bentonite contamination and "major" quartz contamination. The Safety Data Sheets for the HDD products clearly state that the crystalline silica is a Category 1A human carcinogen. Scientific academic papers

are available that highlight the dangers of contaminants in shower vapor. In fact, the smaller the particles (e.g. the ones that bypass the filter), the more carcinogenic those particles are.

The use of both these products is for 'industrial' situations. It clearly states that on the Safety Data Sheets. When either the dust enters residential buildings (those within a few feet of the HDD) or the private water supplies of local residents, this is no longer an industrial setting. There are OSHA guidelines to using these products (protective masks, PPE, etc.) for the workers using them. There are no warnings given to the general public however. How are we to be protected?

Despite numerous emails to both Messrs. Hohenstein and Patterson, I have never received an answer to my original inquiry. Attached is Mr. Hohenstein's email to me, dated October 8, 2019. In this email Mr. Hohenstein states that I "have presented an additional scenario involving water vapor. I have forwarded your concerns to the DOH to review that aspect of contact with this material." I have NEVER received a response.

Your incident response regarding the Marsh Creek Lake Drilling Fluid Spill is a totally different situation to that impacting private well owners and those living within a few feet of HDD sites such as Tunbridge and Glen Riddle Apartments in Middletown Township.

What really concerns me is that an acquaintance of mine living within feet of the construction (my age, non-smoker) was diagnosed with a sudden and aggressive lung cancer in November/December of 2019 and died on April 2, 2020.

I would very much appreciate it, Dr. Levine, if you would do me the courtesy of replying to my email. This is of great concern to us, as I originally expressed in my email to Mr. Hohenstein.

I look forward to hearing from you on this matter.

Sincerely,
Rosemary Fuller

FULLER EXHIBIT 8
SAMANTHA REINER EMAIL
RE. WATER BUFFALOS

From: rosemaryfuller@aol.com,
To: rosemaryfuller@aol.com,
Subject: Water Buffalo
Date: Wed, Jul 31, 2019 4:58 pm

Attachments:

-----Original Message-----

From: Samantha Reiner <sreiner@edgmont.org>
To: Rosemary Fuller <rosemaryfuller@aol.com>
Cc: Tom Killion (tkillion@pasen.gov) <tkillion@pasen.gov>; Chris Quinn <Chris@qiagency.com>; Drocco@pa.gov <Drocco@pa.gov>; gmb@pa.gov <gmb@pa.gov>; rfyong@pa.gov <rfyong@pa.gov>; Catherine Ricardo <cricardo@edgmont.org>
Sent: Wed, Apr 18, 2018 1:26 pm
Subject: RE: Sunoco question/concern

Ms. Fuller: What I know is this:

- Edgmont discovered, during this fall, that Sunoco had installed alternative water supplies to properties near its Mariner East II HDD drill easement area without first contacting authorities for advice, permits, or regulations
- Edgmont researched the matter fully with code officials, electricians, building officials, property owners and water scientists and Aqua public water company to become educated on the topic
- Edgmont's staff developed a protocol to provide for the permitting of temporary water supply facilities, commonly called water buffalos in an effort to protect the safety, health and welfare of its residents
- Edgmont has struggled with Sunoco to gain compliance and get permits issued and safety inspections completed for the temporary water facilities already installed
- Edgmont has discovered improperly installed electric line in at least one of the temporary water supply systems, once it was able to get the work inspected
- Edgmont has learned that Sunoco has now disconnected some of these alternate water supplies and reconnected households to previously abandoned wells, again without first contacting the authorities for advice, permits or regulations
- Edgmont researched the matter and developed a series of dormant well testing criteria that it required Sunoco to perform, with satisfactory results, prior to any future reconnecting of residences to their previously abandoned wells and has requested this testing from Sunoco
- Sunoco is resisting furnishing the township with the well testing results it requires and continues to re-connect residences to their former drinking water well supplies

This is very concerning to your elected officials, the Township Manager and administrative staff, who will continue to try to gain compliance from Sunoco. I have copied this e-mail to your state representatives, the PaDEP and the Public Utility Commission for their information. If you have any questions or concerns, you may also direct them there.

Samantha Reiner
Zoning Officer
Edgmont Township
P.O. Box 267
Gradyville, PA 19039
sreiner@edgmont.org
610-459-1662



From: Rosemary Fuller [mailto:rosemaryfuller@aol.com]
Sent: Wednesday, April 18, 2018 10:50 AM
To: Samantha Reiner <sreiner@edgmont.org>
Cc: Catherine Ricardo <cricardo@edgmont.org>
Subject: Re: Sunoco question/concern

Dear Ms. Reiner,

Thank you so much for contacting me. I live on Valley Road and have been offered a water buffalo by Sunoco. Unfortunately Sunoco has no paperwork to share with us about the water buffalo. Unless we can see some sort of contract or agreement we will not be letting anyone touch our water supply.

A previous water buffalo owner suggested I try Edgmont Township for some kind of paperwork but Lacey explained yesterday that the Township simply inspects and grants permits which I fully understand. Any contract should be between Sunoco and the well owner.

If you can shed any further light on this rather extraordinary situation I would be most grateful.

Kindest regards,
Rosemary and Gordon Fuller

-----Original Message-----

From: Samantha Reiner <sreiner@edgmont.org>
To: rosemaryfuller <rosemaryfuller@aol.com>
Cc: Catherine Ricardo <cricardo@edgmont.org>

FULLER EXHIBIT 9
ERICA AND JON TARR
1762 MIDDLETOWN ROAD
GLEN MILLS, PA 19342

From: ericagtarr@gmail.com,

To: rosemaryfuller@aol.com,

Subject: Fwd: Tarr Property Original and New Well Timelines and Water Tests

Date: Thu, Feb 18, 2021 11:15 am

Attachments: 1762 Middletown Road Water Timeline Original Well.pdf (80K), 1762 Middletown Road Water Timeline New Well.pdf (89K), 1762 Middletown Road water post-treatment.jpg (2248K), BSC Water Results 1762 Middletown Rd (Feb 25 2019).pdf (17K), Basic water test results (Keyes July 22 2019).pdf (56K), Basic water test results (Keyes Aug 13 2019).pdf (56K), BSC Water Results 1762 Middletown Rd (Aug 30 2019) Positive Bacteria.pdf (17K), SUNOCO_ (NOV - Stream Contamination)_19-06-14.pdf (10707K), National Testing Laboratories Results Sample 10-24-19.pdf (149K), National Testing Labs VOCs Sample 11-6-19.pdf (143K), DEP VOCs 12-18-19.pdf (19K), Eurofins 12-2-19.pdf (379K), DEP VOCs pre-treatment 1-21-20.pdf (19K), Water-Right, Inc pre-treatment 11-4-20.pdf (74K)

----- Forwarded message -----

From: Erica Tarr <ericagtarr@gmail.com>

Date: Mon, Jan 4, 2021 at 7:57 AM

Subject: Tarr Property Original and New Well Timelines and Water Tests

To: <[REDACTED]>

[REDACTED]

I hope that you had a good New Year with your family. Attached I have provided a timeline of both our original and new wells. I have also attached water test results on both wells.

As you know, when we purchased our home in April of 2019, we had clear, clean water that did not require any treatment. Our water quality and quantity changed suddenly in June of 2019, and we have been living with a contaminated water supply since October of 2019.

At this time, we are unable to use our water for showering/bathing, doing laundry, etc. During these months with increased COVID cases and advisories to stay at home, we are forced to pack our car up with our dirty laundry to go shower ourselves and bathe our daughter at our family members' homes; all while wearing masks and social distancing to keep our family members safe and healthy as I am continuously exposed to the virus while working in a nursing home setting. To say this past year and a half has been hard on us, is an understatement.

We are begging for assistance. We are asking you to put yourself in our family's shoes. What would you do if your family had to live like this? We need relief. The stress of this water nightmare is simply too much to bear. Will Sunoco/Energy Transfer please, please, please start filling our water buffalo again and/or provide us with a larger buffalo at this time, while we figure out a permanent solution?

Thank you for taking the time to read and review this document. I hope that you can appreciate what we have had to go through over the past year and understand that what we are asking for is not unreasonable. We just want to be able to live a normal life again, with a clean water supply.

Erica and Jon Tarr

1762 Middletown Road

Glen Mills, PA 19342

1 Attached Images



1762 Middletown Road New Well Timeline

When our original well became untreatable, as the yield was not sufficient to utilize the equipment needed to treat the water, our only option was to drill a new well. Our new well was drilled on 10/3-10/4/2019 by Edward Powell Pump & Well Drilling. Horizontal boring from the location of the new well to the house was completed on 10/11 and our original well was abandoned that same day. The new well was shock treated and we flushed the chlorine out for the next few days. On 10/15, the well company obtained the first basic "baseline" water sample on the new well, that was sent to Brandywine Science Center. On 10/18, the well technician came to adjust the settings of the equipment to the new water results and they obtained another sample. From 10/18-10/23, we drank and bathed in the new well water. On 10/23, Nathan Powell, the water quality technician with Edward Powell Pump and Well Drilling came to assess our water and wanted to take another sample to determine why the technician's water sample results from the in-house sample obtained on 10/18 differed from the Brandywine Science Center results from the 10/15 sample. While obtaining the sample from the kitchen faucet, Nathan noticed a "strange odor." At that time, he took the samples to Chris Powell and Mike Urbans (water treatment specialist) to assess the odor. They both stated that they have never smelled that odor in water and asked how far we were from the pipeline. They recommended sending VOC tests. I called Lance Vaught; Chris Powell also called Lance and requested that Sunoco/Energy Transfer come assess our water.

On 10/24/19, Lance came over in the morning and took a statement. He remarked multiple times that he did not realize how close we were to Pat Poppert. He said he knew that Pat Poppert had a water buffalo and stated that they were doing her a favor by providing her with a buffalo. At the conclusion of our meeting, he took my statement back to management. Within a few hours Lance contacted me and asked if they could send GES (Groundwater Environmental Services) over to obtain a water sample and assess our water. Chris Powell sent first VOC sample to National Testing Laboratories on 10/24 and was in the house obtaining the sample when the GES environmental engineer, professional geologist, and technician arrived. They took my statement, and the technician obtained a water sample that was sent to Pace Analytical and RJ Lee Group for analysis. The environmental engineer and geologist who interviewed me requested that I obtain the "well log or drillers log," "well completion form," and "well abandonment form" from our well company. We obtained those and forwarded them to Lance to share with GES since I was not allowed to contact GES directly.

On 10/25/19, my toddler got sick after taking a bath; she had a fever, rash and body pain. Coincidence, or related to possibly contaminated water? This was when we ultimately stopped using the water to drink, bathe in, do laundry, do dishes, wash our hands, brush our teeth, etc. We were only using the water to flush the toilets while we awaited the water test results. From 10/25-11/5, the water quality became alarmingly worse and it left a burning sensation in your mouth if you attempted to taste it. On 10/29, after updating Edgmont Township, they suggested "to request an alternate water supply (water buffalo) from Sunoco and do not use your water until the water testing analysis comes back."

On 11/5/19, we received the first National Testing Laboratories results from the sample sent on 10/24/19. There were 5 Volatile Organic Compounds (VOCs) present post-treatments: Acetone, Methyl-Ethyl Ketone, Styrene, Tetrahydrofuran, and Toluene (see attached). After

doing research, we discovered that we can attribute the Acetone, Methyl-Ethyl Ketone, Styrene and Tetrahydrofuran to the PVC piping installation and adhesive used to connect the PVC pipes from the well to the filtration equipment. On 11/6/19, we sent a second VOC sample to National Testing Laboratories since the water quality had progressively worsened since we discovered the "strange odor" on 10/24 and became more alarming.

On 11/7/19, Lance forwarded the professional geologist (GES) report/evaluation and our water results from Pace Analytical and RJ Lee Group from the GES sample sent on 10/24. On 11/8/19, the DEP sent Rich Staron to assess our water. He reviewed the National Testing Laboratory results and stated that the positive VOCs were related to the PVC piping and the new equipment in our well room. He never provided us with a written report, he simply gave a verbal "explanation." Rich Staron told us that our water was safe to drink and bathe in at that time, as the VOCs were below EPA limits. He also took a sip of the water, and instantly spit it out into the kitchen sink. Rich Staron did not obtain a water sample on that date. On 11/15/19, we filed our second complaint with the DEP, it was the same day that I obtained the records from the 1992 Sunoco Pipeline rupture (Mariner East 1-ME1) that released tens of thousands of gallons of jet fuel on the Batchelder property at 1555 Meadow Lane. On 11/18, I emailed Rich Staron with DEP regarding Toluene present, Toluene in jet fuel, and me discovering documents from 1992 Sunoco Pipeline rupture of jet fuel. I also shared the DER (present day DEP) "no further action letter" with him at that time. Rich responded that the DEP did not have a file for the Meadow Lane Leak Site and asked if I could provide him with the materials that I had obtained. He recommended a Granular Activated Carbon unit for the presence of Toluene. On 11/18, I let Lance know via text that our second National Testing Laboratories results tested positive for Toluene, at a higher level than previously detected. I also let him know that I was reviewing the Meadow Lane Leak Site report from the Sunoco Pipeline rupture in 1992 at 1555 Meadow Lane. He told me that he was forwarding my information to management. This was the last communication that I received from Lance until CBS news contacted Sunoco/Energy Transfer for a statement on 1/6/20, at which time Lance called me and offered to set up a meeting for us with a geologist.

On 11/12/19, HDD resumed at Drill Site 570 for the 20-inch pilot. On 12/2/19, we sent a VOC sample to another independent lab, Eurofins QC, LLC. Those results revealed that Toluene was present and increasing since National Testing Laboratories samples sent one month prior, and the well was now testing positive for MTBE, which we did not test positive for prior to the HDD drilling resumed in mid-November. Of note, Pat Poppert at 1756 Middletown Road's well tested positive for MTBE in March of 2019, and Sunoco/Energy Transfer was made aware. Sunoco/Energy Transfer has been providing Pat Poppert with a water buffalo since the spring of 2019. Pat Poppert has documentation from Sunoco/Energy Transfer stating that her well is 648 feet from the HDD. She received assistance from Sunoco/Energy Transfer even though her well is beyond the "450-foot buffer zone."

From 10/25-12/10/19, we did not use our water to drink, bathe in, do laundry, do dishes, wash our hands, brush our teeth, etc. We were forced to use bottled water to brush our teeth. When I changed a soiled diaper from my daughter, I could not wash my hands, and had to use hand sanitizer to "clean" them. We felt like squatters in our own home, and it is difficult to put into words the stress that we endured. We lived out of suitcases packed with toiletries and

went to our family members' homes to shower/bathe our daughter, do laundry, and clean our dirty dishes. On 12/10/19, we installed two granular activated carbon (GAC) filters to remove the VOCs, Toluene and MTBE. We finally felt "safe" after installing the equipment to remove the VOCs, and we started using our water again to bathe in, do laundry, brush our teeth, wash our hands; however, we did not feel comfortable drinking the water knowing that it had chemicals that needed to be removed. We did not know if we could put our full trust to consume the water in the GAC unit, but we had more peace of mind and thought that we could resume our lives and start living "normally" again.

On 12/16/19, I called Rich Staron at the DEP, and made him aware of the Toluene levels increasing and Methyl Tertiary Butyl Ether (MTBE) now present in our new well, pre-treatment. The DEP sent Tom Buterbaugh to obtain water samples for analysis on 12/18/19; this was the first set of samples taken by the DEP (see attached). While we awaited the results, we went through the holidays with hope and relief, believing that since we installed the GAC unit, all would be well; pardon the pun. On 1/2/20, I put my daughter in the tub and was playing with her while it filled. As it became a few inches deep, I noticed that the color of the water was no longer clear in appearance as it had been days earlier, it had a yellow tint. I thought to myself, "oh no, did Evie just pee in the tub?" At the same moment, our water issues flooded my mind. I snapped a photo of the water, scooped Evie out of the tub, and continued to let it fill up to see if in a larger volume the discoloration would be more prominent. I sent that photo to my husband, and called him almost in tears, telling him that, "it didn't work. After all of this treatment, drilling a new well, installing a GAC unit, our water is not clear like it was when we moved in! What on earth do we do now?" In a moment of frustration, I shared that photo of Evie in the bathtub to my personal Facebook, thinking that I was sharing an update with our friends and family who had been constantly checking in on us to see how our water issues were coming along. I did not expect that photo or post to go viral. I did not expect to have news outlets calling me and wanting to do a story on us. Everything from that moment seemed to spiral, and the next thing I knew our water was featured on CBS news on 1/6/20 and NBC news on 1/8/20. I had State Representatives and the Senator's office calling me, asking what the DEP had done for us; to see how they could help. The Department of Public Health called me on 1/13/20 to discuss our well contamination and concerns. I asked them where they obtained my contact information from and they told me that the DEP had passed our water results on to them to review.

On 1/21/20, Rich Staron with the DEP came to obtain two more water samples; one pre-treatment and one post-treatment. While Rich was here, we discussed the 1992 Sunoco Pipeline rupture and release of jet fuel that was not fully remediated. I brought up the point that Toluene was present in the water retention basin/pond on the Meadow Lane Leak Site property (1555 Meadow Lane) in 1992 and that it was present in that same water retention basin/pond on that property in 2015, as evidenced by Eurofins samples obtained for Sunoco Logistics on 8/17/15. I questioned Rich on how it would be possible for the Toluene in that pond to reach our well at a depth of 200 feet. While he stated that water flow presumably flows from our property upgradient to the pond, he drew us a diagram of how it would be possible for the Toluene in and below the surface of the pond to disperse outward, and migrate away from the pond, in the direction of our property and well. After reviewing the water samples taken on 1/21/20, Rich Staron stated, "your treatment system is appropriately removing contaminants of concern associated with previous releases near your residence. For the analytes sampled, all of your

post-treatment water is appropriate for all residential consumptive uses.”

This statement is not acceptable. The fact that we needed to install two GAC units to filter out the Toluene and MTBE that is in our well, and that we were not responsible for contaminating the well in the first place, is simply unacceptable. Sunoco had a product pipeline that ruptured in 1992 and released tens of thousands of gallons of jet fuel, and the Summary Report for the Meadow Lane Leak Site reveals that Toluene was not fully remediated from 1992-1994. Sunoco was aware of the Toluene in the pond on that property in 2015. Sunoco was also aware of MTBE present in the well of a property owner at 1585 Meadow Lane as evidenced by Eurofins sample obtained for Sunoco Logistics on 6/28/2016.

Prior to construction of the Mariner East 2 (ME2) pipeline, Sunoco/Energy Transfer had a “Water Supply Assessment, Preparedness, Prevention and Contingency Plan,” prepared by Tetra Tech, Inc., a consulting and engineering firm. That document states, “There is the potential to encounter an unanticipated petroleum-based impacted soil during Project construction. The threat of such an encounter to surface or groundwater would depend on the location and extent of the impacted condition.” Sunoco/Energy Transfer was aware of the 1992 Mariner East 1 Leak Site location. Their plans for drilling of the Mariner East 2 pipeline through the same right of way, directly through the remediated property, was not altered or swayed after they learned that there were properties with Toluene and/or MTBE present in 2015/2016. The company was warned that they could encounter petroleum-based impacted soil during drilling that could impact other water supplies. The company chose to continue with their project without choosing a different right of way; if they had done so, they could have potentially avoided causing further contamination. I have referenced four properties that have documented Toluene and/or MTBE. Those properties span over a minimum of 8 acres, a widespread contamination. The only water supplies for these properties are wells and there is documented well water contamination on these properties. We feel that Sunoco/Energy Transfer should be liable for contaminating these properties; since again, they were aware of the contamination in 1992-1994 and 2015/2016, they were warned that water supplies could be impacted, and additional water supplies are now testing positive for Toluene and/or MTBE.

There was one property remediated from 1992-1994, 1555 Meadow Lane, the Meadow Lane Leak Site. The present-day HDD that begins at Drill Site 570 drills directly through 1555 Meadow Lane. The edge of the contaminated water retention basin/pond on that property is less than 200 feet from the HDD path, per a google maps document provided to that property owner by Sunoco/Energy Transfer. Our new well, at the other edge of that contaminated water retention basin/pond, is approximately 500 feet away, per a google maps document provided to us by Sunoco/Energy Transfer. The Leak Site where the pipe ruptured in 1992 is between the contaminated water retention basin/pond and our new well. We have documents from Sunoco/Energy Transfer stating that our property is anywhere between 850 to 950 feet away from Drill Site 570. What exists between my new well and Drill Site 570 is a contaminated property, specifically a water retention basin/pond, that was not fully remediated in the 1990s. Regardless of our distance from the Drill Site, our new well is testing positive for the same VOC, Toluene, found in the water retention basin/pond at the Meadow Lane Leak Site. It seems clear that the HDD drilling activities stirred up the legacy contaminants that have been sitting underground since 1992. We can only assume that the Toluene that is present in the

contaminated pond seeped into the ground, and down to lower rock formation levels. The HDD drilling activities either a.) caused further fracturing of the “fracture dominated valley...characterized by fractured felsic gneisses,” (Summary Report Meadow Lane Leak Site, Sept 1993) which provided further conduits for the contaminated pond water to travel through to get to our new well at a depth of 200 feet, or b.) stirred up the contaminated aquifers causing them to merge, which in turn caused the contaminants to migrate to other aquifers, and ultimately ending up in private well owners' water supplies.

On 12/18/19, the DEP sampling revealed that Toluene was detected at 0.588 ug/L and MTBE was detected at 1.20 ug/L pre-treatment. The DEP sample sent one month later on 1/21/2020 revealed that Toluene was not detected and MTBE was detected at 1.28 ug/L. The minimum detection level on that DEP sample for Toluene was 0.5 ug/L. As you can see, it was only 0.088 ug/L above the minimum detection limit just one month prior. It is likely that on 1/21/20, Toluene was actually present, just below the minimum detection level for that specific testing method performed. The fact is that the water quality changes day to day, and that the contaminant levels change day to day as well.

Since our new well first tested positive for a VOC on 10/24/19, every single subsequent pre-treatment VOC sample has detected either Toluene and/or MTBE. As a private well owner, we are responsible for maintaining and treating our well. The fact that there are VOCs present in our well is not acceptable, no matter the level or if they are below the EPA limit. How much Toluene and/or MTBE is acceptable for my toddler to drink? What is a safe Toluene and/or MTBE level to bathe a newborn baby in? I think the answer is clear to anyone, zero; regardless of whether they are a parent or not.

Putting aside the contaminants in our new well, the other water quality indicators reveal that this well is untreatable. The iron on this well on 11/13/2020 (see attached) was 52.2 mg/L, and the EPA secondary standard for iron is 0.3 mg/L. Our two softeners, followed by both a 5 and a 1 micron filter cannot possibly handle an iron level of 52.5 mg/L. The Total Dissolved Solids (TDS) on this well on 11/13/2020 (see attached) was 947 mg/L, and the EPA secondary standard for TDS is 500 mg/L. The only treatment to remove TDS would be a whole house reverse osmosis system, which would not be possible on our current well. Not only are the high metals levels causing our water to remain brown/murky as the equipment cannot filter the extreme levels, the hardness is causing our pipes to burst and we have had to replace more than 7 sections of copper pipe with PVC pipe.

Our well company came to assess our equipment after it failed on 12/8/20 (see attached photo). At that time, the well company broke the news to us that there is nothing more that they can do to treat the “new” well. With the iron, Total Dissolved Solids, hardness, etc levels well above EPA limits, in addition to the presence of Toluene and MTBE, the well company has recommended abandoning the well. The problem is, we don't know where else on our property to drill another new well. Without hydrogeological studies, we don't know where on our property we could possibly find treatable water. We also don't know at what levels the contamination exists. We can't take the risk of putting ourselves into more debt to attempt to drill a new well, which may yield the same or worse quality water than what we are attempting and failing to treat on our current well. To date, we have spent over \$40K on 1.) an acid neutralizer which has since been changed to a Turbidex/softener 2.) a softener 3.) two granular

activated carbon filters 4.) a UV light 5.) a kitchen sink reverse osmosis system 6.) the new well 7.) abandonment of original well 8.) water tests 9.) water delivery costs for brother-in-law's public water that he has delivered 10.) bottled water for drinking and 11.) attorney fees.

The fact is that when we purchased our property, we had clean water directly from our original well that did not require any treatment or filtration. Today, on our "new" well, we have horrendous, untreatable water that can be compared to third world living. With all of the information that we have learned about the a.) IR and subsequent clean up at Drill Site 570 in June of 2019 that coincides with when our original well water changed overnight and b.) the 1992 Mariner East 1 rupture of jet fuel on the property behind ours and the current contaminants in our new well, we feel that Sunoco/Energy Transfer's HDD construction activities have impacted both our original and new well water supplies.

We are asking for assistance in providing us with clean water. Our brother-in-law constructed us a makeshift water buffalo that holds 300 gallons. At this time, it is not feasible for him to fill the water buffalo for us. We are forced to live with the water that is in the attached photo. We are back to showering, bathing our daughter, and doing laundry at family members' homes. We need relief, and we can't go on living like this forever.

Thank you for taking the time to read and review this document. I hope that you can appreciate what we have had to go through over the past year and understand that what we are asking for is not unreasonable. We just want to be able to live a normal life again, with a clean water supply.

FULLER EXHIBIT 10

**West Chester University
Water Quality Research Initiative**

From: [REDACTED]

To: rosemaryfuller@aol.com,

Cc: [REDACTED]

Subject: RE: Status Update on WCU Water Quality Research Initiative

Date: Fri, Feb 5, 2021 12:43 am

Attachments: Well water contamination _2015.pdf (1184K)

Hi Rosemary

Thanks for your effort and getting us started.

Just to bring us all on same page- we wont be testing for specific contaminants at this stage. Mainly because we don't know what to look for. It is a baseline testing that we are offering, where we will be looking into anions (Cl, Br, F1, NO2-, NO3-, PO3-, SO4-), cations (Ca, Mg, Mn Fe, Sr, Ba, etc), and light hydrocarbons (methane, ethane, ethene, propane).

My colleague- Dr Stolz from Duquesne University, has agreed to test well water samples as he has been doing well water testing for years and has expertise when it comes to pipeline drilling related water quality issues. He conducted similar analysis in 2015, for communities in southwestern PA (see attached file). This document might help understand the scope of our work.

My team will assist in getting the samples from participants and ship them to his lab <https://www.duq.edu/academics/faculty/john-stolz>. Later in summer, I plan to add microbial testing too. But at this first round, we will be using Dr Stolz's lab results for examination of source contamination in well waters. Presence of these ions in well water compared to permissible values will help us understand what could be potential sources of contamination. For more clarification on our approach, please feel free to connect with Dr Stolz directly (stolz@duq.edu). He will be happy to answer any questions that you may have (please cc me so we are in loop). He did mention that he may be able to do X-ray diffraction analysis of bentonite, if we can collect Bentonite sample. Do you think you can have access to Bentonite sample?

My major goal in the project is to help the community with baseline water quality data on their private well water. We will evaluate other options as we move forward. All the test results will be shared with the participants, with explanation on data interpretation.

As you spread the word for us, we are not limited to houses close to pipeline pathway. We do need controls and so houses with private well away from pipeline are also needed.

Let me know of you have any more questions.

Have a good night.

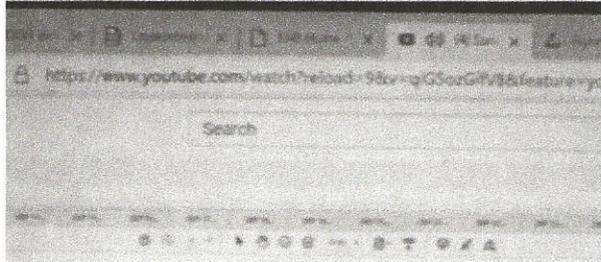
FULLER EXHIBIT 11
Water Well Supply Issues
Slide from EHB Meeting
October 30, 2020
Presented by Domenic Rocco

6:42



Middletown
October 30 3:46 PM

Edit



Water Supply Issues

- As of Sept. 30, 2020:
 - Numerous water supply issues known to start in July 2017 – many requiring the analysis of a P.G. (and review by DEP P.G.)
 - **58** Open Water Supply Complaints
 - **96** Closed Complaints
 - **18** Connections to Public Water
 - Countless connections to Water Buffalos (temp water tank) and use of bottled water.
 - Complaints mainly related to brown/cloudy water or loss of pressure.

DEP - EHB Docket No. 2020-085-L

streaming 6 hours ago

LIKE DISLIKE



FULLER EXHIBIT 1

PERMANENT EASEMENT AGREEMENT

MARINER EAST 2 PENNSYLVANIA PIPELINE PROJECT
SEGMENT 3
PA-DE-0060.0002
Middletown Township
Delaware County, Pennsylvania

Tax Parcel No. 27-00-02629-01

This instrument prepared by
SUNOCO PIPELINE L.P.
and when recorded return to:
SUNOCO PIPELINE L.P.
Attn: Right-Of-Way Department
P.O. Box 10814
Lancaster, PA 17605

RD BK05719-0615 DM-DEED MISCELLANEOUS
2015057534 10/19/2015 03:40:38 PM:6
RCD FEE: \$112.50 POL SUB TAX: \$81.00 ST TAX: \$81.00



PERMANENT EASEMENT

This Permanent Easement ("Easement"), dated October 7, 20 15, by **Gordon Fuller and Rosemary Fuller, husband and wife**, whose mailing address is 226 Valley Road, Media, Pennsylvania 19063, (hereinafter referred to as "Grantor", whether one or more), for the consideration of TEN AND No/100 Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby does forever grant, bargain, sell and convey unto **Sunoco Pipeline L.P.**, a Texas limited partnership, with an office at 525 Fritztown Road, Sinking Spring, PA 19608, and its successors and assigns (such entity and its successors and assigns are collectively referred to as the "Grantee"), a non-exclusive fifty foot (50') wide free and unobstructed permanent easement in order to construct, operate and maintain two (2) pipelines, not to exceed twenty-four inches (24") in nominal pipe diameter (the "Pipelines") and any appurtenant facilities including, above-ground markers, in, over, through, across, under, and along land owned by the Grantor described in the attached Exhibits "A" and "B" (the "Permanent Easement"), attached hereto.

Grantor also hereby grants, bargains, sells and conveys unto Grantee a temporary construction easement, not to exceed twenty-five feet (25') in width immediately adjacent to the Permanent Easement area and additional temporary work space, if any, (collectively, the "Temporary Easement"), at such locations as substantially shown on the attached Exhibits "A" and "B", in order to construct the Pipelines in, over, through, across, under, and along the Property, and to otherwise exercise the rights granted to Grantee provided herein. The term of the Temporary Easement shall be for a period to extend thirty-six (36) months from the date of construction commencement. However, if Grantee has completed its use of this Temporary Easement prior to the thirty-six (36) month period and so states in writing, then the Temporary Easement shall immediately terminate. All rights, duties and/or obligations arising by or under this Easement shall only apply to the Temporary Construction Easement while same is in effect. The Permanent Easement and Temporary Easement (collectively, the "Easements") lie and are located in lands owned by Grantor described as follows:

Parcel identification number(s): 27-00-02629-01, being all that particular tract or parcel of land owned by Grantor or to which Grantor may have rights in said tract or parcel of land, containing 2.0068 acres, more or less, being more specifically described in the Deed dated July 25, 2003 and recorded in Deed Book 2868, Page 2019, in the office of the Recorder of Deeds of said County and State (the "Property").

It is further agreed as follows:

1. The right to use the Easements shall belong to the Grantee and its agents, employees, designees, contractors, guests, invitees, successors and assigns, and all those acting by or on behalf of it for the purposes of establishing, laying, constructing, reconstructing, installing, realigning, modifying, replacing, improving, altering, substituting, operating, maintaining, accessing, surveying, inspecting, patrolling, protecting, repairing, changing the size of, relocating and changing the route or routes of, abandoning in place and removing at will, in whole or in part, pipelines, for the transportation of oil, oil products, crude petroleum, natural gas, natural gas liquids, hydrocarbon liquids and

the products thereof, together with above- and below-ground appurtenances as may be necessary or desirable for the operation of the Pipelines.

2. Grantee shall bury the Pipelines to a minimum depth of thirty-six inches (36") below the surface of the ground and any then-existing drainage ditches, creeks and roads, except at those locations where rock is encountered, the Pipelines may be buried at a lesser depth.

3. Grantee shall have the right to select the exact location of the Pipelines within the Permanent Easement. Further, Grantee shall have the right to construct, maintain and change slopes of cuts and fills to ensure proper lateral and subjacent support for and drainage for the Pipelines and appurtenant facilities related to this pipeline project.

4. The consideration paid by Grantee in this Easement includes the market value of the Easements, both permanent and temporary, conveyed by Grantor and any and all damages to the Grantor's remaining Property and for reasonably anticipated damages caused to the surface of Grantor's lands within the Easements during the initial construction of the Pipelines and related facilities. The initial consideration includes all damages to Grantor (or, if leased, to Grantor's tenant) caused to timber or growing crops on the Easements. The initial consideration does not cover any damages which may accrue after initial construction of the Pipelines to Grantor's other lands or the Permanent Easement from time to time by reason of the operation, maintenance, repair, alteration and/or servicing of the Pipelines, or any other damages incurred from time to time as hereinafter more specifically set forth, including damages for loss, injury, or death of Grantor's (or, if leased, to Grantor's tenant's) livestock if such loss, injury or death is due to Grantee's exercise of any right under this Easement. Grantee shall pay Grantor for any and all other such reasonable damages promptly as they may accrue.

5. Grantee shall have the right of entry, access, ingress and egress in, to, through, on, over, under and across the land of Grantor for any and all purposes reasonably necessary for and/or incident to Grantee's exercise of the rights granted to it by this Easement. Grantee shall promptly repair any damage to Grantor's roads caused by Grantee so as to maintain the roads in as good or better condition as existed prior to use by Grantee.

6. Grantee will, insofar as reasonably practicable, level, re-grade and reseed the ground disturbed by Grantee's use of the Easements and will construct and maintain soil conservation devices on the Easements immediately after the initial disturbance of the soil and maintain throughout construction as may be reasonably required to prevent damage to the Property of Grantor from soil erosion resulting from construction of the Pipelines.

7. Grantor may use the Easements for any and all purposes not inconsistent with the purposes set forth in this Easement. Grantor may not use any part of the Easements if such use may damage, destroy, injure, and/or interfere with Grantee's use of the Easements for the purposes for which the Easements are being sought by Grantee. Without limiting the foregoing, Grantor is expressly not permitted to conduct any of the following activities on the Easements without the written permission of Grantee: (1) construct any temporary or permanent building or site improvements; (2) drill or operate any well; (3) remove soil or change the grade or slope; (4) impound surface water; or (5) plant trees or landscaping. Grantor further agrees that no above- or below-ground obstruction that may interfere with the purposes for which the Easements are being acquired may be placed, erected, installed or permitted upon the Easements without the written permission of Grantee. Grantor's authorized uses may include, but shall not be limited to, agricultural, recreational, industrial, open space, set-back, density, street and roadway purposes; provided that Grantor shall not construct any improvements on the Permanent Easement that would unreasonably interfere with Grantee's exercise of the rights herein conveyed. Grantor is permitted, after review and written approval by Grantee, to construct, reconstruct or maintain any and all streets, roads and utilities (including, but not limited to, water, sewer, gas, electric, cable TV, telephone or other utility lines) at any angle of not less than forty-five (45) degrees to Grantee's Pipelines over and across the Permanent Easement at such place or places as Grantor may select which do not damage, destroy or alter the operation of the Pipelines and its appurtenant facilities and provided that all of Grantee's required and applicable spacing, including depth separation limits and other protective requirements (including Cathodic protection) are met by Grantor. The use of the Permanent Easement by Grantor shall be regulated by all appropriate ordinances, regulations, resolutions or laws of the governmental entity with authority over the Permanent Easement. Grantor must notify Grantee in writing of its intention to install any such encroachments. In the event the terms of this paragraph are violated, Grantor shall have thirty (30) days in which to eliminate such violation upon receipt of written notice from Grantee, except in case of emergency when Grantee shall have the right to immediately correct or eliminate such violation without liability to Grantor for damages.

8. Grantee agrees that Grantee and its agents, officers, servants, employees or subcontractors shall not (i) hunt, fish, trap, swim, camp or picnic on the Easement, (ii) purposely harm or injure in any way the artifacts, wildlife, animals or livestock on the Easement, or (iii) bring any dog, gun, firearm, fishing equipment, other sporting paraphernalia, alcohol or illegal drug of any kind onto the Easement.

9. Grantee has the right, but not the obligation, to mow the Permanent Easement and to trim or cut down or eliminate trees or shrubbery to the extent, in the sole judgment of Grantee, its successors and assigns, as may be necessary to prevent possible interference with the operation of the Pipelines, to remove possible hazards thereto and to comply with governmental regulations, and the right to remove or prevent the construction of, any and all buildings, structures, reservoirs or other obstructions on the Permanent Easement which, in the sole judgment of the Grantee, may endanger or interfere with the efficiency, safety, or convenient operation of the Pipelines and appurtenant facilities or conflict with governmental regulations. All trees, brush and other debris caused by construction shall be burned and/or chipped and spread on the Easements or removed to an authorized disposal site. Grantee shall select the method of disposal. Grantee shall not be liable for damages to any tree, brush or tree limbs upon the Permanent Easement as a result of its exercise of its rights under this paragraph.

10. Grantor shall retain all the oil, gas, and other minerals in, on and under the Permanent Easement; provided, however, that Grantor shall not be permitted to drill or operate equipment for the production or development of minerals on the Permanent Easement, but it will be permitted to extract the oil and other minerals from and under the Permanent Easement by directional drilling and other means, so long as such activities do not damage, destroy, injure, and/or interfere with the Grantee's use of the Permanent Easement for the purposes for which the Permanent Easement is being sought by Grantee.

11. Grantee shall have the right to remove any fence which now crosses or may cross the Easements during initial construction of the Pipelines. Prior to cutting any fence, however, Grantee shall brace the existing fence to be cut adequately on both sides of the proposed cut by suitable H-braces to prevent the remainder of the fence from sagging. Before the fence wire is cut, it is to be attached to the posts in a manner that there will be no slackening of or damage to the wire. Each such wire gap is to be reinforced so as to be strong enough to prevent livestock from passing through same. Upon completion of initial construction operations, each wire gap will be removed and a permanent gate installed, which gate shall, to the extent reasonably practicable, be constructed out of similar or better grade materials than already used for existing gates on the Property. Upon completion of initial construction, permanent fencing destroyed or disturbed by project construction activities shall be installed by Grantee, at its sole expense, along the same alignment and approximate location of the Grantor's existing fences. Grantee will restore all fences cut during construction as nearly as possible to as good, or better, condition as they were prior to the construction of the Pipelines. Each entry and exit gate shall be securely closed and locked, except when Grantee or its authorized personnel are actually passing through same, so that cattle, horses and/or other livestock located on the remainder portion of the Property cannot stray from the fenced pastures. Grantee and Grantor shall have the right to install locks on the gates so as to allow access to each party.

12. Grantee agrees that, after completion of initial construction or in the event Grantee's operation, maintenance, repair, alteration and/or servicing of the Pipelines disturbs the surface of the Permanent Easement, Grantee will restore the surface of the Permanent Easement, as much as is reasonably practicable, to the condition that existed prior to such use of the Permanent Easement, except to the extent that the surface may be permanently modified by such construction, maintenance, repair, alteration and/or servicing of the Pipelines. Grantee shall restore any surface area of the Temporary Easement disturbed during initial construction, as much as is reasonably practicable, to the condition that existed immediately preceding Grantee's use of the Temporary Easement, except to the extent that the surface may be permanently modified by Grantee's permitted use of the Temporary Easement as set forth in this Easement.

13. The undersigned warrant that he/she/they/it is/are the owner(s) of the Property herein described and have authority to execute this Easement on behalf of the parties to this Easement.

14. Cathodic protection test stations, if necessary for the operation of the Pipelines, as determined by Grantee, may be placed by Grantee at the junction of the Permanent Easement and the fence lines on Grantor's Property and at any other location required by law.

15. The rights granted to Grantee in this Easement may be assigned, in whole or in part, to one or more assignees, in which event Grantor acknowledges and agrees that the assignee shall succeed to the rights and obligations of Grantee to the extent conveyed in such assignment. The Permanent Easement shall be perpetual.
16. This Easement shall be interpreted in accordance with the laws of the Commonwealth of Pennsylvania and all applicable federal laws (without regard to any conflicts-of-law rule or principle that would require the application of same to the laws of another jurisdiction).
17. This Easement may be signed in counterparts and all such counterparts shall be deemed as originals and binding upon each party executing any counterpart and upon their respective heirs, representatives, successors and assigns. Facsimile signatures shall be deemed as an original signature by the enforcing party, but Grantor shall deliver at least one (1) original signature to Grantee for recording purposes.
18. This Easement contains the entire agreement and supersedes any and all prior statements, whether written or oral, and all oral or written proposals, if any, concerning the subject of the Easement. Grantor confirms and agrees that Grantor has been made no promise or agreement by Grantee or any agent of Grantee that is not expressed or referenced specifically within the Easement, that Grantor is not relying upon any statement or representation of Grantee or any agent of Grantee and that Grantor's execution of this Easement is free and voluntary; this Easement may not be modified or amended, except on or after the date hereof, by a writing signed by the other party against whom such modification or amendment is to be enforced and no party shall be liable or bound to any other party in any manner except as specifically set forth herein.
19. Any and all notices to which the parties shall be entitled hereunder or under any law, statute, rule, regulation, order, ordinance or policy of any governmental agency or entity having jurisdiction of the subject matter for which this Easement is granted, shall be deemed delivered when the same has been placed in the U.S. Mail in a properly stamped envelope or other appropriate mail container, addressed to the addresses shown above, bearing the adequate amount of postage to result in delivery of same to the address shown thereon, and sent by certified mail, return receipt requested, to the party to whom such notice is given. In the alternative, either party may give such notice by United Parcel Service (UPS), Federal Express or other similar national expedited mail service guaranteeing not later than two (2) day delivery of any such letter or notice to the addresses provided for herein. Grantor and Grantee may designate persons and addresses for all notices and information. Such persons or addresses may be changed by the respective party by delivering written notice of such change to the other party.
20. At Grantee's sole discretion, it may replace **Exhibit "A" and "B"** with a more definitive description and drawing, respectively, of the Easements and record the same in the County Clerk's Office. If Grantee requires additional work space and/or easement or the final survey of the Easements increases the size of the Easements, then an additional payment shall be made to the Grantor on a pro rata basis. If the final survey does not increase the size of the Easements or include additional work space/easements, then Grantor shall retain all funds paid to it by Grantee with no refund required.
21. Grantor and Grantee shall execute and deliver any instruments and documents and take such action as may be necessary or reasonably requested or required by the other party to give full force and effect to this Easement and to carry out its intent.

TO HAVE AND TO HOLD the rights, privileges and authority hereby granted unto the Grantee, its successors and assigns, forever, and Grantor does hereby agree to warrant and defend said Easements unto Grantee, its successors and assigns. This Easement and all of its terms, provisions and obligations shall be covenants running with the land affected thereby and shall inure to the benefit of and be binding upon Grantor and Grantee and their respective heirs, executors, administrators, successors and assigns.

[Signature Page(s) Follow]

EXECUTED this 7th day of October, 2015.

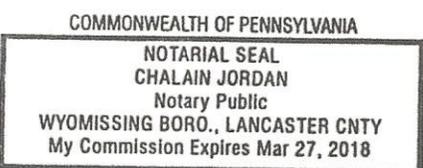
GRANTOR:
[Signature]
Gordon Fuller

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA §
COUNTY OF Delaware §
§

BEFORE ME, the undersigned authority, on this day personally appeared Gordon Fuller, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he/she executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 7th day of October, 2015.



[Signature]
Notary Public in and for the Commonwealth of Pennsylvania
Chelain Jordan
(Print Name of Notary Public Here)

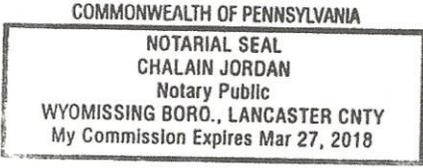
GRANTOR:
[Signature]
Rosemary Fuller

ACKNOWLEDGEMENT

COMMONWEALTH OF PENNSYLVANIA §
COUNTY OF Delaware §
§

BEFORE ME, the undersigned authority, on this day personally appeared Rosemary Fuller, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he/she executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 7th day of October, 2015.



[Signature]
Notary Public in and for the Commonwealth of Pennsylvania
Chelain Jordan
(Print Name of Notary Public Here)

PA-DE-0060.0002
Delaware County, Pennsylvania
Pennsylvania Pipeline Project

Exhibit "A"

**DESCRIPTION FOR A PERMANENT EASEMENT ACROSS THE LANDS OF
GORDON FULLER AND ROSEMARY FULLER, HUSBAND AND WIFE**

BEING A METES AND BOUNDS DESCRIPTIONS FOR PERMANENT EASEMENT ACROSS THE LANDS NOW OR FORMERLY OF GORDON FULLER AND ROSEMARY FULLER, HUSBAND AND WIFE IN MIDDLETOWN TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA, SAID LAND BEING MORE PARTICULARLY DESCRIBED IN DEED BOOK 2868, PAGE 2019 AS RECORDED IN THE DELAWARE COUNTY RECORDER OF DEEDS.

Beginning at a point, said point being the northernmost corner lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife in Valley Road; thence along the northeastern boundary line lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife in Valley Road South 22°54'39" East a distance of 15.7 feet more or less to a point; thence across the lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife along a curve to the right, having a radius of 2020.0 feet, an arc length of fifteen feet (15') more or less, a chord bearing North 32°08'53" West and a distance of 14.6 feet more or less to a point on the northwesterly boundary line lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife; thence along said northwesterly boundary line North 37°12'18" East a distance of 2.7 feet more or less to the POINT OF BEGINNING.

Beginning at a point, said point being the easternmost corner lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife in Valley Road; thence along the easterly boundary line lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife South 36°18'10" West a distance of 28.9 feet more or less to a point; thence across the lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife along a curve to the right, having a radius of 2020.0 feet, an arc length of two hundred forty-nine feet (249') more or less, a chord bearing North 35°57'05" West and a distance of 249.1 feet more or less to a point on the northeasterly boundary line lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife in Valley Road; thence along said northeasterly boundary line South 42°29'39" East a distance of 241.8 feet more or less to the POINT OF BEGINNING.

The above described easements across the lands now or formerly Gordon Fuller and Rosemary Fuller, husband and wife containing 0.09 acres more or less as shown on a plan prepared by LW Survey Co. entitled "PERMANENT EASEMENT & RIGHT OF WAY CROSSING PROPERTY OF GORDON FULLER AND ROSEMARY FULLER, HUSBAND AND WIFE"

Notes:

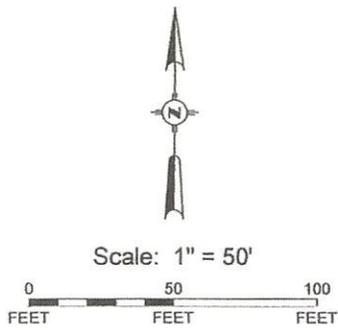
- 1) The purpose of this Exhibit "A" document is to fully describe the area of the proposed permanent easement across the lands of Gordon Fuller and Rosemary Fuller, husband and wife.
- 2) The intent of this Exhibit "A" is NOT to supersede any of the existing easements for the existing pipelines shown on the attached Exhibit "B".
- 3) Bearings shown hereon are Grid bearings of NAD83 Pennsylvania State Plane Coordinate System, South Zone, U.S. Survey Feet. Distances shown hereon are on Grid and a scale factor must be applied to convert to ground distances.
- 4) Record information shown hereon is based on the best available record information and provided to LW Survey Co. by Rooney Engineering.
- 5) For additional information, see attached easement drawing (Exhibit "B") made in conjunction with and considered an integral part of the above described permanent easement.
- 6) This description and the attached Exhibit "B" were prepared for the purpose of creating a permanent easement and are not intended for use as a boundary survey.

TEMPORARY/ADDITIONAL TEMPORARY WORKSPACE

This parcel is not subject to Temporary/Additional Temporary Workspace.

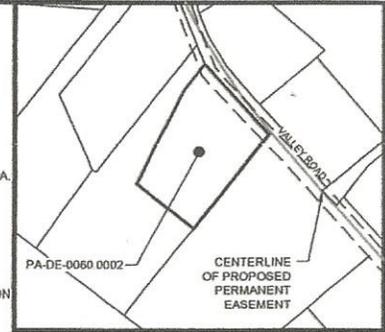
LW Survey Co.
1725A Oregon Pike, Suite 204
Lancaster, PA. 17601

EXHIBIT B MIDDLETOWN TOWNSHIP DELAWARE COUNTY, PENNSYLVANIA

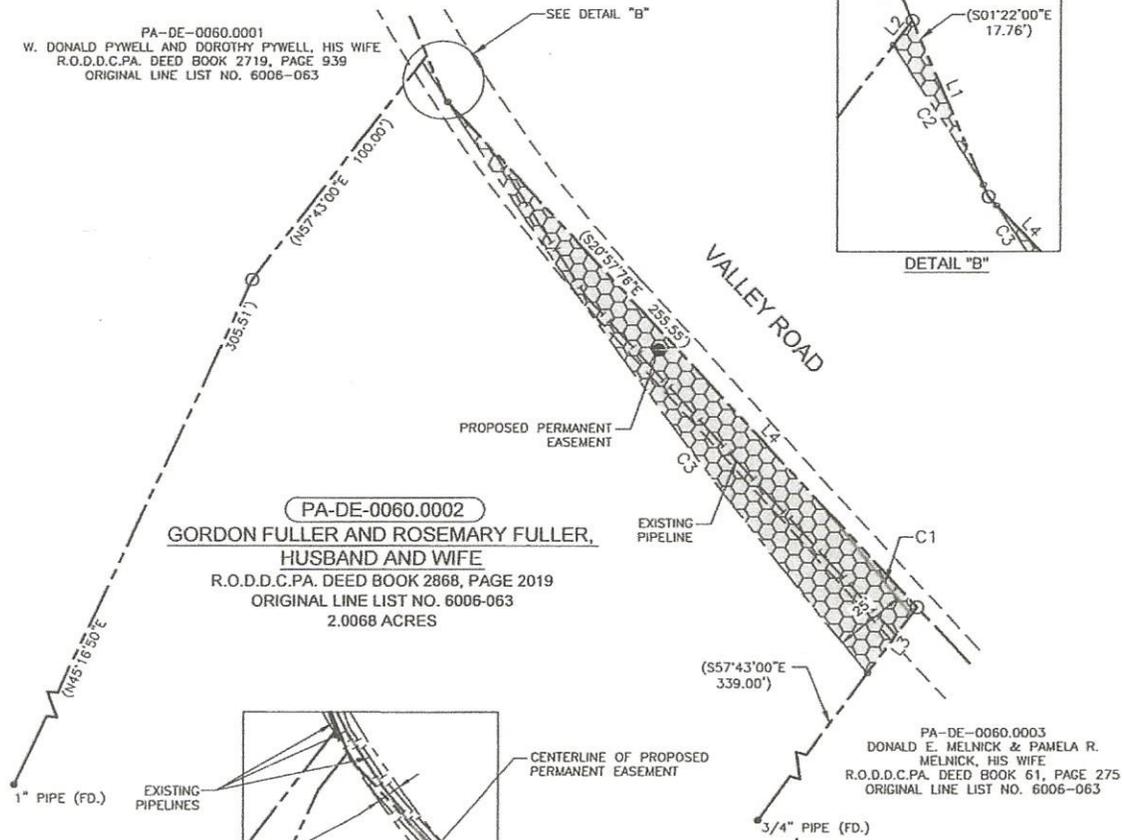
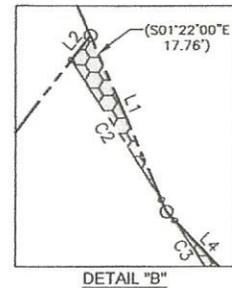


LEGEND

R.O.D.D.C.PA.	DELAWARE COUNTY RECORDER OF DEEDS, PA.
P.O.B.	POINT OF BEGINNING
P.O.T.	POINT OF TERMINATION
()	RECORD BEARING AND DISTANCE
•	PROPERTY CORNER FOUND
○	PROPERTY CORNER NOT FOUND
△	PROPOSED PIPELINE/DEED LINE INTERSECTION
○	PROPOSED PIPELINE VERTICE
	PROPOSED PERMANENT EASEMENT
	PROPOSED TEMPORARY WORK SPACE
	PROPOSED ADDITIONAL TEMPORARY WORK SPACE



PA-DE-0060.0001
W. DONALD PYWELL AND DOROTHY PYWELL, HIS WIFE
R.O.D.D.C.PA. DEED BOOK 2719, PAGE 939
ORIGINAL LINE LIST NO. 6006-063



PA-DE-0060.0002
**GORDON FULLER AND ROSEMARY FULLER,
HUSBAND AND WIFE**
R.O.D.D.C.PA. DEED BOOK 2868, PAGE 2019
ORIGINAL LINE LIST NO. 6006-063
2.0068 ACRES

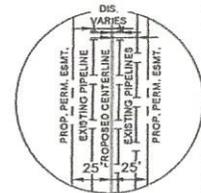
CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING
C1	1995.00'	45.77'	45.77'	S38°38'49"E
C2	2020.00'	14.58'	14.57'	N32°08'53"W
C3	2020.00'	249.22'	249.06'	N35°57'05"W

LINE	BEARING	DISTANCE
L1	S22°54'39"E	15.73'
L2	N37°12'18"E	2.70'
L3	S36°18'10"W	28.93'
L4	S42°29'39"E	241.82'

TOTAL DISTANCE ACROSS PROPERTY: 45.77 FT
 PROPOSED PERMANENT EASEMENT: 0.09 ACRES
 TEMPORARY WORK SPACE: 0.00 ACRES
 ADDITIONAL TEMPORARY WORK SPACE: 0.00 ACRES

NOTES:

- THE PURPOSE OF THIS PLAN IS TO SHOW THE LIMITS OF THE PROPOSED PERMANENT AND TEMPORARY EASEMENTS CROSSING THE SUBJECT PROPERTY. THE PROPERTY LINES SHOWN HEREON, WERE COMPILED FROM THE BEST AVAILABLE RECORD INFORMATION AND GEO-REFERENCED TO APPARENT BOUNDARY EVIDENCE AND IS NOT THE RESULT OF A BOUNDARY SURVEY.
- THE INFORMATION SHOWN HEREON IS AN ILLUSTRATION OF THE APPARENT PROPERTY LINES IN RELATION TO THE PROPOSED EASEMENTS. IT SHOULD NOT BE USED AS A PROPERTY BOUNDARY SURVEY.
- BEARINGS SHOWN HEREON ARE GRID BEARINGS BASED ON THE PROJECT COORDINATE SYSTEM OF NAD 83, PENNSYLVANIA STATE PLANE, SOUTH ZONE, U.S. SURVEY FEET. DISTANCES SHOWN HEREON ARE GRID DISTANCES AND A SCALE FACTOR MUST BE APPLIED TO CONVERT TO GROUND DISTANCES.
- CORNER TIES WITH "A" REFERENCE, ARE APPROXIMATE SCALED DISTANCES.
- FOR ADDITIONAL INFORMATION, SEE ATTACHED LEGAL DESCRIPTION (EXHIBIT "A") MADE IN CONJUNCTION WITH AND CONSIDERED AN INTEGRAL PART OF THE ABOVE DESCRIBED EASEMENT.



SURVEYED BY: LW Survey Co.
1725A Oregon Pike
Suite 204
Lancaster, PA 17601

CLIENT: Sunoco Pipeline L.P.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
0	04/10/15	JG	ISSUED FOR REVIEW
1	8/5/15	ARG	REVISED PER COMMENTS

**PERMANENT EASEMENT & RIGHT OF WAY
CROSSING PROPERTY OF
GORDON FULLER AND ROSEMARY FULLER,
HUSBAND AND WIFE**

DRAWN BY: JG DRAWN DATE: 04/10/15 CHECKED BY: PKB PLOT DATE: 8/5/15

TRACT NO: PA-DE-0060.0002

FULLER EXHIBIT 2

EDGMONT TOWNSHIP GASOLINE LEAKS

1988 - 2015



Groundwater
& Environmental Services, Inc.

FINAL REPORT
Sunoco, Inc.
Glen Mills Leak Site (DUNS #9000-0060)
Valley Road, Edgmont Township

Prepared for:

Sunoco, Inc.
1135 Post Road and Blue Ball Avenue
Marcus Hook, Pennsylvania 19061

Prepared by:

Groundwater & Environmental Services, Inc.
410 Eagleview Blvd., Suite 110
Exton, Pennsylvania 19143

February 3, 2003



FINAL REPORT

**GLEN MILLS LEAK SITE (DUNS #9000-0060)
SUNOCO, INC.
VALLEY ROAD
EDGMONT TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

February 4, 2003

Prepared for:

SUNOCO, INC.
Automotive Laboratory
P.O. Box 1135
Post Road and Blueball Avenue
Marcus Hook, Pennsylvania 19061

Prepared by:

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
410 Eagleview Boulevard, Suite 110
Exton, Pennsylvania 19341

Prepared by:

Lisa Holderbach
Staff Geoscientist



Reviewed by:

Stephen D. Brower, P.G.
Senior Project Manager

By affixing my seal to this document, I am certifying that this information is true and correct. I further certify that I am licensed to practice in the Commonwealth of Pennsylvania and that it is within my professional expertise to verify the correctness of this information



FINAL REPORT

GLEN MILLS LEAK SITE (DUNS #9000-0060)
SUNOCO, INC.
VALLEY ROAD
EDGMONT TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

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FINAL REPORT
GLEN MILLS LEAK SITE (DUNS #9000-0060)
SUNOCO, INC.
VALLEY ROAD
EDGMONT TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA

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FINAL REPORT

**GLEN MILLS LEAK SITE (DUNS #9000-0060)
SUNOCO, INC.
VALLEY ROAD
EDGMONT TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA**

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1.0 EXECUTIVE SUMMARY

Groundwater & Environmental Services, Inc. (GES) was retained by Sunoco, Inc. (Sunoco) to prepare a Final Report for the Glen Mills Leak Site located at 1316 and 1320 Valley Road in Edgmont Township, Delaware County, Pennsylvania. This investigation was performed in accordance with Pennsylvania Code 25, Chapter 250 (Administration of the Land Recycling Act – Act 2). The purpose of the investigation was to determine the nature and extent of petroleum hydrocarbon impact in the site subsurface, document characterization and attainment activities and results, determine the environmental fate and transport of dissolved-phase hydrocarbons in groundwater, and to evaluate the potential risks posed by residual adsorbed and dissolved phase hydrocarbons present at the site. Sunoco is requesting a full Release of Liability for soil and groundwater from the Pennsylvania Department of Environmental Protection (PADEP) for the site.

This report presents data and information to support Sunoco's request for a Release of Liability based on the following:

- site history;
- characterization of petroleum hydrocarbon impacts to soil and groundwater;
- evaluation of potentially sensitive receptors;
- results of environmental fate and transport analysis;
- results from a baseline exposure assessment and;
- demonstration of a combination of Statewide Health and Site-Specific Standards attainment for soil and groundwater.

This Final Report summarizes all activities performed at the site as of the date of this report. This report also provides detailed information pertaining to the data collected, the pathways identified, and provides an evaluation of current site conditions with respect to the residual petroleum impact present at the site. The required Final Report fee of \$500.00 is included with this report submittal. A copy of the Notice of Intent to Remediate (NIR), proof of newspaper publication and township notification are included in **Appendix A**.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Site Description and History

The Glen Mills Leak Site is located along Valley Road, Glen Mills, Pennsylvania. The release location is comprised of two individual parcels of land. The first parcel, 1320 Valley Road, is owned by Dennis and Ruth Bregande and includes a residential home and one potable well. The second parcel, 1316 Valley Road, is owned by Marion and Laura Bregande and includes a residential home and one potable well. The two parcels of residential property encompass 4.7 acres. Petroleum odors were detected in soil in the fall of 1988 when Dennis Bregande was digging test pit locations for a potential septic system installation. The area where the petroleum odors were detected was in the vicinity of subsurface petroleum transmission lines owned by Sunoco. The site, as defined by historical groundwater and soil characterization, is comprised of two parts and are as follows:

- Site 1 – Soil Area is defined by the soil characterization area which encompasses 113,597 square feet or 2.6 acres.
- Site 2 – Groundwater Area is defined by the groundwater characterization area which encompasses 48,043 square feet or 1.1 acres.

A site location map is included as **Figure 1** and depicts the location of the Glen Mills release location on the United States Geological Survey (USGS) Media, Pennsylvania 7.5 Minute Quadrangle. The topographic high point of the property is located in the northeastern portion of the property and the topography slopes to the south and west. The elevation of the property ranges from approximately 430 feet above mean sea level in the northwestern corner to approximately 390 feet above mean sea level along the eastern and southern property boundaries.

Additional activities that have taken place at the site are as follows. More detailed descriptions of these activities are included in the Site Characterization section of this report (Section 3.0).

- In May 1989, Sunoco contacted Target Environmental Services to conduct a soil gas survey in the area of the observed petroleum odors. The soil gas survey results indicated elevated readings.
- In June 1989, Sunoco contacted ENSR Environmental to conduct an initial assessment including installation of test pits, hand-augured borings, and the collection of soil samples for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total petroleum hydrocarbons (TPH). ENSR identified subsurface impact of petroleum hydrocarbons.
- GES conducted a comprehensive assessment of the site in June 1989. Site activities included the installation of 48 soil borings and 23 groundwater monitoring wells were installed. At least one soil sample per boring was collected for analysis of BTEX and TPH. Six additional soil samples were analyzed via “fingerprinting” methods to determine the type of hydrocarbons present.
- In April 1992, Sunoco and Pennsylvania Department of Environmental Resources (PADER) agreed to a site monitoring program to include the following: collection of monthly depth-to-water readings from a network of eight wells, quarterly collection of groundwater samples from a representative network of six monitoring wells, annual



sampling of two additional wells, and monthly sampling of two domestic supply wells. This sampling plan was conducted from April 1992 through September 1996.

- In September 1996, GES requested to modify the sampling program to the following: collection of annual depth-to-water readings from a network of eight wells, collection of groundwater samples from a representative network of eight monitoring wells on an annual basis, quarterly sampling of two domestic supply wells, and annual reporting of site findings. This plan was approved by PADEP in September 1996 without comment.
- On January 14, 1997, GES requested permission to abandon ten wells, not utilized for sampling or monitoring. On February 4, 1997, PADEP approved the proposal to abandon the wells; the activities were completed in October 1997.
- Four vacuum truck extraction events were conducted at the site in 1997.
- In 1998, GES performed a pumping test on the potable wells located at 1316 and 1320 Valley Road to determine if hydraulic communication existed between the shallow and deeper water bearing zones.
- On August 15, 2000, Oxygen Release Compound® (ORC) was injected into boreholes surrounding MW-9 and MW-6.
- On September 19 and 20, 2002, soil boring program was performed at the site in order to collect current soil quality data from the site. The soil data was intended to be used in the demonstration of attainment for a combination of Statewide Health and Site-Specific Standards at the site.

2.2 Local Land Use and Surrounding Properties

Property surrounding the release location is primarily rural and is used for residential purposes. The Fonshell Residence is located north-northeast of the release location, the McLaughlin Residence is located west-northwest of the release location, and the Magargal Residence is located east of the release location. South-southwest of the release location is undeveloped land and residential properties. A local area map showing the neighboring residences is included as **Figure 2**.

2.3 Future Land Use

In order to be conservative in the use of applicable soil and groundwater standards, the potential future land use is considered to be residential.

3.0 SITE CHARACTERIZATION ACTIVITIES

3.1 1989 Site Investigation

In May 1989, Sunoco contacted Target Environmental Services (Target) to conduct a soil gas survey along Valley Road. This soil gas survey included the analysis of 22 soil headspace samples. Seven soil samples were collected from locations on the eastern side of Valley Road and east of the Sunoco pipeline, and the remaining 15 soil samples were collected west of the former Atlantic pipeline located on the western side of Valley Road. The headspace was analyzed for the following constituents: BTEX, pentane/methyl tert-butyl ether (MTBE), and total volatiles. The results of the soil gas headspace analysis indicated that three areas displayed elevated headspace readings. As a result, Sunoco subsequently contacted ENSR to further characterize the potential impact to soil and groundwater.

In June 1989, ENSR collected soil samples from five hand auger locations and 23 test pit locations and analyzed the samples for TPH and benzene, toluene, and total xylenes. All soil samples were collected from depths that ranged from three to 11 feet below ground surface (bgs). The results of the Target and ENSR characterization work were summarized and included in GES' Environmental Quality Assessment Report, dated July 1990. This report was sent to PADEP by GES under a separate cover dated June 8, 2000. The ENSR results indicate that two samples collected from test pits located northeast of the Marion and Laura Bregande residence and domestic supply well contained petroleum hydrocarbons at concentrations above applicable Statewide Health Standards. Copies of selected figures and tables from the Target and ENSR assessments are included in **Appendix B**. A more detailed soil quality discussion is included in Section 4.2 of this report.

3.2 1989-1990 Environmental Quality Assessment

In November 1989, Sunoco contracted GES to expand upon ENSR's soil characterization and from November 27, 1989 through December 15, 1989, GES collected 57 soil samples from 48 soil borings. The soil samples were collected from depths that ranged from four to 14 feet bgs. Subsurface logs are included in **Appendix C**. These soil borings were installed via continuous split-spoon sampling and were advanced to depths where groundwater was encountered. Soil samples continuously screened with an organic vapor meter (OVM) and qualitative observations such as lithologic composition, odors, staining, moisture, and color were recorded by the GES geoscientist. In addition, when groundwater was observed in the borehole, split-spoons were advanced until bedrock was encountered and a saturated soil sample was collected from the borehole. The soil samples were submitted to Lancaster Laboratories of Lancaster, Pennsylvania (Lancaster) for analysis of BTEX and TPH. Copies of select figures and tables from the GES' historical characterization efforts are also included in **Appendix B**. Soil results from samples collected by GES indicate that applicable Statewide Health Standards were exceeded in four of the 57 soil samples. Two of the soil samples with exceedences are in the same vicinity as the ENSR test pit samples mentioned above that had exceedences, one additional sample was near the intersection of Dennis and Ruth Bregande's driveway with Valley Road, and the third location was located midway along length of Dennis and Ruth Bregande's driveway, on the northeast side of the driveway. A more detailed soil quality discussion is included in Section 4.2 of this report.

From December 1989 through March 1990, Sunoco contracted GES to provide the oversight of the installation of a total of 23 monitoring wells. The majority of the monitoring wells were installed on the two Bregande's properties, however, three monitoring wells (MW-1 through MW-3) were installed on the Fonshell property and one monitoring well was installed on the McLaughlin property. The monitoring wells were a combination of 2-inch diameter and 4-inch diameter



monitoring wells and were completed to depths that ranged from 15 feet to 30 feet bgs. All monitoring wells, with the exception of MW-16, were installed in a former soil boring location (**Appendix C**).

In April 1990, GES installed one additional test pit on the Fonshell property and four additional test pits on the McLaughlin property in order to collect additional characterization data. One soil sample was collected from each test pit at depths ranging from 6 to twelve feet bgs and the samples were analyzed for BTEX and TPH (**Appendix B**).

3.3 1997 Well Abandonment

Historically, 23 monitoring wells have been installed on domestic properties surrounding the release location. In October 1997, GES abandoned the following wells after receiving written approval by PADEP: MW-1 through MW-4, MW-7, MW-16 through MW-20, and MW-22. In addition, following the June 1998 sampling event MW-8 and MW-23 could no longer be located and it was discovered that between July 1999 and March 2000, MW-21 was abandoned by the property owner. The October 1997 well abandonment was performed by Lutz Environmental under the supervision of a GES geoscientist and well abandonment records are included as **Appendix D**. The remaining monitoring wells utilized at the site are shown on **Figure 3**.

3.4 2002 Soil Boring and Well Installation

On September 19 and 20, 2002, 18 soil borings were installed at the site and 28 soil samples were collected from these soil borings. The soil borings were installed in three specific areas in order to collect current soil quality data from these three areas where applicable Statewide Health Standards were previously exceeded. The soil sampling locations and numbers of samples were previously discussed with PADEP in electronic communication that took place on March 14, 2002 and in a meeting that took place on November 13, 2002. The three areas of concern are as follows: one soil sample (GP-18) was collected on the northeastern side of Dennis and Ruth Bregande's property; five soil borings (GP-13 through GP-17) were installed near MW-6, near where Dennis and Ruth Bregande's driveway intersects Valley Road; and 12 soil borings (GP-1 through GP-12) were installed northeast of the Marion and Laura Bregande residence and domestic supply well. The locations of the twelve soil borings installed northeast of the Marion and Laura Bregande residence were selected by using the random and systematic sampling grid established by the EPA (1989). The volume of impacted soil in that area was determined to be less than 3,000 cubic yards; therefore 12 soil samples were required for that area.

All soil borings were installed to depths ranging between 11 feet and 16 feet bgs. The soil borings were advanced with a Earthprobe® until refusal was encountered or the borehole was terminated at 16 feet. Soil samples were screened with an OVM and the sample with the highest OVM reading was collected for laboratory analysis. If soil samples from relatively shallow depths exhibited the highest OVM reading, then a deeper soil sample was also collected (**Appendix C**). The soil samples were submitted to Lancaster for analysis of BTEX, MTBE, isopropylbenzene, naphthalene, 1-methylnaphthalene, fluorene, and phenanthrene. The results of the 2002 soil boring investigation are discussed in Section 4.2 of this report. The soil sample locations are depicted on **Figure 4**.

Two new monitoring wells (MW-24 and MW-25) were installed at the site on September 19 and 26, 2002. Well logs for MW-24 and MW-25 are included as **Appendix C**. MW-25 was installed in order to further characterize groundwater quality downgradient of MW-6 and MW-24 was installed as a downgradient point of compliance well.

3.5 Sensitive Receptors

There are several sensitive receptors in the vicinity of the leak site (Figure 2). Domestic supply wells are located at the five residences immediately surrounding the site: Dennis and Ruth Bregande residence, Marion and Laura Bregande residence, McLaughlin residence, Fonshell residence, and Magargal residence. Well construction details as obtained from property owners via onsite interviews, is summarized below. In addition, an unnamed intermittent tributary to Chester Creek is located in the southwestern portion of Dennis and Ruth Bregande's property.

Well Owner	Total Depth (feet)	Casing Length (feet)	Year Drilled	Pump Depth (feet)	Comments
Marion and Laura Bregande	103	40-50	Unknown	Unknown	None
Dennis and Ruth Bregande	Unknown	60	1987	Unknown	Possibly not grouted below 5 feet
Fonshell – Deep Well	175	Unknown	Unknown	Unknown	None
Fonshell – Shallow Well	40	Unknown	1959	Unknown	Jet Pump
McLaughlin	Over 100	14	Unknown	100	Submersible Pump
Magargal	65	Unknown	Unknown	Unknown	None

The domestic supply wells have been historically sampled and details regarding the sampling of the domestic wells are included in Section 4.4.1 of this report.

3.6 Ecological Receptors

Since the only constituents detected at the leak site originate from the release of heating oil and gasoline, these constituents are considered to be light petroleum product constituents. Therefore, the ecological screening process, as outlined in Act 2 for Statewide Health Standards, states that no further ecological action is required.

3.7 General Geologic and Hydrogeologic Conditions

Soil data obtained from subsurface investigations at the site indicate that the subsurface lithology consists of an upper horizon of silty-clay loam from approximately 3 to 10 feet thick, underlain by clay-rich saprolitic soils, generally 15 to 25 feet thick. The saprolite is underlain by native bedrock, noted at a minimum depth of 23 feet, but generally beginning at more than 30 feet below grade. The bedrock identified in field investigations and reported in published literature indicates that the site area bedrock is comprised of felsic gneiss with mafic-rich zones. Four soil samples were collected from the site and analyzed by GeoStructures of Wayne, Pennsylvania for bulk density, porosity, and total carbon content. The dry density of these soil samples ranged from 74.08 pounds per cubic foot (pcf) to 100.83 pcf, the moist bulk density ranged from 100.62 pcf to 125.04 pcf, the porosity ranged from 39% to 56%, and the total carbon content ranged from 4.7% to 11.1%. The geotechnical analytical report is included as **Appendix E**.

Groundwater at the site occurs under unconfined conditions, therefore the groundwater levels are influenced by seasonal phenomena such as variable precipitation, evapotranspiration, and percolation. In addition, groundwater occurs in two water-bearing zones including the



unconsolidated materials as well as in the underlying competent bedrock. Historically, depth to groundwater at the site has ranged from approximately 1 to 18 feet below grade. The groundwater gradient at the site slopes toward the southwest under an average hydraulic gradient of 0.038 feet. The past eight quarters of groundwater monitoring maps are included as **Figures 5 -12** and show groundwater gradients from sampling and gauging events that correspond to the following dates: March 19, 2001, June 7, 2001, September 12, 2001, December 6, 2001, March 21, 2002, June 13, 2002, September 20, 2002, and December 30, 2002, respectively.

Aquifer testing was performed at the site to determine if hydraulic communication exists between the unconsolidated aquifer and the bedrock aquifer. The second objective of aquifer testing was to determine a site average hydraulic conductivity of the overburden aquifer. A pumping test was performed on two domestic supply wells (Dennis and Ruth Bregande well and Marion and Laura Bregande well) from May 11-14, 1999. While pumping on the domestic wells completed in the bedrock aquifer, observation wells screened in the unconsolidated aquifer were monitored for changes in water levels. Minimal hydraulic communication was observed in the observation wells completed in the overburden aquifer. Results of the May 1999 pumping tests on Dennis and Ruth Bregande's property and Marion and Laura Bregande's property were submitted to PADEP in correspondence dated June 26, 1999 and June 27, 1999, respectively.

Rising head slug tests were also performed at the site on December 20-21, 2003. A data logger and transducer were used to measure the change in displacement of water column over time when a volume of water was removed from the well. Three tests were performed on three different wells and an average of the nine total tests was used to calculate a site average hydraulic conductivity. MW-5, MW-14, and MW-25 were used as the slug test wells and the average hydraulic conductivity calculated for each well are 0.656 feet per day (ft/day), 0.694 ft/day, and 3.32 ft/day, respectively. The site average hydraulic conductivity was calculated to be 1.56 ft/day. Slug testing documentation is included as **Appendix F**.

4.0 NATURE AND EXTENT OF PETROLEUM IMPACT

4.1 Source Identification and Nature of Release

There are three primary components to a plume of released hydrocarbon product to the subsurface. These components are generally comprised of an adsorbed phase, separate-phase hydrocarbons (SPH), and a dissolved phase. As a release of hydrocarbon product comes in contact with soil a significant percentage of the release will become adsorbed on to the particles of soil. The amount of product that becomes adsorbed will depend upon the following factors:

- the properties of the product (viscosity, solubility etc.);
- the intrinsic permeability of the soil (the relative ease with which a porous material transmits liquid);
- the amount of recharge, flushing or infiltration of precipitation from the surface; and
- the amount of total organic carbon in the soil.

The remaining product trapped as residual will continue to migrate vertically through the soil column in the unsaturated zone and follow the path of least resistance (i.e. lenses or layers with the highest intrinsic permeability). As the product encounters the capillary fringe (the portion of the soil column where water is drawn upward from the saturated zone), it will spread laterally and a greater percentage will remain adsorbed in this zone.

Product that continues to migrate through the capillary fringe will eventually encounter the saturated zone and float on top of that zone. The primary mechanism for product migration on the saturated zone is horizontal groundwater flow, but is influenced by the following factors:

- horizontal groundwater flow velocity;
- preferential pathways;
- specific gravity less than water (tendency to float);
- intrinsic permeability of the aquifer material; and
- amount of total organic carbon in the aquifer material.

Soluble compounds of the product will dissolve into the groundwater and migrate with the groundwater flow. The fate and transport of these compounds in the groundwater are dependent upon the individual properties of each constituent.

4.2 Extent of Petroleum Impact to Soil

Soil samples collected from ENSR's June 1989 characterization activities indicate that benzene was detected in two samples at concentrations that exceeded applicable Statewide Health Standards. Benzene concentrations were 5,000 micrograms per kilogram ($\mu\text{g}/\text{kg}$) in TP-16@9'-10' and 1,100 $\mu\text{g}/\text{kg}$ in TP-18@6'-8'. These two samples were located northeast of the Marion and Laura Bregande residence and domestic supply well. The remaining samples contained benzene, toluene, and total xylenes at concentrations below applicable Statewide Health Standards. As mentioned above, select figures and tables of historical characterization data is included in **Appendix B**.

Soil samples collected from GES' 1989-1990 characterization activities indicated that benzene concentrations were below laboratory detection limits; however in four samples the laboratory detection limit was greater than the applicable Statewide Health Standard. These four benzene concentrations were <1,000 $\mu\text{g}/\text{kg}$, <3,000 $\mu\text{g}/\text{kg}$, <3,000 $\mu\text{g}/\text{kg}$, and <800 $\mu\text{g}/\text{kg}$ at SB-6@9'-10'.

SB-21@8'-10', SB-22@9'-10', and SB-36@8.5'-9.5', respectively. The locations of these four soil borings are as follows: SB-6 is located near MW-6; SB-21 and SB-22 are located in the same vicinity as the ENSR test pit samples mentioned above that had benzene exceedences, northeast Marion and Laura Bregande's property; and SB-36 is located midway along length of Dennis and Ruth Bregande's driveway, on the northeast side of the driveway.

Analytical results from soil samples collected on September 19 and 20, 2002 indicate that GP-15@8'-10 contained benzene at a concentration (2,900 µg/kg) that exceeded the applicable Statewide Health Standard. Benzene concentrations in all other samples, along with other constituents of concern, were below applicable Statewide Health Standards. The analytical results of the soil samples collected by GES are summarized in **Table 1**. The analytical results from the 2002 soil boring program are shown on **Figure 13** and the laboratory analytical reports from the 2002 soil samples are included in **Appendix G**.

4.3 Presence of Separate Phase Hydrocarbons

Historical groundwater gauging and sampling indicated that separate-phase hydrocarbons have never been detected in onsite monitoring wells.

4.4 Extent of Petroleum Impact to Groundwater

4.4.1 Groundwater Quality in Domestic Wells

Domestic potable water supply wells located at 1316 and 1320 Valley Road have been sampled on a regular basis from August 1989 to December 2002. These wells have been sampled for BTEX, naphthalene, and 1-methylnaphthalene on a historical basis. MTBE, isopropylbenzene, fluorene, and phenanthrene were added to the sampling program between 1997 and 2000, depending on the constituent. Historical sampling indicates that all petroleum related constituents of concern have been not detected, or have been detected at concentrations below applicable Drinking Water and Statewide Health Standards. Historical domestic sampling analytical results are included in **Table 2**. Laboratory analytical reports for the past eight quarters of domestic sampling are included in **Appendix H**.

4.4.2 Groundwater Quality in Monitoring Wells

Onsite monitoring wells have been sampled since 1990. Historical monitoring has indicated that dissolved concentrations of benzene has been detected in MW-5, MW-6, MW-9, MW-13, and MW-25 at concentrations that have historically exceeded that Statewide Health Standard of 5 micrograms per liter (µg/L). Ethylbenzene and naphthalene were historically detected in MW-6 and MW-9 at concentrations that exceeded the applicable Statewide Health Standard of 700 µg/L and 100 µg/L, respectively. Toluene, ethylbenzene, total xylenes, MTBE, isopropylbenzene, 1-methyl-naphthalene, fluorene, and phenanthrene have either been not detected, or detected at concentrations below applicable Statewide Health Standards. The historical groundwater quality data is summarized in **Table 3** and laboratory analytical reports are included in **Appendix H**.



5.0 TARGET REMEDIATION

5.1 Vacuum Extraction Events

A vacuum extraction event was conducted on March 27, 1997 by extracting groundwater from MW-6 and MW-9. A total of approximately 500 gallons of groundwater was extracted from the two wells during this event.

5.2 ORC® Injection

On August 15, 2000, GES was contracted by Sunoco to inject ORC® into boreholes near select accessible monitoring wells to enhance the natural bioremediation of any remaining petroleum hydrocarbons in the subsurface at the release location. ORC® is a patented formulation of very fine, insoluble peroxygen that releases oxygen at a slow, controlled rate when hydrated. By releasing oxygen slowly into the groundwater, ORC® provides a constant supply of oxygen to aerobic microorganisms to promote biodegradation of hydrocarbon constituents, including BTEX, MTBE, and naphthalene. Since ORC® provides a pure oxygen source, it saturates water to higher levels than aeration.

Four soil borings were installed around MW-9 to a total depth of 10 feet bgs. Upon installation of the soil borings, 25 pounds of ORC® was mixed into a slurry and injected into each borehole via a high pressure pump. Two soil borings were installed around MW-6 and 50 pounds of ORC® was injected into each of these boreholes. Subgrade utility conflicts surrounding MW-6 prevented the installation of four soil borings around this well.



6.0 IDENTIFICATION OF CONSTITUENTS OF CONCERN

The source of impact to soil and groundwater at the Glen Mills Leak site is likely from an inactive pipeline that runs parallel to Valley Road. The constituents of concern are light petroleum products associated with heating oil and unleaded gasoline. Toluene, total xylenes, MTBE, isopropylbenzene, 1-methylnaphthalene, fluorene, and phenanthrene have either been not detected at the site, or detected at concentrations below applicable Statewide Health Standards for soil and groundwater. Please note that 1-methylnaphthalene does not currently have a Statewide Health Standard for soil or groundwater.

Benzene

The benzene soil to groundwater Statewide Health Standard for unsaturated soil in a residential setting is 500 $\mu\text{g}/\text{kg}$, as outlined in Act 2. Benzene was detected in six soil samples during the 1989 and 1990 characterization efforts. The concentrations of these six soil samples ranged from <800 $\mu\text{g}/\text{kg}$ to 5,000 $\mu\text{g}/\text{kg}$. In addition, historical groundwater samples collected from the site monitoring wells indicate that benzene has been detected in five wells at concentrations that have exceeded the Statewide Health Standard of 5 $\mu\text{g}/\text{L}$ for a residential used aquifer scenario. The maximum dissolved benzene concentration observed at the site was 1,900 $\mu\text{g}/\text{L}$.

Ethylbenzene

The ethylbenzene soil to groundwater Statewide Health Standard for unsaturated soil in a residential setting is 70,000 $\mu\text{g}/\text{kg}$, as outlined in Act 2. Ethylbenzene was not detected during the 1989 and 1990 characterization efforts at concentrations that exceeded the applicable Statewide Health Standard. However, historical groundwater samples collected from the site monitoring wells indicate that ethylbenzene has been detected in two wells at concentrations that have exceeded the Statewide Health Standard of 700 $\mu\text{g}/\text{L}$ for a residential used aquifer scenario. The maximum dissolved ethylbenzene concentration observed at the site was 850 $\mu\text{g}/\text{L}$.

Naphthalene

The naphthalene soil to groundwater Statewide Health Standard for unsaturated soil in a residential setting is 25,000 $\mu\text{g}/\text{kg}$, as outlined in Act 2. Naphthalene was not analyzed in the 1989 and 1990 characterization. Historical groundwater samples collected from the site monitoring wells indicate that naphthalene has been detected in two wells at concentrations that have exceeded the Statewide Health Standard of 100 $\mu\text{g}/\text{L}$ for a residential used aquifer scenario. The maximum dissolved naphthalene concentration observed at the site was 1,200 $\mu\text{g}/\text{L}$.



7.0 FATE AND TRANSPORT MODELING

7.1 Analytical Model Description

In order to evaluate potential impact to potentially sensitive receptors in the vicinity of the site, GES modeled the movement of the applicable dissolved-phase hydrocarbon plumes utilizing the PADEP-approved Quick Domenico (QD) application of "An Analytical Model for Multidimensional Transport of a Decaying Contaminant Species" (Domenico, 1987). The QD model calculates the concentration of dissolved organic constituents at a location down gradient of a source area. The QD model assumes steady-state flow conditions in a homogeneous aquifer. The model considers first-order decay, retardation, and three-dimensional dispersion. In the QD model, concentrations are calculated for a single species and reactions between constituents are not considered. The QD model provides a conservative estimate of compound migration based on the assumption that contaminants are continuously introduced into the unconsolidated aquifer at the specified input concentration and over the entire specified time period being modeled. In addition, the QD model does not consider fracture flow scenarios or dual porosity.

The objective of this QD modeling is to conservatively simulate the transport and persistence of benzene. Benzene is the only constituent of concern to model since groundwater concentrations in single wells have exceeded the Statewide Health Standard in at least two samples over the past eight quarters.

7.2 Input Parameters and Calculations

In the modeling effort, input parameter values were defined from site data whenever possible. When site-specific data were not available, literature values were utilized to define model input values. The following describes the input parameters of the QD model and the values applied in the modeling effort. Input parameters and calculations for each constituent are provided in **Appendix I**.

Source Width and Source Thickness

The source width is the maximum width of the soil or residual contamination perpendicular to the direction of groundwater flow. The source area thickness represents the extent of vertical soil contamination. The source area was characterized by analytical results of test pit and soil boring samples collected at the site. The width of the area of residual soil impact near the release area was determined to be 60 feet. The thickness of residual soil impact as defined by the test pit and soil boring investigation was determined to be 10 feet.

Source Concentration

The source concentration of the constituent modeled is applied uniformly across the entire source area and is presumed to be continuous. The maximum observed dissolved-phase benzene concentration was utilized as the source concentration. Since the QD model does not consider source depletion and maximum observed concentrations were defined, these applied conditions are considered highly conservative. Benzene concentrations detected in MW-6 were utilized as the source concentrations that were projected over time.

Hydraulic Conductivity

As described in Section 3.6, the average site-specific hydraulic conductivity (K) value was calculated to be 1.56 ft/day from data collected during the rising head slug tests performed on MW-5, MW-14, and MW-25.

Hydraulic Gradient

The hydraulic gradient is the slope of the water table. The average hydraulic gradient across the site was calculated to be 0.0038 ft/ft over the past eight quarters in the southwest direction.

Longitudinal, Transverse, and Vertical Dispersivity

Hydrodynamic dispersion is the term applied to the combined effects of mechanical dispersion and molecular diffusion in causing a plume to spread within a groundwater system. Mechanical dispersion is the physical mixing of the dissolved plume with the surrounding aquifer causing a reduction in the concentration. Variations in pore size, flow path, and pore friction cause dispersion. Longitudinal dispersion occurs in the direction of advective groundwater flow, while transverse dispersion occurs perpendicular to groundwater flow. Diffusion is the movement of dissolved molecular species in response to concentration gradients and is governed by Fick's Second Law. Molecular diffusion occurs even in the absence of groundwater flow. Under normal advective flow systems, mechanical dispersion predominates.

Dispersivity has been observed by numerous researchers to vary with travel distance. In natural systems, longitudinal dispersivity is greater than the transverse dispersivity, typically by an order of magnitude. As a first approximation, the longitudinal dispersivity can be defined as 10 percent of the plume flow path (Fetter, 1993). For this modeling effort, the longitudinal, lateral, and vertical dispersivities were calculated based on the observed plume lengths. These values were calculated for each constituent as shown on the parameter calculation sheets for each constituent (**Appendix I**).

Effective Porosity, Soil Bulk Density, and Fraction Organic Content

Effective porosity is the ratio of void volume to total volume in the aquifer where movement occurs between the voids. Soil bulk density is a measurement of the compressibility of a porous medium and fraction organic carbon (f_{oc}) represents the organic carbon content of the soil. As stated in Section 3.6, four soil samples were collected for analysis of bulk density, porosity and total organic content. The average dry bulk density of the four samples was 87.1 pcf, the average porosity was 48%, and the average total carbon content was 7.2% (0.072). The average dry bulk density was converted to 1.40 grams per cubic centimeter (g/cm^3) for model input (**Appendix E**).

Organic Carbon Partition Coefficient (K_{oc}) – The partition coefficient is chemical specific and describes the ratio of the amount of constituent adsorbed per unit weight of organic carbon in the aquifer soil to the concentration in aqueous solution. A K_{oc} value of 58 was utilized in the benzene model and this value was listed in Appendix A, Table 5, of the Act 2 regulations.

Lambda

Lambda is the first-order decay constant for a constituent. A site-specific lambda value was calculated for benzene using the following equation:

$$\lambda = (-\ln C/C_0) / \text{time}$$

where C_0 is the initial concentration of the constituent of concern, C is the final concentration of the constituent of concern, and t is the difference in time between the two observed concentrations. For comparison of the site-specific lambda, literature values were obtained from ASTM Standard 1739-95 Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites and Appendix A, Table 5 of the Act 2 regulations. The calculated lambda values were then compared to published values for verification (see table below).



Compound	Calculated Lambda	Act 2 Table 5 Lambda	ASTM Lambda	Lambda Used in Model
Benzene	0.00159	0.001	0.0009-0.069	0.00159

Distance to Location of Concern

This is the distance from the source area to a down gradient location of interest. In this modeling effort, the locations of concern are the two domestic wells. Dennis and Ruth Bregande's supply well is located 300 feet in the longitudinal direction and 50 feet in the transverse direction from MW-6. Marion and Laura Bregande's supply well is located 230 feet in the longitudinal direction and 170 feet in the transverse direction from MW-6.

For model calibration, the distance to the location of concern was 180 feet in the longitudinal direction to model dissolved benzene migrating from MW-6 towards MW-25, as this is the distance that separates MW-6 from MW-125. Model calibration is discussed in more detail in Section 7.3.

7.3 Model Calibration

The benzene model was calibrated using observed concentrations from MW-6 to MW-25 over time. In January 1990 (a date of January 1, 1990 was assumed for the model), 1,900 µg/L of benzene was observed in MW-6 and a subsequent concentration of not detected was observed on December 30, 2002 in MW-25. The model projected a concentration of 0.0 µg/L after 4,746 days in MW-25, and this was considered a good calibration.

7.4 Modeling Results

GES ran the QD model to predict the fate and transport of benzene over time to determine if the worst-case dissolved benzene plume in MW-6 would adversely impact the domestic wells in the area. The output documentation from the modeling calculations is provided in **Appendix I**. Using the maximum benzene concentration of 1,900 µg/L observed in MW-6, the dissolved benzene plume is not projected to reach with Dennis and Ruth Bregande's or Marion and Laura Bregande's domestic well. The maximum extent of the historical benzene plume was projected to be 200 feet in the longitudinal direction and 100 feet in the transverse direction from MW-6.

8.0 BASELINE EXPOSURE ASSESSMENT

A Baseline Exposure Assessment was conducted utilizing Tier 2 Risk-Based Corrective Action (ASTM E-1739, 1995) protocols and guidelines established by 25 PA Code, Chapter 250. In this section, all potential exposure pathways were reviewed and a baseline risk assessment was conducted for petroleum hydrocarbons that exceeded applicable Statewide Health Standards at the site.

8.1 Exposure Pathway Assessment

Human or ecological receptors can be exposed to constituents of concern (COC) through four major pathway categories: 1) air, 2) groundwater, 3) soil, and 4) surface water. Within each pathway category are specific exposure pathway scenarios. The following is a description of each potential exposure pathway. Pathways pertinent to the site and surrounding area are identified below.

Air Exposure Pathways

Inhalation of vapors volatilized or particulates from surface soil into ambient outdoor air. Screening of soil during the historical soil characterization activities indicate that surface soil was not adversely impacted by petroleum hydrocarbons; therefore this pathway was not considered in the exposure assessment.

Inhalation of vapors volatilized from subsurface soil into the ambient outdoor air. This pathway will be considered in this exposure assessment due to the concentrations of benzene exceeding applicable Statewide Health Standards for residential, unsaturated, subsurface soil.

Inhalation of vapors volatilized from soil into an enclosed space. An enclosed space exists at the site in the form of the residential structures. Soil samples collected from locations near the residential structures were below applicable Statewide Health Standards; therefore this pathway will not be considered in the exposure assessment.

Inhalation of vapors volatilized from groundwater to the ambient air. Permeable materials (i.e. soil) cover a majority of the site; therefore the possibility exists that constituents in groundwater could volatilize and migrate into the ambient air. Current residential scenarios were investigated for this pathway in the exposure assessment due to the presence of benzene in groundwater above applicable Statewide Health Standards for the residential, used aquifer scenario.

Inhalation of vapors volatilized from groundwater into an enclosed space. As stated above, an enclosed space exists at the site in the form of the residential structures with basements. The dissolved benzene plume however is not projected to reach the locations of residential structures; therefore this pathway will not be considered in the exposure assessment.

Groundwater Exposure Pathway

Ingestion of contaminated drinking water from a water supply well. Potable supply wells exist in the vicinity of the site. Ten years of historical monitoring of domestic wells in the area indicate that the domestic water supplies have not been adversely impacted by petroleum hydrocarbons. In addition, the fate and transport analysis indicates that the dissolved benzene plume will not reach the two closest domestic wells; therefore this pathway was not considered in the exposure assessment.

Soil Exposure Pathway

Dermal contact and direct ingestion of contaminated soils. Concentrations of benzene from soil samples collected during the soil boring investigation are below applicable direct contact numeric values (Table 3, Act 2); therefore this pathway was not considered in the exposure assessment.

Surface Water Exposure Pathways

Exposure to or ingestion of surface water contaminated by runoff from contaminated soil. As stated above, surficial soil was not observed to be impacted by petroleum hydrocarbons. In addition, the closest surface water (intermittent tributary to Chester Creek) to the dissolved benzene plume is located over 600 feet from MW-6. The dissolved benzene plume is not projected to extend beyond 200 feet. As a result, this pathway was not considered in this exposure assessment.

Exposure or ingestion of surface water contaminated by groundwater discharge. As stated above, the dissolved benzene plume is not expected to reach the surface water; therefore this pathway was not considered in the exposure assessment.

In summary, the potential exposure pathways identified in the assessment for the site are inhalation of vapors volatilized from subsurface soil and groundwater into ambient outdoor air at the site.

8.2 Exposure Assessment Approach

To assess the exposure from the identified potential exposure pathways, two scenarios were developed:

- onsite residential outdoor air quality from volatilization of subsurface soil vapors, and
- onsite residential outdoor air quality from volatilization of groundwater vapors.

Historical soil and groundwater analytical data summaries are presented in **Table 1** and **Table 3**, respectively. A maximum benzene soil concentration of 5,000 µg/kg and a maximum benzene groundwater concentration of 1,900 µg/L observed on at the site were utilized in the baseline exposure assessment. The following ASTM-approved exposure factors were also used in the risk assessment model:

- average adult person's body weight is 70 kilograms;
- the average person's outdoor inhalation rate at residential sites is 20 m³/day;
- exposure at a residential property is assumed to occur 350 day/yr for a total of 30 years for a non-carcinogenic constituent and 70 years for a carcinogenic compound.

Site-specific parameters applied in the risk assessment include:

- average dry soil bulk density of 1.40 g/cm³ (average from soil borings collected at the site);
- average porosity of 0.48 (average from soil borings collected at the site);
- average depth to water of 8.58 feet based on historical gauging data from monitoring wells; and
- thickness of potentially affected soil zones (10 feet).

All other values utilized in the exposure assessment follow either PA Chapter 250 regulations or ASTM protocols (ASTM, 1995).

8.3 Exposure Evaluation

The health risks associated with benzene in groundwater and soil were evaluated using the RBCA Tool Kit for Chemical Releases software (Groundwater Services, 1999). The exposure assessment procedure employed in the RBCA Tool Kit follows the ASTM standards described in ASTM E-1739 (1995). In particular, the carcinogenic and non-carcinogenic exposure was estimated for benzene. Exposure was calculated as the excess risk incurred by individuals exposed to the chemical by the pathways and routes identified in Section 8.2. For carcinogenic compounds, risk values greater than a value of 1×10^{-4} indicates excess risk (PA Chapter 250 regulations). The hazard index is indicative of the potential for adverse health effects due to exposure to non-carcinogenic chemical substances. A hazard index greater than 1.0 indicates sensitive populations may experience adverse health effects (PA Chapter 250 regulations). Therefore, the criteria used for assessing the safety of a particular exposure scenario were:

- individual COC excess lifetime risk of cancer of 1×10^{-5} or more;
- a cumulative excess lifetime risk of cancer of 1×10^{-4} or more; and
- a target hazard index of 1.0 for non-carcinogenic effects.

8.4 Exposure Assessment Results

Results of the risk analysis for the outdoor air exposure scenario indicate levels of risk below the PADEP's target risk guidelines for both baseline carcinogenic risk and baseline non-carcinogenic effects (hazard index) for the onsite residential scenario. The calculated carcinogenic and non-carcinogenic indices associated with the outdoor air quality for the onsite residential scenario were 1.7×10^{-6} and 3.5×10^{-1} , respectively. The risk assessment documentation for the onsite residential scenario is included as **Appendix J**.



9.0 DEMONSTRATION OF ATTAINMENT

9.1 Soil

9.1.1 Statewide Health Standard

Soil samples collected in 2002 were below applicable Statewide Health Standards for the following compounds: toluene, ethylbenzene, total xylenes, MTBE, isopropylbenzene, naphthalene, 1-methylnaphthalene, fluorene, and phenanthrene (Table 1). As a result, a demonstration of attainment for these compounds in soil is complete.

9.1.2 Site-Specific Standard

Historical soil samples have exceeded applicable Statewide Health Standards at the site for benzene. A maximum benzene concentration of 5,000 $\mu\text{g}/\text{kg}$ was observed at the site and this concentration was utilized in the baseline exposure assessment. Residual benzene concentrations of 5,000 $\mu\text{g}/\text{kg}$ did not project excessive carcinogenic or non-carcinogenic risk at the site; therefore a concentration of 5,000 $\mu\text{g}/\text{kg}$ is selected as the Site-Specific Standard for benzene. All other concentrations of benzene detected at the site have been below 5,000 $\mu\text{g}/\text{kg}$; therefore a demonstration of attainment of the site-specific concentration of benzene is complete.

9.2 Groundwater

9.2.1 Statewide Health Standard

Groundwater samples collected over the past eight quarters were below applicable Statewide Health Standards for the following compounds: toluene, ethylbenzene, total xylenes, MTBE, isopropylbenzene, naphthalene, 1-methylnaphthalene, fluorene, and phenanthrene (Table 3). As a result, a demonstration of attainment for these compounds in groundwater is complete.

9.2.2 Site-Specific Standard

Historical groundwater samples have exceeded applicable Statewide Health Standards at the site for benzene. A maximum benzene concentration of 1,900 $\mu\text{g}/\text{L}$ was observed at the site and this concentration was utilized in the baseline exposure assessment. Residual benzene concentrations of 1,900 $\mu\text{g}/\text{L}$ did not project excessive carcinogenic or non-carcinogenic risk at the site; therefore a concentration of 1,900 $\mu\text{g}/\text{L}$ is selected as the Site-Specific Standard for benzene. All other concentrations of benzene detected at the site have been below 1,900 $\mu\text{g}/\text{L}$; therefore a demonstration of attainment of the Site-Specific Standard for benzene is complete.



10.0 PUBLIC INVOLVEMENT PLAN

On November 8 and 19, 2002, Edgmont Township and the public were notified of the Notice of Intent to Remediate (NIR) the site and that a final report would be submitted for the site following a 30-day comment period. This notification took place in the form of notice publication in the Daily Local News on the aforementioned dates. In addition, Edgmont Township was notified in written communication by GES dated November 14, 2002 of the NIR, comment period, and final report. Edgmont Township chose not to comment or be involved in the remediation process for the property; therefore, a public involvement plan is not required (Appendix A).

NOTICE: This report is required by 49 CFR Part 195. Failure to report can result in a civil penalty not to exceed \$100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed \$1,000,000 as provided in 49 USC 60122.		OMB NO: 2137-0047 EXPIRATION DATE: 8/31/2020	
 U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration	Original Report Date:	05/06/2015	
	No.	20150163 - 30182 <small>(DOT Use Only)</small>	
ACCIDENT REPORT - HAZARDOUS LIQUID PIPELINE SYSTEMS			
A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0047. All responses to the collection of information are mandatory. Send comments regarding this burden or any other aspect of this collection of information, including suggestions for reducing the burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.			
INSTRUCTIONS			
<i>Important: Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.</i>			
PART A - KEY REPORT INFORMATION			
Report Type: (select all that apply)	Original:	Supplemental:	Final:
		Yes	Yes
Last Revision Date:	04/11/2018		
1. Operator's OPS-issued Operator Identification Number (OPID):	18718		
2. Name of Operator	SUNOCO PIPELINE L.P.		
3. Address of Operator:			
3a. Street Address	1300 MAIN STREET		
3b. City	HOUSTON		
3c. State	Texas		
3d. Zip Code	77002		
4. Local time (24-hr clock) and date of the Accident:	04/10/2015 15:05		
5. Location of Accident:			
Latitude:	39.94024		
Longitude:	-75.4799		
6. National Response Center Report Number (if applicable):	1113257		
7. Local time (24-hr clock) and date of initial telephonic report to the National Response Center (if applicable):	04/10/2015 19:31		
8. Commodity released: (select only one, based on predominant volume released)	Refined and/or Petroleum Product (non-HVL) which is a Liquid at Ambient Conditions		
- Specify Commodity Subtype:	Mixture of Refined Products (transmix or other mixture)		
- If "Other" Subtype, Describe:			
- If Biofuel/Alternative Fuel and Commodity Subtype is Ethanol Blend, then % Ethanol Blend:			
- If Biofuel/Alternative Fuel and Commodity Subtype is Biodiesel, then Biodiesel Blend e.g. B2, B20, B100			
9. Estimated volume of commodity released unintentionally (Barrels):	.40		
10. Estimated volume of intentional and/or controlled release/blowdown (Barrels):			
11. Estimated volume of commodity recovered (Barrels):	.40		
12. Were there fatalities?	No		
- If Yes, specify the number in each category:			
12a. Operator employees			
12b. Contractor employees working for the Operator			
12c. Non-Operator emergency responders			
12d. Workers working on the right-of-way, but NOT associated with this Operator			
12e. General public			
12f. Total fatalities (sum of above)			
13. Were there injuries requiring inpatient hospitalization?	No		
- If Yes, specify the number in each category:			
13a. Operator employees			
13b. Contractor employees working for the Operator			
13c. Non-Operator emergency responders			
13d. Workers working on the right-of-way, but NOT associated with this Operator			
13e. General public			

13f. Total injuries (sum of above)	
14. Was the pipeline/facility shut down due to the Accident?	Yes
- If No, Explain:	
- If Yes, complete Questions 14a and 14b: (use local time, 24-hr clock)	
14a. Local time and date of shutdown:	04/10/2015 15:40
14b. Local time pipeline/facility restarted:	04/12/2015 01:22
- Still shut down? (* Supplemental Report Required)	
15. Did the commodity ignite?	No
16. Did the commodity explode?	No
17. Number of general public evacuated:	0
18. Time sequence (use local time, 24-hour clock):	
18a. Local time Operator identified Accident - effective 7- 2014 changed to "Local time Operator identified failure":	04/10/2015 18:45
18b. Local time Operator resources arrived on site:	04/10/2015 16:00

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the origin of the Accident onshore?	Yes
	<i>If Yes, Complete Questions (2-12)</i>
	<i>If No, Complete Questions (13-15)</i>
- If Onshore:	
2. State:	Pennsylvania
3. Zip Code:	19342
4. City:	Glen Mills
5. County or Parish:	Delaware
6. Operator-designated location:	Survey Station No.
	Specify: 998+54
7. Pipeline/Facility name:	Point Breeze to Montello 12"
8. Segment name/ID:	11001-12" Point Breeze to Montello
9. Was Accident on Federal land, other than the Outer Continental Shelf (OCS)?	No
10. Location of Accident:	Pipeline Right-of-way
11. Area of Accident (as found):	Underground
	Specify: Under soil
	- If Other, Describe:
	Depth-of-Cover (in): 36
12. Did Accident occur in a crossing?	No
- If Yes, specify type below:	
- If Bridge crossing –	
	Cased/ Uncased:
- If Railroad crossing –	
	Cased/ Uncased/ Bored/drilled
- If Road crossing –	
	Cased/ Uncased/ Bored/drilled
- If Water crossing –	
	Cased/ Uncased
	- Name of body of water, if commonly known:
	- Approx. water depth (ft) at the point of the Accident:
	- Select:
- If Offshore:	
13. Approximate water depth (ft) at the point of the Accident:	
14. Origin of Accident:	
- In State waters - Specify:	
	- State:
	- Area:
	- Block/Tract #:
	- Nearest County/Parish:
- On the Outer Continental Shelf (OCS) - Specify:	
	- Area:
	- Block #:
15. Area of Accident:	

PART C - ADDITIONAL FACILITY INFORMATION

1. Is the pipeline or facility:	Interstate
2. Part of system involved in Accident:	Onshore Pipeline, Including Valve Sites
- If Onshore Breakout Tank or Storage Vessel, Including Attached Appurtenances, specify:	
3. Item involved in Accident:	Pipe
- If Pipe, specify:	Pipe Body
3a. Nominal diameter of pipe (in):	12

3b. Wall thickness (in):	.375
3c. SMYS (Specified Minimum Yield Strength) of pipe (psi):	35,000
3d. Pipe specification:	Grade B
3e. Pipe Seam , specify:	Seamless
- If Other, Describe:	
3f. Pipe manufacturer:	National Tube Company
3g. Year of manufacture:	1937
3h. Pipeline coating type at point of Accident, specify:	Coal Tar
- If Other, Describe:	
- If Weld, including heat-affected zone, specify. If Pipe Girth Weld, 3a through 3h above are required:	
- If Other, Describe:	
- If Valve, specify:	
- If Mainline, specify:	
- If Other, Describe:	
3i. Manufactured by:	
3j. Year of manufacture:	
- If Tank/Vessel, specify:	
- If Other - Describe:	
- If Other, describe:	
4. Year item involved in Accident was installed:	1937
5. Material involved in Accident:	Carbon Steel
- If Material other than Carbon Steel, specify:	
6. Type of Accident Involved:	Leak
- If Mechanical Puncture – Specify Approx. size:	
in. (axial) by	
in. (circumferential)	
- If Leak - Select Type:	Pinhole
- If Other, Describe:	
- If Rupture - Select Orientation:	
- If Other, Describe:	
Approx. size: in. (widest opening) by	
in. (length circumferentially or axially)	
- If Other – Describe:	
PART D - ADDITIONAL CONSEQUENCE INFORMATION	
1. Wildlife impact:	No
1a. If Yes, specify all that apply:	
- Fish/aquatic	
- Birds	
- Terrestrial	
2. Soil contamination:	Yes
3. Long term impact assessment performed or planned:	Yes
4. Anticipated remediation:	Yes
4a. If Yes, specify all that apply:	
- Surface water	Yes
- Groundwater	
- Soil	Yes
- Vegetation	
- Wildlife	
5. Water contamination:	Yes
5a. If Yes, specify all that apply:	
- Ocean/Seawater	
- Surface	Yes
- Groundwater	
- Drinking water: (Select one or both)	
- Private Well	
- Public Water Intake	
5b. Estimated amount released in or reaching water (Barrels):	.10
5c. Name of body of water, if commonly known:	Unnamed intermittent drainage swale
6. At the location of this Accident, had the pipeline segment or facility been identified as one that "could affect" a High Consequence Area (HCA) as determined in the Operator's Integrity Management Program?	Yes
7. Did the released commodity reach or occur in one or more High Consequence Area (HCA)?	Yes
7a. If Yes, specify HCA type(s): (Select all that apply)	
- Commercially Navigable Waterway:	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's	

Integrity Management Program?	
- High Population Area:	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
- Other Populated Area	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Drinking Water	
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	
- Unusually Sensitive Area (USA) - Ecological	Yes
Was this HCA identified in the "could affect" determination for this Accident site in the Operator's Integrity Management Program?	Yes
8. Estimated cost to Operator – effective 12-2012, changed to "Estimated Property Damage":	
8a. Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator – effective 12-2012, "paid/reimbursed by the Operator" removed	\$ 46,550
8b. Estimated cost of commodity lost	\$ 24
8c. Estimated cost of Operator's property damage & repairs	\$ 230,000
8d. Estimated cost of Operator's emergency response	\$ 100,000
8e. Estimated cost of Operator's environmental remediation	\$ 75,000
8f. Estimated other costs	\$ 40,000
Describe:	Failure Analysis
8g. Estimated total costs (sum of above) – effective 12-2012, changed to "Total estimated property damage (sum of above)"	\$ 491,574
PART E - ADDITIONAL OPERATING INFORMATION	
1. Estimated pressure at the point and time of the Accident (psig):	670.00
2. Maximum Operating Pressure (MOP) at the point and time of the Accident (psig):	950.00
3. Describe the pressure on the system or facility relating to the Accident (psig):	Pressure did not exceed MOP
4. Not including pressure reductions required by PHMSA regulations (such as for repairs and pipe movement), was the system or facility relating to the Accident operating under an established pressure restriction with pressure limits below those normally allowed by the MOP?	No
- If Yes, Complete 4.a and 4.b below:	
4a. Did the pressure exceed this established pressure restriction?	
4b. Was this pressure restriction mandated by PHMSA or the State?	
5. Was "Onshore Pipeline, Including Valve Sites" OR "Offshore Pipeline, Including Riser and Riser Bend" selected in PART C, Question 2?	Yes
- If Yes - (Complete 5a. – 5f below) effective 12-2012, changed to "(Complete 5.a – 5.e below)"	
5a. Type of upstream valve used to initially isolate release source:	Remotely Controlled
5b. Type of downstream valve used to initially isolate release source:	Remotely Controlled
5c. Length of segment isolated between valves (ft):	66,000
5d. Is the pipeline configured to accommodate internal inspection tools?	Yes
- If No, Which physical features limit tool accommodation? (select all that apply)	
- Changes in line pipe diameter	
- Presence of unsuitable mainline valves	
- Tight or mitered pipe bends	
- Other passage restrictions (i.e. unbarred tee's, projecting instrumentation, etc.)	
- Extra thick pipe wall (applicable only for magnetic flux leakage internal inspection tools)	
- Other -	
- If Other, Describe:	
5e. For this pipeline, are there operational factors which significantly complicate the execution of an internal inspection tool run?	No
- If Yes, Which operational factors complicate execution? (select all that apply)	

- Excessive debris or scale, wax, or other wall buildup	
- Low operating pressure(s)	
- Low flow or absence of flow	
- Incompatible commodity	
- Other -	
- If Other, Describe:	
5f. Function of pipeline system:	> 20% SMYS Regulated Trunkline/Transmission
6. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Accident?	Yes
If Yes -	
6a. Was it operating at the time of the Accident?	Yes
6b. Was it fully functional at the time of the Accident?	Yes
6c. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
6d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
7. Was a CPM leak detection system in place on the pipeline or facility involved in the Accident?	Yes
- If Yes:	
7a. Was it operating at the time of the Accident?	Yes
7b. Was it fully functional at the time of the Accident?	Yes
7c. Did CPM leak detection system information (such as alarm (s), alert(s), event(s), and/or volume calculations) assist with the detection of the Accident?	No
7d. Did CPM leak detection system information (such as alarm (s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Accident?	No
8. How was the Accident initially identified for the Operator?	Notification From Public
- If Other, Specify:	
8a. If "Controller", "Local Operating Personnel", including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 8, specify:	
9. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Accident?	No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the Operator did not investigate)
- If No, the Operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the operator did not investigate)	A review of the accident determined that there were no control room actions that contributed to the event.
- If Yes, specify investigation result(s): (select all that apply)	
- Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
- Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator), and other factors associated with fatigue	
Provide an explanation for why not:	
- Investigation identified no control room issues	
- Investigation identified no controller issues	
- Investigation identified incorrect controller action or controller error	
- Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response	
- Investigation identified incorrect procedures	
- Investigation identified incorrect control room equipment operation	
- Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response	
- Investigation identified areas other than those above:	
Describe:	
PART F - DRUG & ALCOHOL TESTING INFORMATION	
1. As a result of this Accident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?	No
- If Yes:	
1a. Specify how many were tested:	

1b. Specify how many failed:	
2. As a result of this Accident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations? - If Yes:	No
2a. Specify how many were tested:	
2b. Specify how many failed:	
PART G – APPARENT CAUSE	
<i>Select only one box from PART G in shaded column on left representing the APPARENT Cause of the Accident, and answer the questions on the right. Describe secondary, contributing or root causes of the Accident in the narrative (PART H).</i>	
Apparent Cause:	G1 - Corrosion Failure
G1 - Corrosion Failure - only one sub-cause can be picked from shaded left-hand column	
Corrosion Failure – Sub-Cause:	External Corrosion
- If External Corrosion:	
1. Results of visual examination: - If Other, Describe:	Localized Pitting
2. Type of corrosion (<i>select all that apply</i>)	
- Galvanic	Yes
- Atmospheric	
- Stray Current	
- Microbiological	
- Selective Seam	
- Other:	
- If Other, Describe:	
3. The type(s) of corrosion selected in Question 2 is based on the following: (<i>select all that apply</i>)	
- Field examination	Yes
- Determined by metallurgical analysis	Yes
- Other:	
- If Other, Describe:	
4. Was the failed item buried under the ground? - If Yes :	Yes
<input type="checkbox"/> 4a. Was failed item considered to be under cathodic protection at the time of the Accident? If Yes - Year protection started:	Yes 1964
4b. Was shielding, tenting, or disbonding of coating evident at the point of the Accident?	Yes
4c. Has one or more Cathodic Protection Survey been conducted at the point of the Accident? If "Yes, CP Annual Survey" – Most recent year conducted: If "Yes, Close Interval Survey" – Most recent year conducted: If "Yes, Other CP Survey" – Most recent year conducted:	Yes 2017
- If No:	
4d. Was the failed item externally coated or painted?	
5. Was there observable damage to the coating or paint in the vicinity of the corrosion?	Yes
- If Internal Corrosion:	
6. Results of visual examination: - Other:	
7. Type of corrosion (<i>select all that apply</i>): -	
- Corrosive Commodity	
- Water drop-out/Acid	
- Microbiological	
- Erosion	
- Other:	
- If Other, Describe:	
8. The cause(s) of corrosion selected in Question 7 is based on the following (<i>select all that apply</i>): -	
- Field examination	
- Determined by metallurgical analysis	
- Other:	
- If Other, Describe:	
9. Location of corrosion (<i>select all that apply</i>): -	
- Low point in pipe	
- Elbow	
- Other:	

- If Other, Describe:	
10. Was the commodity treated with corrosion inhibitors or biocides?	
11. Was the interior coated or lined with protective coating?	
12. Were cleaning/dewatering pigs (or other operations) routinely utilized?	
13. Were corrosion coupons routinely utilized?	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Tank/Vessel.	
14. List the year of the most recent inspections:	
14a. API Std 653 Out-of-Service Inspection	
- No Out-of-Service Inspection completed	
14b. API Std 653 In-Service Inspection	
- No In-Service Inspection completed	
Complete the following if any Corrosion Failure sub-cause is selected AND the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
15. Has one or more internal inspection tool collected data at the point of the Accident?	Yes
15a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -	
- Magnetic Flux Leakage Tool	Most recent year:
- Ultrasonic	Most recent year:
- Geometry	Most recent year:
- Caliper	Most recent year:
- Crack	Yes Most recent year: 2016
- Hard Spot	Most recent year:
- Combination Tool	Yes Most recent year: 2016
- Transverse Field/Triaxial	Most recent year:
- Other	Most recent year:
Describe:	
16. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	Yes
If Yes -	
Most recent year tested:	2017
Test pressure:	1,560.00
17. Has one or more Direct Assessment been conducted on this segment?	No
- If Yes, and an investigative dig was conducted at the point of the Accident::	
Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:	
Most recent year conducted:	
18. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	No
18a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
Describe:	
G2 - Natural Force Damage - only one sub-cause can be picked from shaded left-handed column	
Natural Force Damage – Sub-Cause:	
- If Earth Movement, NOT due to Heavy Rains/Floods:	
1. Specify:	

	- If Other, Describe:	
- If Heavy Rains/Floods:		
2. Specify:		
	- If Other, Describe:	
- If Lightning:		
3. Specify:		
- If Temperature:		
4. Specify:		
	- If Other, Describe:	
- If Other Natural Force Damage:		
5. Describe:		
Complete the following if any Natural Force Damage sub-cause is selected.		
6. Were the natural forces causing the Accident generated in conjunction with an extreme weather event?		
6a. If Yes, specify: <i>(select all that apply)</i>		
- Hurricane		
- Tropical Storm		
- Tornado		
- Other		
	- If Other, Describe:	
G3 - Excavation Damage - only one sub-cause can be picked from shaded left-hand column		
Excavation Damage – Sub-Cause:		
- If Previous Damage due to Excavation Activity: Complete Questions 1-5 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.		
1. Has one or more internal inspection tool collected data at the point of the Accident?		
1a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run: -		
- Magnetic Flux Leakage	Most recent year conducted:	
- Ultrasonic	Most recent year conducted:	
- Geometry	Most recent year conducted:	
- Caliper	Most recent year conducted:	
- Crack	Most recent year conducted:	
- Hard Spot	Most recent year conducted:	
- Combination Tool	Most recent year conducted:	
- Transverse Field/Triaxial	Most recent year conducted:	
- Other	Most recent year conducted:	
	Describe:	
2. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?		
3. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?		
- If Yes:		
	Most recent year tested:	
	Test pressure (psig):	
4. Has one or more Direct Assessment been conducted on the pipeline segment?		
- If Yes, and an investigative dig was conducted at the point of the Accident:		
	Most recent year conducted:	
- If Yes, but the point of the Accident was not identified as a dig site:		
	Most recent year conducted:	
5. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?		
5a. If Yes, for each examination, conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:		
- Radiography	Most recent year conducted:	
- Guided Wave Ultrasonic	Most recent year conducted:	

- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
Describe:	
Complete the following if Excavation Damage by Third Party is selected as the sub-cause.	
6. Did the operator get prior notification of the excavation activity?	
6a. If Yes, Notification received from: <i>(select all that apply)</i> -	
- One-Call System	
- Excavator	
- Contractor	
- Landowner	
Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.	
7. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)?	
8. Right-of-Way where event occurred: <i>(select all that apply)</i> -	
- Public	
	- If "Public", Specify:
- Private	
	- If "Private", Specify:
- Pipeline Property/Easement	
- Power/Transmission Line	
- Railroad	
- Dedicated Public Utility Easement	
- Federal Land	
- Data not collected	
- Unknown/Other	
9. Type of excavator:	
10. Type of excavation equipment:	
11. Type of work performed:	
12. Was the One-Call Center notified?	
12a. If Yes, specify ticket number:	
12b. If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:	
13. Type of Locator:	
14. Were facility locate marks visible in the area of excavation?	
15. Were facilities marked correctly?	
16. Did the damage cause an interruption in service?	
16a. If Yes, specify duration of the interruption (hours)	
17. Description of the CGA-DIRT Root Cause <i>(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):</i>	
Root Cause:	
- If One-Call Notification Practices Not Sufficient, specify:	
- If Locating Practices Not Sufficient, specify:	
- If Excavation Practices Not Sufficient, specify:	
- If Other/None of the Above, explain:	
G4 - Other Outside Force Damage - only one sub-cause can be selected from the shaded left-hand column	
Other Outside Force Damage – Sub-Cause:	
- If Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation:	
1. Vehicle/Equipment operated by:	
- If Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring:	
2. Select one or more of the following IF an extreme weather event was a factor:	
- Hurricane	
- Tropical Storm	
- Tornado	
- Heavy Rains/Flood	
- Other	
- If Other, Describe:	
- If Previous Mechanical Damage NOT Related to Excavation: Complete Questions 3-7 ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is Pipe or Weld.	
3. Has one or more internal inspection tool collected data at the point of	

the Accident?	
3a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	Most recent year conducted:
- Ultrasonic	Most recent year conducted:
- Geometry	Most recent year conducted:
- Caliper	Most recent year conducted:
- Crack	Most recent year conducted:
- Hard Spot	Most recent year conducted:
- Combination Tool	Most recent year conducted:
- Transverse Field/Triaxial	Most recent year conducted:
- Other	Most recent year conducted:
	Describe:
4. Do you have reason to believe that the internal inspection was completed BEFORE the damage was sustained?	
5. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	Most recent year tested:
	Test pressure (psig):
6. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident:	Most recent year conducted:
- If Yes, but the point of the Accident was not identified as a dig site:	Most recent year conducted:
7. Has one or more non-destructive examination been conducted at the point of the Accident since January 1, 2002?	
7a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted:	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:
- Wet Magnetic Particle Test	Most recent year conducted:
- Dry Magnetic Particle Test	Most recent year conducted:
- Other	Most recent year conducted:
	Describe:
- If Intentional Damage:	
8. Specify:	- If Other, Describe:
- If Other Outside Force Damage:	
9. Describe:	
G5 - Material Failure of Pipe or Weld - only one sub-cause can be selected from the shaded left-hand column	
Use this section to report material failures ONLY IF the "Item Involved in Accident" (from PART C, Question 3) is "Pipe" or "Weld."	
Material Failure of Pipe or Weld – Sub-Cause:	
1. The sub-cause shown above is based on the following: <i>(select all that apply)</i>	
- Field Examination	
- Determined by Metallurgical Analysis	
- Other Analysis	
	- If "Other Analysis", Describe:
- Sub-cause is Tentative or Suspected; Still Under Investigation (Supplemental Report required)	

- If Construction, Installation, or Fabrication-related:	
2. List contributing factors: <i>(select all that apply)</i>	
- Fatigue or Vibration-related	
	Specify:
	- If Other, Describe:
- Mechanical Stress:	
- Other	
	- If Other, Describe:
- If Environmental Cracking-related:	
3. Specify:	
- If Other - Describe:	
Complete the following if any Material Failure of Pipe or Weld sub-cause is selected.	
4. Additional factors: <i>(select all that apply)</i> :	
- Dent	
- Gouge	
- Pipe Bend	
- Arc Burn	
- Crack	
- Lack of Fusion	
- Lamination	
- Buckle	
- Wrinkle	
- Misalignment	
- Burnt Steel	
- Other:	
	- If Other, Describe:
5. Has one or more internal inspection tool collected data at the point of the Accident?	
5a. If Yes, for each tool used, select type of internal inspection tool and indicate most recent year run:	
- Magnetic Flux Leakage	Most recent year run:
- Ultrasonic	Most recent year run:
- Geometry	Most recent year run:
- Caliper	Most recent year run:
- Crack	Most recent year run:
- Hard Spot	Most recent year run:
- Combination Tool	Most recent year run:
- Transverse Field/Triaxial	Most recent year run:
- Other	Most recent year run:
	Describe:
6. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Accident?	
- If Yes:	
	Most recent year tested:
	Test pressure (psig):
7. Has one or more Direct Assessment been conducted on the pipeline segment?	
- If Yes, and an investigative dig was conducted at the point of the Accident -	
	Most recent year conducted:
- If Yes, but the point of the Accident was not identified as a dig site -	
	Most recent year conducted:
8. Has one or more non-destructive examination(s) been conducted at the point of the Accident since January 1, 2002?	
8a. If Yes, for each examination conducted since January 1, 2002, select type of non-destructive examination and indicate most recent year the examination was conducted: -	
- Radiography	Most recent year conducted:
- Guided Wave Ultrasonic	Most recent year conducted:
- Handheld Ultrasonic Tool	Most recent year conducted:

- Wet Magnetic Particle Test	Most recent year conducted:	
- Dry Magnetic Particle Test	Most recent year conducted:	
- Other	Most recent year conducted:	
		Describe:
G6 – Equipment Failure - only one sub-cause can be selected from the shaded left-hand column		
Equipment Failure – Sub-Cause:		
- If Malfunction of Control/Relief Equipment:		
1. Specify: <i>(select all that apply)</i> -		
- Control Valve		
- Instrumentation		
- SCADA		
- Communications		
- Block Valve		
- Check Valve		
- Relief Valve		
- Power Failure		
- Stopple/Control Fitting		
- ESD System Failure		
- Other		
		- If Other – Describe:
- If Pump or Pump-related Equipment:		
2. Specify:		
		- If Other – Describe:
- If Threaded Connection/Coupling Failure:		
3. Specify:		
		- If Other – Describe:
- If Non-threaded Connection Failure:		
4. Specify:		
		- If Other – Describe:
- If Other Equipment Failure:		
5. Describe:		
Complete the following if any Equipment Failure sub-cause is selected.		
6. Additional factors that contributed to the equipment failure: <i>(select all that apply)</i>		
- Excessive vibration		
- Overpressurization		
- No support or loss of support		
- Manufacturing defect		
- Loss of electricity		
- Improper installation		
- Mismatched items (different manufacturer for tubing and tubing fittings)		
- Dissimilar metals		
- Breakdown of soft goods due to compatibility issues with transported commodity		
- Valve vault or valve can contributed to the release		
- Alarm/status failure		
- Misalignment		
- Thermal stress		
- Other		
		- If Other, Describe:
G7 - Incorrect Operation - only one sub-cause can be selected from the shaded left-hand column		
Incorrect Operation – Sub-Cause:		
- If Tank, Vessel, or Sump/Separator Allowed or Caused to Overfill or Overflow		
		1. Specify:
		- If Other, Describe:
- If Other Incorrect Operation		

2. Describe:	
Complete the following if any Incorrect Operation sub-cause is selected.	
3. Was this Accident related to <i>(select all that apply)</i> : -	
- Inadequate procedure	
- No procedure established	
- Failure to follow procedure	
- Other:	
- If Other, Describe:	
4. What category type was the activity that caused the Accident?	
5. Was the task(s) that led to the Accident identified as a covered task in your Operator Qualification Program?	
5a. If Yes, were the individuals performing the task(s) qualified for the task(s)?	
G8 - Other Accident Cause - only one sub-cause can be selected from the shaded left-hand column	
Other Accident Cause – Sub-Cause:	
- If Miscellaneous:	
1. Describe:	
- If Unknown:	
2. Specify:	
PART H - NARRATIVE DESCRIPTION OF THE ACCIDENT	
<p>On 4/10/2015 at approximately 15:05 a landowner telephonically reported a petroleum odor to the SPLP Control Center. The line was shutdown and field personnel were dispatched to the area and detected a rainbow sheen on an intermittent drainage swale in a wooded area adjacent to the pipeline ROW. Emergency Response and Incident Command was initiated and the source of the odor was traced to the Point Breeze to Montello 12" refined products pipeline system. This area of the pipeline was excavated and a Plidco repair clamp was used to effect repair at the failure location. Permanent repair via cut out and replacement was planned however the area of the failure was located in a wetland area that is subject to PA DEP permitting. Permit approval process significantly delayed permanent repair. As of 7/10/2017 the failed section was cut out and replaced. The failed section was sent to a laboratory for failure analysis. The failure analysis report confirmed that the cause of the failure was external corrosion. The most likely mechanism for the external corrosion was coating failure which caused localized shielding of the CP. In 2016, Def/MFL/SMFL/LFM and UT Crack ILI tools were run and subsequent repairs and replacement of sections of this pipeline were affected including the cut out and replacement of this failed section of pipe. Subsequent to the repair program a hydrostatic pressure test was completed to requalify the MOP.</p>	
PART I - PREPARER AND AUTHORIZED SIGNATURE	
Preparer's Name	Todd G. Nardozzi
Preparer's Title	Sr. Manager DOT Compliance
Preparer's Telephone Number	281-637-6576
Preparer's E-mail Address	todd.nardozzi@energytransfer.com
Preparer's Facsimile Number	877-917-0448
Authorized Signer Name	Todd G. Nardozzi
Authorized Signer Title	Sr. Manager DOT Compliance
Authorized Signer Telephone Number	281-637-6576
Authorized Signer Email	todd.nardozzi@energytransfer.com
Date	04/11/2018



To the Joint House and Senate Democratic Committee,

Thank you for the invitation to speak about putting climate justice at the center of the People's Budget, a topic close to my heart. I am Bishop Dwayne Royster, Executive Director of POWER Interfaith. POWER is a multi-faith, multi-racial movement, that builds racial and economic justice on a liveable planet. Our Climate Justice and Jobs team is working with constituents and other organizations across the state on clean energy and just transition base-building, policies, and advocacy.

We believe that the budget is a Moral Document - it should direct and fund the programs that increase all communities' quality of life. The budget should be a moral compass that is an expression of the values we care about in our society. The budget should direct resources towards the common good to build a world where everyone can breathe fresh air, drink clean water, educate our children, access medical care and have a healthy livelihood.

We know that the communities that have faced the most burden from climate and racial injustice are the same communities targeted by the dirty fossil fuel economy for placement of toxic industry and waste. We have witnessed this year the devastating collision of COVID and climate crisis in a society of extreme inequality with those living in the most polluted areas getting the sickest and dying the most. It is imperative that a People's Budget repair these past harms and prioritize investment in environmental justice communities which are predominantly Black, Brown, Indigenous, low-income, and marginalized.

A People's Budget that focuses on the environment can invest in communities in ways that are both good for the environment and for the communities as we face climate change collectively. Such investments might include funding tree canopies in heat deserts, green space development, green water infrastructure, coal and other hazardous waste clean up, such as cleaning lead and asbestos toxins out of public schools, monitoring air and water quality and cumulative pollution burdens, green and renewable infrastructure with workforce development, investments in energy efficiency and solarization for low income housing, etc. I want to emphasize the need for dedicated funds to monitor the overall well-being of environmental justice communities, as defined by the Department of Environmental Protection. These are just some ways that we can both invest in communities and clean our environment through A People's Budget with a strong green justice focus.

A People's Budget with Climate Justice at its center can facilitate interdepartmental work that incorporates environmental considerations into sanitation, public transportation, housing, health, department of environmental protection, etc. It is an opportunity to work together towards common ends.

A People's Budget addressing the threat of Climate Crisis and the opportunity of a regenerative economy should feature a number of things. This budget should feature a just transition for both workers and communities tied to the fossil fuel industry, such as local governments that depend on the fossil fuel tax base for public institutions such as libraries and schools. We can look to examples like Colorado who are starting an Office of a Just Transition to support communities in deciding their future in the clean energy and other sectors. Budget commitments should work towards cleaning our



environment and supporting new jobs, that are proven to increase state GDP and lower greenhouse gas emissions. The cost of this transition must not be put on those who are the most impacted by the fossil fuel economy or those with the least resources. PA is a national leader in energy generation and the 5th highest carbon polluter in the country. We can and we must move towards renewables, which can be supported by a People's Budget.

We need to enlist the moral imagination of our leaders to put People and Planet first and not Profit. We have to stop putting jobs vs. the environment and change the narrative to one that recognizes that all people can be part of transitioning our fossil fuel economy to one that is sustainable and regenerative. What do I mean by regenerative? A regenerative economy, as defined by allies at the United Frontlines Table, "is based on ecological restoration, community protection, equitable partnerships, justice and full and fair participatory processes... It values the dignity of work and humanity... supports collective and inclusive participatory governance..." Let us create a budget that addresses the interconnectedness of many issues. That is what it means to live into the Justice part of Environmental Justice or Climate Justice.

A budget that supports a green transition is an opportunity for community-driven development on multiple scales. It should include communities in shaping their futures away from a fossil fuel economy. This budget can be utilized to create a pathway that supports individualized counseling for workers, job creation in new industries that incorporate green economy principles, which can be used to address energy efficiency, clean air and water solutions, and generally increase the quality of life for all people, especially those left behind. Therefore this budget should be shaped by community-driven input on needs and solutions. Communities know best what they need, what they want, and what the stakes are when elected leaders ignore them. The budget can uplift these local solutions.

A People's Budget must address racial justice, economic justice, and climate justice in an interconnected way because the problems of racism, economic inequality and climate crisis are inseparable. We believe in a world where there are no Throw Away people and no Throw Away places. When we fail to create solutions with and for everyone, all of us are harmed and this ultimately costs the state way more in lost revenue, lost health, and lost community stability. Let's not be the next Texas with no heat or water for millions in the depth of winter and pandemic. We need real leadership and that leadership should be reflected in the priorities of our state budget.

How will you engage communities and imagine moving us towards Climate Justice through this budget?

Thank you for your time.

Sincerely,

Bishop Dwayne Royster
Executive Director

Learn more about the Climate Justice and Jobs team: <https://powerinterfaith.org/campaigns/climate-justice/>

BURIED OUT OF SIGHT

UNCOVERING PENNSYLVANIA'S HIDDEN FOSSIL FUEL SUBSIDIES



February 2021



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Christina Simeone, former Director of PennFuture's Energy Center, authored the first edition (2011) and second edition (2015), which formed the foundations of this third edition.

Acknowledgements:

Now in its third edition, PennFuture's Fossil Fuel Subsidy Report has expanded to include newly uncovered subsidies, updated numbers and methods, and specific recommendations for the elimination of fossil fuel subsidies. For this, we have PennFuture's staff to thank for their time and dedication. A big thanks especially to Rob Altenburg, Director of PennFuture Energy Center; Jacquelyn Bonomo, President and CEO; Abigail Jones, Vice President of Legal and Policy; Matthew Stepp, Executive Vice President and Chief of Staff; and Jared Stonesifer, Director of Media Relations.

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Executive Summary

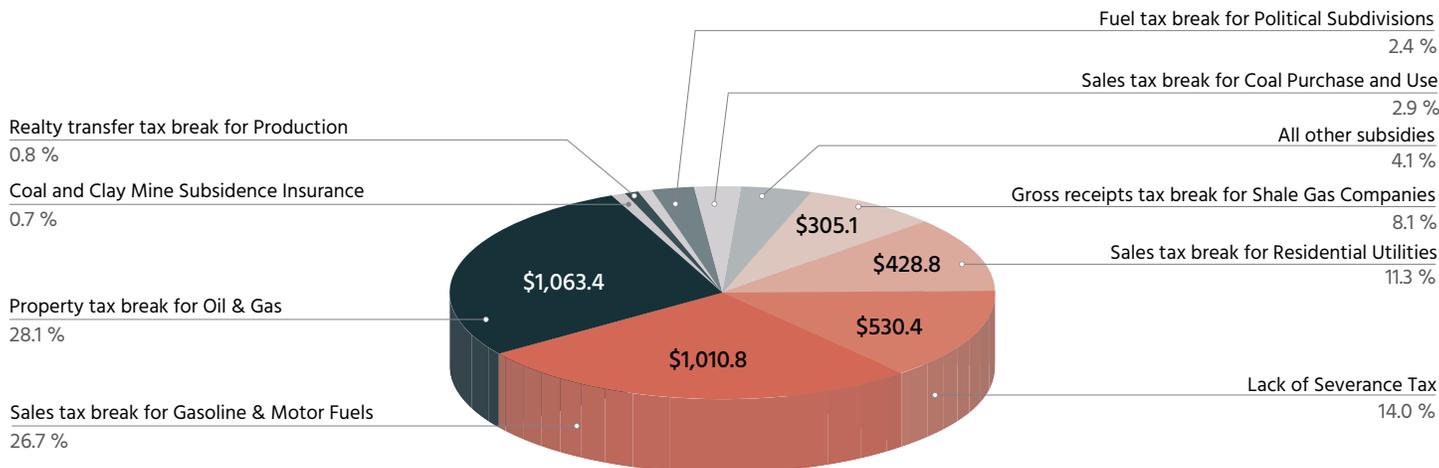


Climate scientists overwhelmingly agree that failure to drastically curb greenhouse gas emissions will result in calamitous social, ecological, and economic consequences. And right now, we are failing. Pennsylvania must act upon these dire warnings by taking concrete action to reduce greenhouse gas emissions, while also addressing the immediate and devastating social and environmental impacts of fossil fuel exploitation. One of the simplest solutions: Stop subsidizing fossil fuels.

In the third edition of PennFuture’s Fossil Fuel Subsidy Report, we quantify Pennsylvania’s fossil fuel subsidies in a step-by-step analysis of three subsidy types. In Part One, we review Forgone Revenues including the underpricing of government-owned resources, tax credits, and tax subsidies. Then, in Part 2, we look at the Direct Spending of five state government agencies to understand how government spending on grants and subsidized loans contribute to fossil fuel subsidies. Finally, in Part 3, we dive into the Negative Externalities resulting from the unconventional shale gas industry, including everything from the industry’s imposition on public health to its damaging impact on climate change.

With the help of tax documents, news articles, and a whole lot of digging, PennFuture was able to identify more than 50 ways that our state and local governments subsidize fossil fuels. Finding this information was not easy. Pennsylvania’s fossil fuel subsidies are pernicious in part because they are buried out of sight and difficult to disentangle. This difficulty limited the accuracy and depth of our analysis. It is entirely possible – perhaps even probable – that we missed some subsidies. For the subsidies we were able to affirmatively identify, many were ultimately assigned no value due to lack of available information, while still others were crudely estimated.

In total, our analyses reveal that Pennsylvania provided \$3.8 billion in fossil fuel subsidies in Fiscal Year 2019 by systematically disabling many of its standard tools for collecting tax revenues, allowing the industry to extract public resources at little to no charge, and awarding the industry grants and tax credits. Meanwhile, in the same time period, the industry imposed \$11.1 billion worth external costs to the state and its residents.

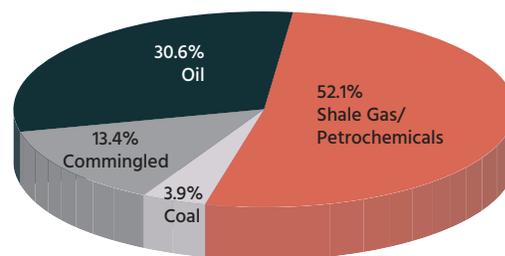


**PENNSYLVANIA'S
TEN LARGEST
SUBSIDIES COMPRISE
96 PERCENT
OF THE TOTAL
SUBSIDY VALUE.**

Altogether, these estimates likely undervalue the true scale of Pennsylvania's fossil fuel subsidies. Nonetheless, they provide a useful guide, a first step along the path to the elimination of fossil fuel subsidies, and eventually fossil fuels themselves. As the cost of fossil fuel subsidies on Pennsylvania taxpayers and residents continues to creep upward, we urge the Governor and the General Assembly to pursue the following:

1. **End Economic Reliance on Fossil Fuels** by transforming our approach to community and economic development. Discontinue petrochemical tax credits, diversify local economies dependent on fossil fuels, and strategically divest from the fossil fuel industry.
2. **Reduce subsidies for greenhouse gas emissions** by eliminating the Natural Gas Vehicle Development Program, reforming the Alternative Fuels Incentive Act and Alternative Energy Portfolio Standard, and joining the Regional Greenhouse Gas Initiative.
3. **Shift the public health burden of shale gas development to the industry** by enacting recommendations from the 2020 Attorney General's Report on fracking, closing the hazardous waste loophole, amending PA's Dormant Oil and Gas Act to protect surface owners, and increasing funding for DEP'S Oil and Gas Program and Office of Environmental Justice.
4. **Restore \$2.0 billion in foregone revenues** by enacting a severance tax and eliminating the local property tax break for oil and gas, the gross receipts tax break for shale gas distribution companies, the sales and use tax break for coal purchase and use, and the realty transfer tax break for the production and extraction of coal, oil, gas, or minerals.
5. **Track and reduce fossil fuel subsidies** by requiring annual reports on the purpose, progress, cost, and success of DCED's tax credit, grant, and loan programs. In addition, the Governor's Budget Office must track fossil fuel subsidies and set targets for their removal.

Most of Pennsylvania's fossil fuel subsidies benefit the shale gas industry, which captured \$2.0 billion of the subsidy value in FY 2019.



We must act on climate to provide a healthy, livable environment for our residents and a stable world

for future generations. These solutions offer an opportunity to deliver on our responsibilities while restoring \$2.0 billion in funding to state and local budgets, evaluate and improve economic development and climate action strategies, and equip Pennsylvania for a healthy and stable climate future. Now is the time to act.

Pennsylvania's fossil fuel subsidies are summarized in the chart below. A more in-depth summary can be found in the appendices.

Category	Summary	Estimated Fossil Fuel Subsidy FY 2019
Foregone Revenues		\$3,667.2
Government Underpricing	Underpricing of government-owned resources, goods, and services.	\$530.4
Tax Credits	Provides a dollar-to-dollar reduction in tax payments for credit users.	\$14.3
Gross Receipts Tax Subsidies	Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.	\$322.9
Public Utility Realty Tax Subsidies	Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.	\$2.9
Sales and Use Tax Subsidies	Special exemptions from sales tax. Decreases revenues to the PA General Fund.	\$1,554.7
Personal Income Tax Subsidies	Special exemptions from income tax. Decreases revenues to the PA General Fund.	\$0.1
Realty Transfer Tax Subsidies	Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.	\$30.0
Local Property Tax Subsidies	Special exemption from property taxes collected by and for local governments.	\$1,063.4
Motor License Fund Fuel Tax Subsidies	Special exemptions from multiple use taxes. Decreases revenue to the Motor License Fund for the construction and maintenance of highways.	\$148.5
Direct Spending		\$118.9
Department of Environmental Protection	Addresses legacy impacts from fossil fuel extraction, sometimes using taxpayer money to supplement fees from the fossil fuel industry. Also benefits fossil fuel companies with spending related to climate change mitigation.	\$51.0
Public Utilities Commission	Oversees PA's Alternative Energy Portfolio Standard to reduce greenhouse gas emissions, which includes some fossil fuels in its electricity sourcing requirements.	\$2.6
Department of Community and Economic Development	Engages in marketing to attract fossil fuel companies and supports their activities with grants, loans, and loan guarantees for site acquisition, preparation, and remediation, job creation and workforce development, and business development.	\$25.4
Department of Transportation	Responsible for programs and policies impacting transportation, PennDOT has a rail freight grant program and a CNG fueling station public-private partnership which directly support shale gas.	\$39.9
Department of General Services	In its role to support the operations of all state agencies, DGS implements a 1990 act that requires use of PA coal in any heating systems or units installed in state buildings.	Unknown
Negative Externalities of Shale Gas Development		\$11,084.5
Hydraulic Fracturing	Degradation to the natural environment, water consumption, infrastructure damage from increased truck traffic, and impacts to public health and safety. Due to lack of available information, estimate is incomplete.	\$146.3
Processing & Downstream Use	Air pollution which disproportionately burdens people of color and people living in poverty, as well as other externalities that are felt within and beyond Pennsylvania, including greenhouse gas emissions, plastic collection and sorting costs, and ocean cleanup.	Unknown
Climate Impacts	Total greenhouse gas emissions from all fossil fuel use according to DEP multiplied by the International Monetary Fund's social cost of carbon.	\$10,938.2

Introduction



For centuries, Pennsylvania has relied on fossil fuel extraction for economic development. First, it was oil – Pennsylvania was home to the first commercial oil well in the country, and the nation’s top producer up until the early 1900s.¹ Next, it was coal. Despite coal’s rapid decline, Pennsylvania remains the third largest domestic producer of coal.² Steadily, however, shale gas has taken its place. In 2018, Pennsylvania’s shale gas production comprised 20 percent of total U.S. production, making the state the second highest gas producer in the nation.³

Yet fossil fuel extraction comes at a cost. Alongside coal and shale gas production, Pennsylvania also tops the charts in other measures: fifth for greenhouse gas emissions,⁴ twelfth on the U.S. News measure of poorest environmental health,⁵ and fourteenth for largest domestic corporate subsidizers.⁶ Teasing out the precise impacts of natural resource extraction on these measures is difficult, but there is no doubt that fossil fuel extraction and use has severe consequences for our climate, health, environment, and economy.

Despite this, Pennsylvania policymakers are sacrificing billions of taxpayer dollars to support fossil fuel companies. Conservative estimates put US fossil fuel subsidies at \$27.4 billion each year. After factoring in negative externalities, however, the International Monetary Fund (IMF) values this number closer to \$649 billion annually.⁷ This makes the United States the second largest fossil fuel subsidizer in the world. It is no mere coincidence then that the United States is also the largest producer of fossil fuels.⁸

These subsidies are a drain on federal and state governments. But more than harming government finances, corporate subsidies encourage firms to avert limited resources to lobbying and wasteful public relations campaigns to please lawmakers. This invites public cronyism and corruption while distorting economic activity.⁹

WHAT ARE NEGATIVE EXTERNALITIES?

Negative externalities occur when the producer of a good or service creates costs that it does not bear the burden of paying.

The most common example of a negative externality is pollution. A polluting company can profit enormously while degrading the environment and harming human health. These costs are not paid by the polluter and are thus not captured in the price of the good or service produced.

To internalize negative externalities – or, in other words, ensure that the industry at fault pays for the damage it causes – governments can intervene by imposing environmental regulations or increasing taxes for the harming industry.

To learn more, see IMF's article "Externalities: Prices Do Not Capture the Costs."

Indeed, fossil fuel subsidies sustain global greenhouse gas emissions at levels 28 percent higher than the market would without them.¹⁰ This is at a time when climate scientists overwhelmingly agree that failure to drastically curb greenhouse gas emissions will result in devastating social and economic consequences.¹¹ For many impacted communities, it already has.

This dire situation is made worse by misguided state action. Despite widely accepted evidence that taxation plays only a minor role in investment decisions, states continue to use fiscal policy to attract oil and gas investment¹² – and study after study shows that Pennsylvania is winning the race to the bottom.

In a 2014 report, the Independent Fiscal Office compared Pennsylvania's shale gas public revenues to nine neighboring states with high gas production and found that Pennsylvania's effective tax rate was the lowest in every modelled scenario. Another study found Pennsylvania's oil and gas revenues as a share of production value was less than half the average of all major producing states – just 4 percent compared to Texas and West Virginia's 8 percent, North Dakota's 12 percent, and Wyoming's 17 percent.¹³

Pennsylvania, however, has doubled down on its commitment to fossil fuels. In addition to disabling many of the standard tools for collecting revenue from the fossil fuel industry, Pennsylvania is also paying for the many negative externalities of fossil fuel extraction and use. If this weren't enough, the state directly assists fossil fuel companies by underpricing government-owned natural resources, providing grants for fossil fuel companies, and offering other incentives.

These foregone revenues, direct expenditures, and negative externalities are subsidies (see discussion box, "What is a subsidy?"). Fossil fuel subsidies divert limited resources – which, in this case, might otherwise be used for education, infrastructure improvements, and climate change mitigation – to favored recipients based on political influence. At their best, subsidies may create jobs or reduce economic burdens for low-income residents. At their worst, they flow directly to profit, benefitting distant shareholders while stripping government of its ability to serve the public.

Policymakers must more rigorously weigh the cost of subsidies against their ability to achieve economic, social, and environmental objectives. To do so, they must first be able to identify those subsidies. In the sweeping review that follows, we break Pennsylvania's fossil fuel subsidies down into three categories: foregone revenues, direct spending, and negative externalities. Then, we build upon existing evidence for analysis and recommendations. In so doing, we offer a path toward increased state and local revenues, increased economic efficiency, and positive outcomes for public health, the environment, and climate change mitigation.

WHAT IS A SUBSIDY?

Too often, people view energy subsidies only as cash transfers from a governmental agency to an energy producer or consumer. In contrast, a 2019 UN Environment Programme report which attempts to standardize measurements of fossil fuel subsidies considers four commonly used subsidy types: direct transfer of funds, induced transfers (price support), foregone revenues, and transfer of risk to government.

Due to the data intensity needed to assess the transfer of risk to government on an international scale, the report ultimately recommends its exclusion from national reporting of fossil fuel subsidies. However, the Organization for Economic Cooperation and Development and the IMF both include the transfer

of risk to government.¹⁴ In so doing, they find that most fossil fuel subsidies globally arise from the transfer of climate risk to government, or the failure to price greenhouse gas emissions.¹⁵ A 2020 study further affirms the need to include indirect government support in fossil fuel subsidy analyses. According to the authors, these types of subsidies play a large role in propping up the fossil fuel industry.¹⁶ In fact, more complicated and less visible transfer mechanisms can be especially valuable to subsidized groups because they attract less political attention for reform.

Adapted from the UN Environment Programme report, this chart provides examples of the four types of energy subsidies. This is a non-exhaustive list.

Government revenue foregone

- Tax expenditure
- Under-pricing of government-owned energy resources, other natural resources, land, infrastructure, or other goods and services

Direct transfer of government funds

- Agency appropriations: Targeted spending on the sector through government budgets and budgets of individual government agencies
- Subsidies to intermediate inputs
- Wage subsidies to assist individuals in preparing for and maintaining employment (e.g. training)
- Government loans provided below-market rates, with low collateral requirements, lengthy repayment periods, or deferred repayments
- Government spending on research and development
- Government use of tax-free bonds to fund private investments

Induced transfers (price support)

- Consumption mandates
- Regulated prices set at below-market rates for consumers or above-market rates from producers
- Relief from costs enterprises normally bear in the normal course of business (labor, environmental, health, safety)
- Exemption from government procedures normally followed by enterprises

Transfer of Risk

- Credit support: Guarantees of loans, security, or credit
- Debt restructuring or cancellations
- Insurance and indemnification: market or below-market risk management or risk shifting services
- Assumption of occupational health and accident liabilities
- Assumption of liabilities for closure and post-closure risks, waste management and environmental damages

METHODS: Identifying & Valuing Fossil Fuel Subsidies



The second edition of PennFuture’s Fossil Fuel Subsidy Report (2015) served as an important starting point for identifying fossil fuel subsidies. This was updated to the most recent year available using a variety of sources, including the Governor’s Executive Budget, departmental websites, news articles, and various watchdog reports, including the 2020 Attorney General Report and reports from the Independent Fiscal Office. Once a fossil fuel subsidy was identified, we used the following assumptions and methods to assign a value:

- **Source of Dollar Values:** Unless otherwise noted, all dollar values of tax exemptions are taken from official government documents and cover fiscal year July 1, 2018 through June 31, 2019, abbreviated as FY 2019.
- **Electricity Use:** Since Pennsylvania’s electricity mix was approximately 59 percent fossil fuel-based in 2020, any tax benefits pertaining to electricity use primarily support the fossil fuel industry. As of April 2020, less than 7 percent of Pennsylvania’s electricity mix was supplied by renewables (including wind, solar, biomass, hydroelectric) and about 34 percent from nuclear energy.^a Approximately 59 percent of the value of any electricity subsidy will be reported as fossil fuel subsidies where possible.
- **Industry Specific vs. Broadly Defined:** Some subsidies can be wholly attributed to the fossil fuel industry (e.g. tax subsidy for use of a fossil fuel), while others apply to a broader range of industries, including the realty tax exemption that applies to fossil fuel (e.g. electric and gas utilities) and non-fossil fuel (e.g. water or sewer) utilities alike. Research and data limitations precluded analyzing each of these policies in detail. When necessary, a sensitivity analysis was conducted, apportioning a low (10 percent), mid (25 percent) or high (60 percent) proportion of the total indirect subsidy amount to fossil fuels. While admittedly inexact, the approach does help identify which indirect subsidies are potentially large and, therefore, should be prioritized for future research.

^a Federal tax expenditure budgets used to capture this effect in their “outlay equivalent” metric, reported in tandem to the “revenue loss” metric most states report. However, they stopped reporting the outlay equivalent more than a decade ago.

PART 1: Foregone Revenues



Although foregone revenues are not direct government expenditures – you cannot spend money you never had – they are indeed considered indirect expenditures because they reduce revenue that the state otherwise would have received under standard tax rules. This effectively constitutes a cash transfer from the state to private individuals or firms. Foregone revenues fit into two general categories: 1) underpricing of government-owned resources, goods, and services; and 2) tax subsidies.

In Pennsylvania, a tax subsidy:¹⁷

- Reduces government revenues
- Confers special treatment, meaning differential tax breaks which distort competitiveness
- Is included in the defined tax base
- Is not subject to equivalent alternative taxation
- Can be altered by a change in state law
- Is not an appropriation

While this structure means that tax subsidies are similar to standard expenditures, there are two differences worth noting. First, when a tax subsidy disappears, markets often adjust either by reducing activity within the formerly subsidized activity or shifting to a less valuable alternative tax subsidy. Both factors would tend to reduce actual realized savings relative to tax subsidy estimates. Second, though tax subsidies may effectively increase firm income, this incremental gain is not always taxed. Adjusting for this would tend to increase the size of reported tax subsidies.

In the pages that follow, we briefly visit government underpricing in Section 1, and then dive into a host of tax subsidies in Sections 2 through 9, from fossil fuel tax credits to exclusions and exemptions.

Section 1: Underpricing of Government-Owned Resources

By 2020, Pennsylvania had 230 coal mines, 64 coal refuse sites,¹⁸ over 92,000 miles of pipelines,¹⁹ and 12,737 unconventional gas wells.²⁰ This infrastructure consumes and degrades Pennsylvania's natural resources, including permanent consumption of non-renewable extracted resources, thousands of acres of cleared forests and converted agricultural land, and massive amounts of water consumption and contamination. When the government fails to properly charge for the use and degradation of these publicly owned resources, a subsidy arises from the escaped costs. For the sake of simplicity, this section focuses exclusively on underpricing of government-owned resources as it pertains to shale gas.

Public Land Leases

The Department of Conservation and Natural Resources (DCNR) manages 2.2 million acres of state forest. Despite a moratorium on new leases for oil and gas development on these lands, over a quarter of it is nonetheless available for gas development because of severed land rights (meaning DCNR owns the surface rights but not the mineral rights) or through previously issued leases.²¹ In 2016, 8.9 percent of Pennsylvania's shale gas came from state forest land.²²

The Pennsylvania Game Commission (PGC) also manages oil, gas, and mineral agreements on state game lands and, unlike DCNR, is not subject to a moratorium on new leases for development. As such, about 177,322 acres of state game lands are impacted by oil, gas, coal, and mineral development. The Commission approved eight new projects in FY 2019.²³

Whether for DCNR or PGC, collected revenues for public land leases should not be used to fund oversight of the oil and gas industry, but rather as a return on the sale of a valuable public asset. Thus, a subsidy arises when land is leased below market value or when proceeds from leasing are used in lieu of a separate fee to fund general industry oversight.

- In FY 2019, oil and gas leases and royalties on DCNR land generated \$75.6 million,²⁴ the revenues of which are allocated to the Oil and Gas Lease Fund.²⁵ We were unable to determine if payments between developers and DCNR represented fair market values, but it is clear that the funding is used for such purposes as industry oversight and gas well management and plugging.²⁶ DCNR leases and royalties thus result in a subsidy, but we are unable to determine its scale.
- Similarly, PGC earned \$19.2 million from royalties in 2017, the revenues for which are used to support their mission. However, according to a 2019 Auditor General Report, the Game Commission was not tracking or verifying revenue from oil and gas, relying upon the companies to honestly and accurately pay what they owe in a timely manner. In fact, accounting was so poor that, according to Auditor General DePasquale, "my auditors could not determine if the commission was receiving all the money it was due." We are thus unable to determine the existence or scale of any subsidy arising from leases and royalties of PGC land.²⁷
- As of 2018, there were 1,334 active wells on state forest land,²⁸ with another 10,000 estimated to be drilled in the coming decade.²⁹ This underlines the need for more research to understand the nature of subsidies arising from shale gas drilling on public lands, proper regulatory oversight, and adequate levels of reclamation bonding and insurance coverage.

**PENNSYLVANIA IS
THE ONLY MAJOR
OIL AND GAS
PRODUCING STATE
IN THE COUNTRY
WITHOUT A
SEVERANCE TAX ON
NATURAL GAS**

Severance of Natural Resource

In 34 states across the country, a severance tax is imposed for the loss, or “severance,” of a state’s oil or gas resource.³⁰ This tax is standard practice among gas producing states, with one exception: Pennsylvania.

- **What Pennsylvania loses.** Pennsylvania is the only major oil and gas producing state in the country without a severance tax on natural gas.^b According to a report by Resources for the Future, the top 16 oil and gas producing states had an average severance tax rate that worked out to about 5.5 percent of production value in FY 2013.³¹ When this rate is applied to Pennsylvania’s 2019 production value of \$9.6 billion,³² we find an estimated \$530.4 million in foregone revenues in 2019. This subsidy value will be used for FY 2019 and FY 2021.
- **Multiple Attempts.** Governor Wolf has consistently supported the implementation of a shale gas severance tax, albeit at a much lower rate than other oil and gas producing states. In the 2018-2019 Executive Budget Book, Governor Wolf proposed a severance tax that would have amounted to an estimated \$210 million in FY 2019.³³
- **Pennsylvania’s severance payment.** In place of a severance tax, there are specific instances when Pennsylvania pays petrochemical manufacturers for their use of shale gas, instead of the other way around. For example, once operational, the Shell petrochemical plant in Beaver County will be eligible for tax credits worth \$0.05 per gallon of ethane – a component of shale gas in Southwestern Pennsylvania, amounting to up to \$1.65 billion over 25 years. A similar tax subsidy will provide a tax credit of \$0.47 per thousand cubic feet of shale gas for qualifying facilities, amounting to another \$667.5 billion over 25 years. We will explore this topic further in Section 2: Tax Credits.

^b Only Ohio’s tax rate is lower. See Diana Polson & Stephen Herzenberg, “Governor Wolf’s 2018 Severance Tax Proposal Could Bring in \$1.7 Billion of Revenue Over the Next Five Years,” Pennsylvania Budget and Policy Center, June 2018

WHAT ABOUT THE IMPACT FEE?

With the passage of Act 13 of 2012, Pennsylvania became the first state in the nation to enact a **Pigouvian tax** on unconventional gas extraction. According to the Tax Foundation:³⁴

A Pigouvian tax is a tax on a market transaction that creates a negative externality, or an additional cost, borne by individuals not directly involved in the transaction. Examples includes sugar taxes, tobacco taxes, and carbon taxes.

Optimally, a Pigouvian tax on unconventional gas extraction should be equal to the total external damages produced. As we will explore in Part 3 of this report, unconventional gas extraction creates billions of dollars in external costs, including air and water pollution, public health impacts, and damage to public infrastructure like roads and bridges. According to Professor Thomas Kinnaman, “If firms respond to the [optimal Pigouvian tax] by reducing gas extraction, the social costs of that gas extraction must have exceeded the benefits of that gas extraction.”³⁵

While not set at an optimal tax rate, Pennsylvania’s so-called “impact fee” acts like Pigouvian tax in many ways. As its name implies, one of its core purposes is to compensate for damages caused by unconventional gas extraction.

The impact fee is applied to each unconventional gas well during its first fifteen years of operation, its rate depending upon the well’s year of operation and the price of shale gas.³⁶ On average, the fee works out to approximately 0.8 percent of the production value of shale gas.³⁷



In 2018, \$252 million in collected impact fees were distributed to local governments impacted by drilling (\$135 million), the Marcellus Legacy Fund (\$90 million), and state agencies (\$18 million).³⁸ Yet despite an 11.4 percent increase in production, impact fees fell by 20 percent the next year. This is because production per well has been steadily increasing over time, resulting in a lower effective tax rate from the per-well fee.³⁹

Though far from sufficient, Pennsylvania’s impact fee represents an important step towards an ideal Pigouvian tax. Yet however noteworthy this step may be, Pennsylvania’s impact fee should absolutely not be used in place of a severance tax. Many lawmakers and industry proponents like to compare or equate the impact fee with severance taxes commonly employed in other states – But do not be mistaken. These devices serve entirely different purposes: one to internalize negative externalities, the other to compensate for the direct loss of a nonrenewable natural resource.

Section 2: Tax Credit Programs

Tax credit programs are a tool often deployed by states to attract investment by reducing the tax liability of the targeted credit user. Because they provide a dollar-for-dollar reduction in tax payments due (as compared to reductions in the income on which a tax is applied), tax credits are among the most valuable types of tax subsidies.

One challenge for states attempting to attract firms with tax credits is that firms with lower tax liability are sometimes unable to take advantage of the full tax credit. To address this challenge and increase the potential for tax subsidies, states developed the relatively new concept of transferability. This allows the credit user to sell unused credits and pocket the proceeds. This also drives up costs to the government.⁴⁰ As we will see in this section, many of Pennsylvania's fossil fuel-related tax credits are indeed transferable.

Pennsylvania Resource Manufacturing Tax Credit

Act 85 of 2012 created the Pennsylvania Resource Manufacturing (PRM) Tax Credit for an entity purchasing ethane for use in an ethylene manufacturing facility in the Commonwealth that has made a capital investment of at least \$1 billion and created at least 2,500 full-time jobs during the construction phase. The PRM tax credit provides a useful example of legislative framing that targets a specific industrial project under consideration – in this case, the Shell petrochemical plant in Beaver County. The tax credit is equal to \$0.05 per gallon of ethane purchased (\$2.10/barrel) from 2017 through 2042. It may be used to offset 20 percent of the taxpayer's liabilities for personal income tax, corporate net income tax, capital stock/foreign franchise tax, bank shares tax, title insurance company shares tax, gross premiums tax, and/or mutual thrift institutions tax. Within one year after the credit is approved, a taxpayer can apply to assign or sell eligible credits to another taxpayer.

- **\$0 was spent on this tax credit in FY 2019.** Realization of this expenditure is dependent on development of an eligible ethylene manufacturing facility in Pennsylvania, which to-date has not occurred.
- **\$17.1 million was budgeted for FY 2021.**⁴¹ If utilized to its fullest potential, the value of the credit has been estimated at approximately **\$1.65 billion over a 25-year period.**⁴²

Local Resource Manufacturing Tax Credit

Signed into law in July 2020, the Local Resource Manufacturing Tax Credit is modelled after the Pennsylvania Resource Manufacturing Tax Credit to attract investment from the petrochemical and fertilizer industries in Pennsylvania. The tax credit is valued at \$0.47 per thousand cubic feet of dry shale gas purchased and used in the production of petrochemicals or fertilizers from 2024 through 2049. To be eligible, a qualified taxpayer must spend at least \$400 million on capital investments in a new manufacturing plant and create at least 800 new temporary or permanent jobs at prevailing wage. Within one year after the credit is approved, a taxpayer can apply to assign or sell eligible credits to another taxpayer.

- **\$0 was spent on this tax credit in FY 2019,** which is authorized to begin in 2024.
- At a total cost of **\$26.7 million annually,** this tax credit is available for up to four eligible facilities each year and could cost taxpayers up to **\$667.5 million over a 25-year period.**⁴³

Keystone Opportunity Zone

Since 1998, the Department of Community and Economic Development has designated specific areas of deteriorated property as Keystone Opportunity Zones (KOZ). Economic activities occurring within these zones are exempt from most state and local taxation.

WITH MINIMAL
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PENNSYLVANIA
RESOURCE
MANUFACTURING
TAX CREDIT.

- According to a report on program impact from 2011 to 2014, oil and gas companies represented about 2 percent of KOZ economic impact and manufacturing about 8.3 percent.⁴⁴ According to the National Association of Manufacturers, 39.7 percent of the value of manufacturing in 2017 came from fossil fuels and their derivatives (petroleum and coal products, plastics and rubber products, and chemicals),⁴⁵ so we can estimate that fossil fuel-related manufacturing accounted for 3.3 percent of KOZ economic impact. Assuming the share remained relatively constant, fossil fuel subsidies would account for approximately 5.3 percent of the \$82 million of KOZ tax credits in FY 2019, or **\$4.3 million**. The costs of this program are estimated to continue to grow over the coming years.⁴⁶
- In September 2013, the KOZ partially underlying Shell’s proposed petrochemical plant was expanded to include the entire site and extended for a duration of 22 years.⁴⁷ With minimal state and local tax liabilities, Shell will be able to sell essentially all of its \$1.65 billion worth of credits from the Pennsylvania Resource Manufacturing Tax Credit.

Coal Refuse Energy and Reclamation Tax Credit

Pennsylvania has between 200 million and 8 billion cubic yards of coal waste, posing an ongoing liability for public health and the environment. One option for getting rid of the mess: converting coal waste into energy.⁴⁸

This expensive, inefficient process was made economically feasible by a host of federal and state policies that incentivize alternative energy, including the U.S. Public Utilities Regulatory Act, the Pennsylvania Alternative Energy Portfolio Standards (more in Part 2), and the Pennsylvania Coal Refuse and Reclamation (CRR) Tax Credit.⁴⁹

Established in 2016 by Act 84, the CRR Tax Credit provides eligible facilities \$4 in credits per ton of qualified coal refuse processed, up to a maximum of 22.2 percent of total credits awarded per fiscal year. The credit can be sold or used against personal income, corporate net income, bank and trust company shares, title insurance companies shares, insurance premiums, gross receipts, and mutual thrift tax liabilities.⁵⁰

- This tax credit was valued at **\$10 million in FY 2019**. In 2019, legislation was passed to double the program cap from \$10 million to **\$20 million**.⁵¹
- **Ongoing concerns.** Coal refuse energy plants produce higher mercury pollution and greenhouse gas emissions than coal-burning power plants. Further, they do not eliminate waste coal solids, but instead further concentrate it into toxic ash mounds which are currently exempted from laws governing hazardous wastes.⁵² Rather than burning coal waste, programs like Operation Scarlift and Growing Greener Grants target environmental remediation. Both will be explored further in Part 2.

Manufacturing Tax Credit

The Manufacturing Tax Credit was created by Act 84 of 2016. To receive this tax credit, a qualified taxpayer must increase their annual taxable payroll by \$1 million through the creation of new full-time jobs maintained for at least five years. The tax credit is worth up to 5 percent of the total increase in annual taxable payroll and is transferable.

- **\$0 were spent on this tax credit in FY 2019.**
- \$4 million was budgeted for FY 2020 and the five fiscal years following. According to the National Association of Manufacturers, 39.7 percent of the value of manufacturing in 2017 came from fossil fuels and their derivatives (petroleum and coal products, plastics and rubber products, and chemicals).⁵³ For purposes of analysis, a 39.7 percent of the value, or **\$1.6 million** is being reported as a fossil fuel subsidy.

Section 3: Gross Receipts Tax Subsidies

Much like a sales tax, but applied to the seller instead of the buyer, the gross receipts tax is applied to the gross revenues of specific companies. In addition to final consumer purchases, the gross receipts tax also applies to business-to-business transactions. In Pennsylvania, the gross receipts tax is applied to a variety of business enterprises including some related to the fossil fuel sector such as pipelines; conduit; transportation companies; freight or oil transporters; and electric light.⁵⁴

Gross receipts tax exemptions may only be considered a subsidy under certain conditions. If a fossil fuel company is exempted from the gross receipts tax but instead pays a sales tax at the same rate, there is no subsidy. In Pennsylvania, the sales tax is 6 percent, while the gross receipts tax rate as applied to fossil fuel companies is as follows:

- 5 percent for freight and oil transported within the region
- 5.9 percent for the sale of electric energy⁵⁵

Municipally-Owned Public Utilities

Public utilities owned or operated by a municipality are exempt from gross receipts taxes to the extent the gross receipts are derived from business done inside the limits of the municipality.

- In FY 2019, approximately 35 municipally-owned utilities operating in the Commonwealth benefited from this exemption at a cost of **\$9.9 million**.⁵⁶

According to our estimates,^c we find that **approximately 45 percent – or \$4.5 million – of this subsidy benefits the fossil fuel industry.**

Electric Cooperatives

Electric cooperatives are exempted from the gross receipts tax. These cooperatives provide electricity across nearly a third of Pennsylvania's land area to primarily rural residents.⁵⁷

- In FY 2019, approximately 14 cooperatives enjoyed a \$22.6 million benefit from this tax subsidy.⁵⁸ Since 59 percent of Pennsylvania's electricity supply comes from fossil fuels, **\$13.3 million** will be the subsidy value used.

Shale Gas Companies

Natural gas was subject to the gross receipts tax until Act 4 of 1999 created an exemption for all natural gas company and utility sales. According to Pennsylvania's 2012 tax compendium, the exemption was passed in preparation for the deregulation of the natural gas industry.⁵⁹ Pennsylvania's electricity market, however, was not exempted from the gross receipts tax despite similar deregulation around the same time. It is unclear why two industries undergoing deregulation received different treatment.

- Current government budget documents do not track the value of this exemption. At the time the natural gas gross receipts tax was repealed in 1999, the estimated annual value of the exemption was \$82.2 million.⁶⁰ Lawmakers considered reviving the shale gas gross receipts tax in 2016 and 2017.⁶¹ At a rate of 57 mils, this would have generated **\$305.1 million in FY 2018**.⁶²
- The \$305.1 million estimate for FY 2018 will be used for FY 2019 and FY 2021. Because shale gas consumption has since increased in Pennsylvania, this subsidy value is likely an underestimation.

c According to data from the Pennsylvania Office of Consumer Advocate, there are 37 registered public utilities (e.g. gas, electric, water, telecommunications), 10 of which are electric and 11 of which are gas. We apply 59 percent to the 10 electric utilities to get an estimate of the ratio of fossil fuel-derived electricity impacted by this tax subsidy (5.9). We then add this to the number of gas utilities (11) and divide by the total registered public utilities (37) and find that approximately 45 percent of the municipally-owned public utilities exemption benefits the fossil fuel industry.



Section 4: Public Utility Realty Tax Subsidies

Pennsylvania imposes the public utility realty tax (PURTA) on public utility real estate in lieu of local real estate taxes and distributes revenue to local taxing authorities based on a realty tax equivalent. If PURTA tax rates are lower than local property tax rates, then there would be an effective subsidy for utilities. However, if the tax simply shifts between collectors (e.g. from state to local collections), then a subsidy would only exist in the case of exemptions. Key considerations in determining if PURTA is a subsidy include:

- Are all utility and pipeline properties paying property taxes through one of the two methods (local appraisal and collection, or PURTA)?
- Are rates similar or equal to those of other sectors?
- Are valuation/appraisal methods similar to those used in other sectors?

Below, we review specific exemptions from PURTA that provide a clear subsidy. Further research is needed to understand the nature and depth of fossil fuel subsidies for non-exempted parties, which is unfortunately beyond the scope of this report.

Utility Easements

Easements, or similar interest in land that is owned by another entity that the public utility is entitled to use for the provision of utility service, are excluded from the PURTA base.^d

- For FY 2019, approximately 282 public utilities benefited from this exemption at a value of **\$3.0 million**.⁶³ Given data from the Office of Consumer Advocate, the nature of these 282 public utilities is unclear. For purposes of this analysis, a mid-range of 25 percent of the value, or **\$0.8 million**, is being reported as a fossil fuel subsidy.

^d It is unclear if the practice of exempting utility easements from the public utility real estate tax base is common practice in other states with comparable taxes or if such an exemption in Pennsylvania represents unique treatment. For purposes of this report, the provision has been identified because it was reported as a tax expenditure in the Governor's Budget book.

MULTIMODAL
FREIGHT
TRANSPORTATION
HAS EXPERIENCED
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FROM FRACKED GAS
PRODUCTION NOT
SEEN SINCE THE
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COAL RESOURCE
EXTRACTION
INDUSTRY.

Municipal Utilities

Municipalities or municipal authorities furnishing electric, shale gas, telephone, or water public utility services are exempt from the PURTA tax.

- In FY 2019, approximately 635 municipal authorities and 35 municipal public utilities benefited from this tax subsidy at a value of **\$3.7 million**.⁶³ Because this amount applies to all public utilities, most of which are water-related, only 10 percent of the value, or **\$0.4 million**, is being reported as a fossil fuel subsidy.

Railroad Rights-of-Way

Railroad rights-of-way and superstructures thereon are excluded from the PURTA base. This tax relief was, in part, intended to encourage development of Pennsylvania's railroad network.

- According to 2011 data from the U.S. Department of Transportation, coal tonnage was the largest commodity category shipped by rail into, or out of, Pennsylvania.⁶⁵ While coal tonnage would have certainly decreased marginally by 2018, multimodal freight transportation has experienced a level of demand from fracked gas production not seen since the beginning of the coal resource extraction industry. A single well pad requires up to 40 rail carloads of equipment for drilling including sand, pipes, and chemicals. Indeed, rail shipments for gravel and sand and miscellaneous organic chemicals are expected to increase by 86 and 57 percent, respectively, by 2040 from 2011 levels.⁶⁶ Further, with increased opposition to pipeline construction, the fracked gas industry is looking for creative ways to transport their product and, increasingly, turning to rail.⁶⁷ Therefore, subsidies afforded to the rail industry likely provide a benefit to the fossil fuel industry.
- In FY 2019, approximately 50 railroad public utilities were eligible to benefit from this **\$6.9 million** tax subsidy.⁶⁸ For purposes of this analysis, we report 25 percent of the value, or **\$1.7 million**, as a fossil fuel subsidy.

Section 5: Sales and Use Tax Subsidies

A sales and use tax of 6 percent is levied on retail sale, consumption, rental, and use of tangible personal property in Pennsylvania, with an additional 1 percent applying to all sales made in Allegheny County and an additional 2 percent in Philadelphia. Revenues from this tax make up a 9.1 percent of Pennsylvania's revenues, compared to an average of 12 percent in all states.⁶⁹ Sales and use tax subsidies can benefit fossil fuel companies regardless of where they are applied in the supply chain by increasing costs during production or distribution or, when applied at the retail level, by sending consumers price signals that discourage excess consumption.⁷⁰

In our consideration of Pennsylvania's sales taxes, we must keep in mind the following:

1. Sales taxes at the retail level are regressive. This means that low-income households face a higher tax burden from sales taxes because they spend – and are thus taxed for – a greater share of their income.⁷¹
2. Some sales and use tax subsidies are imposed to prevent tax pyramiding, which happens when inputs used to manufacture a final product or service are taxed more than once as they move from raw material, to production, to final retail sale. Yet these tax subsidies may also result in some inputs or transactions never being taxed, creating economic distortions in the opposite direction while reducing state revenue. Thus, while exemptions at the retail level are clearly subsidies, it is unclear if exemptions during production should be considered special treatment or common practice. This is further complicated by the fact that adjustments to prevent tax pyramiding are inconsistent across states. See the “Decoding Fuels Transaction” text box for additional discussion.

COAL PURCHASE AND USE IS EXCLUDED FROM THE SALES AND USE TAX TO ENCOURAGE COAL CONSUMPTION WHICH, ACCORDING TO THE GOVERNOR'S EXECUTIVE BUDGET 2020-2021, "MAY HAVE BEEN PERCEIVED AS PROVIDING OR PRESERVING EMPLOYMENT WHEN MINING WAS A MAJOR EMPLOYER WITHIN THE COMMONWEALTH."

Utilities for Residential Use

Tangible personal property is taxable, with a few specific exclusions, including electricity, steam, and shale, manufactured, and bottled gas and fuel oil.⁷² Practically, this exemption means that all fossil fuel use by the residential sectors – whether for heat, hot water, cooking, or power – is exempt from Pennsylvania sales and use taxes. The scale of fuel consumption within Pennsylvania is large and, as a result, this exemption is one of the largest subsidies identified in this report. The subsidy distorts price signals to consumers and provides an increased competitive advantage for commodity fuels relative to other methods of energy generation that are not fuel dependent (e.g. renewable energy) or are based on reduced fuel use (e.g. demand-side management) to provide energy services.

Residential utilities are essential for maintaining a basic standard of life. This subsidy is meant to reduce the tax burden on families who spend a disproportionate share of income on these services. Yet because this exemption applies to households regardless of income, a large proportion of the cost of lost revenue goes to recipients that don't need it. Further, the residential utility tax exemption can trigger other problems such as undermining the economic returns on energy efficiency, conservation, or customer-sited forms of energy generation.

- The electricity tax subsidy had an estimated cost of \$440.2 million in FY 2019, a price tag which is continually growing. The portion attributed to fossil fuels, or 59 percent of the total cost of this subsidy, is **\$259.7 million for FY 2019**.
- The fuel oil and gas tax subsidy had an estimated cost of **\$169.1 million in FY 2019**, a price tag which, again, is estimated to continue growing.⁷³

Coal Purchase and Use

Coal purchase and use is excluded from the sales and use tax to encourage coal consumption which, according to the Governor's Executive Budget 2020-2021, "may have been perceived as providing or preserving employment when mining was a major employer within the commonwealth."

- Approximately 53,000 households and an unknown number of businesses benefit from this tax exemption at an estimated cost of **\$110.3 million in FY 2019**.
- The estimated cost of this exemption is expected to steadily increase over the next six fiscal years.⁷⁴ While the price tag continues to climb (from \$86.4 million in FY 2013), the number of households benefitting has declined by 17,000 since 2012.⁷⁵

Gasoline and Motor Fuels

Gasoline and motor fuels are excluded from the sales and use tax because they are subject to another tax – the Oil Company Franchise Tax – for highway maintenance and construction. In fact, all motor fuels, including alternative fuels such as shale gas, alcohols, and electricity^e are subject to an equivalent tax – the Alternative Fuel Tax – for their use of highway infrastructure, yet are not exempted from the sales and use tax.⁷⁶ This is because these taxes serve separate purposes: one to maintain highways and the other for general use in the PA General Fund. More information can be found in discussion "Motor License Fund Shortfall – And One Forgotten Solution" in Section 8.

Placed on a level playing field with all other goods and services – including alternative fuels like electricity – gasoline and motor fuels would indeed be subject to the sales and use tax.

^e One exception is that electricity from municipally-owned, residential uses are not subject to additional taxes. However, electricity from private utilities are subject to a gross receipts tax and electricity from non-residential utilities are subject to a sales and use tax, in addition to the alternative fuels tax imposed on electric vehicles.

- The gasoline and motor fuels tax subsidy applies to more than 2.2 million heavy trucks, buses, etc., at a cost of **\$1.0 billion in FY 2019**.⁷⁷
- Other states (e.g. Florida, Georgia, Hawaii, Michigan, West Virginia) impose a sales tax on liquid fuels in addition to a variety of other gasoline and diesel taxes.⁷⁸

Commercial Vessel Fuel Purchase

The purchase or use of fuel, supplies, equipment, ships or sea stores, and cleaning or maintenance supplies is exempt from taxation. This exemption applies to vessels of 50 tons or more designed for commercial use.

- This exemption comes at a cost of **\$2.9 million in FY 2019**, a price tag which will continue to grow by at least \$1 million per year over the next six fiscal years.⁷⁹
- For purposes of analysis, 25 percent of this value, or **\$0.7 million**, will be considered a fossil fuel subsidy.

Mining

The purchase or use of tangible personal property or services used predominantly in mining operations is exempt from sales and use tax.⁸⁰ In 2014, the Department of Revenue released an information notice to further clarify the applicability of this exemption – originally intended for coal mining – for shale gas mining as well. This includes exploring, extracting, blasting, mining, transporting during the mining process, and drilling, and for shale gas also includes cementing, fracturing, and acidizing.⁸¹ According to Deloitte, this type of exemption is not universal among other states. Texas, for example, does not exempt mining activities from sales taxes.⁸²

- This tax subsidy was excluded from the 2020-2021 Governor’s Executive Budget. More research is needed to estimate the costs.

Rail Transportation Equipment

The purchase or use of rail transportation equipment by a business in the movement of its own personal property is exempt from taxation.

- This tax subsidy was valued at **\$16.3 million** in FY 2019.
- For reasons discussed previously (see the PURTA tax subsidy for railroad rights-of-way), we will assume a mid-range value of 25 percent of the total tax break, or **\$4.1 million**, is a fossil fuel subsidy.



DECODING SALES TAX EXEMPTIONS ON FUELS

Tax exemptions for fuels^f like steam, electricity, and fuel oil are sprinkled throughout our tax code and create significant foregone revenues to the state, many of which are not tracked. Compiled, they represent sizeable subsidies that benefit fossil fuel companies at the expense of taxpayers. Here, we provide a general overview of the host of exemptions that apply to the purchase and use of fuels and associated supplies and equipment.

- **Residential Use:** All purchases and use of fuels by a residential purchaser solely for the purchaser's own residential use is exempt.⁸³ This is identified earlier in this chapter as the "Utilities for Residential Use" exemption.
- **Commercial Mixed Use and Commercial Use:** Purchase and use of fuels and associated equipment and supplies other than by a residential purchaser for the purchaser's own residential use is presumed to be made for a commercial use and is subject generally subject to tax. However, there are significant exemptions for favored businesses and transactions.⁸⁴
 - **Resale Exemption:** This provision attempts to prevent tax pyramiding by exempting inputs to production of a good or service that will be taxed at retail. The purchase of fuels for resale in the ordinary course of business is exempt from tax, as is the purchase or lease of equipment and supplies associated with these fuels. The purchase of wholesale gas by a gas distribution company, for instance,



would be exempt from the sales and use tax under this provision.⁸⁵

- **Direct Use Exemptions:** Like the resale exemption, direct use exemptions attempt to prevent tax pyramiding through sales tax exemptions for fuels and other materials directly used by select commercial entities in their respective services or activities.⁸⁶ See the "Manufacturing Exemption" sections above for direct use exemptions as they apply to manufacturing and processing, agriculture, and public utilities. Other exempted commercial enterprises include mining, printing, photographers, and municipal, electric, and agricultural cooperatives.
- **Exemptions for Political Subdivisions:** Local, state, and federal governments are all exempt from sales taxes on fuel.⁸⁷ This is to avoid conflicts between subdivisions.
- **Exemptions for Non-Governmental Organizations:** Charitable, volunteer firemen, religious organizations, nonprofit institutions are all exempt from sales taxes on fuel.⁸⁸ This exemption parallels general tax exemptions for these organizations.

These wide-ranging tax exemptions create a competitive disadvantage for energy resources that are not fuel dependent. They also distort prices in another important way. An electricity distribution company can purchase machinery, equipment, parts and supplies for all stages of electricity generation, transmission, and distribution without paying sales and use taxes.⁸⁹ This exemption benefits non-residential electricity generators like gas, wind, and nuclear while disadvantaging distributed energy resources like micro-combined heat and power, solar, energy efficiency, bio-digesters, and backup generators.

^f As per Chapter 32.25 of Title 61, Part I, Subpart B, Article II, "fuels" refer to steam, natural and manufactured gas and electricity, through a metered device; and bottled gas, fuel oil, and kerosene.

Section 6: Personal Income Tax Subsidy

In Pennsylvania, personal income taxes are levied at a rate of 3.07 percent against the taxable income of both residents and nonresidents, estates and trusts, partnerships, S corporations, business trusts, and limited liability companies not taxed as corporations.⁹⁰ Only eight other states levy a personal income tax at a flat rate, with 32 states having a progressive tax rate (rate increases with income bracket) and seven states having no income tax at all.⁹¹

Expensing Intangible Drilling Costs

Drilling equipment is a tangible cost, while other items like labor, chemicals, and grease are intangible. Intangible drilling costs comprise about 65 to 80 percent of the total cost of drilling a well.⁹² In Pennsylvania, intangible costs can be recovered by using either a ten-year amortization period (standard capitalization) or electing to immediately expense up to one-third of the allowable costs and recovering the remaining costs over a ten-year period. In essence, this subsidy allows for smaller fossil fuel extraction ventures in Pennsylvania to take advantage of a federal tax subsidy afforded to corporations across the country.⁹³

- This personal income tax deduction came at a cost of **\$0.1 million in FY 2019**. Annual costs for this tax subsidy are predicted to remain constant over the next six fiscal years.⁹⁴

Section 7: Realty Transfer Tax Subsidies

Pennsylvania imposes a 1 percent realty transfer tax on the value of real estate transferred, with both grantor and grantee held jointly liable for payment. Local jurisdictions may impose an additional tax for realty transfer. Revenues from the state realty transfer tax are divided between the General Fund (about 80 percent), the Keystone Recreation, Park, and Conservation Fund (15 percent), and the Pennsylvania Housing Affordability and Rehabilitation Enhancement Fund (maximum of \$40 million annually).⁹⁵

Production or Extraction of Coal, Oil, Shale Gas or Minerals

Leases for the production or extraction of coal, oil, shale gas, and minerals, and assignments thereof, are excluded from the realty transfer tax. While government documents do not provide a value for this tax subsidy, the revenues lost are certainly significant.

- Using state-level data on production levels and market values for 2018,^g we estimate total revenues for the 1,950 companies eligible for this tax subsidy at about \$30.04 billion. Assuming lease sale values approach about 10 percent of this value, the 1 percent realty transfer tax would translate to about **\$30 million per year**.
- While this estimation is certainly rough, it is the closest approximation possible given the clear lack of public information. It highlights the need to track and report fossil fuel subsidies that, currently, are buried out of sight.

^g For purposes of general estimation, we can use U.S. EIA data to examine the impact of a 1 percent tax on annual production of Pennsylvania coal (29,790 thousand short tons in 2018 at \$57.91/ short ton for average combined anthracite and bituminous price), oil (6.57 million barrels in 2018 at WTI average price of \$65.23/barrel), and natural gas production (gross withdrawals of 6,210,673 million cubic feet in 2018 at \$4.49 per thousand cubic feet citygate price).

A 2002
PENNSYLVANIA
SUPREME COURT
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ENTERPRISE IN
THE STATE.

Section 8: Local Property Tax Subsidy

In most states throughout the country, property taxes are levied on land, improvements to land (including buildings), and personal property such as machinery, equipment, vehicle fleet, and inventories. However, seven states exempt all personal property from taxation – and Pennsylvania is one of them.⁹⁶

This exemption provides an added benefit to all businesses, including oil and gas companies. Many believe Pennsylvania’s property tax system is a competitive advantage for companies doing business in the state.⁹⁷

While there is no state tax on personal property, Pennsylvania counties, municipalities, and school districts do collect real and personal property taxes. About 30 percent of local general revenue in Pennsylvania comes from local property taxes levied by these local governmental entities.⁹⁸ This funding is especially significant for school districts, which receive about 83 percent of their own-source general revenue from local property taxes.⁹⁹

Oil and Gas Exemption to Local Property Taxes

Since the early 1900s, oil and gas reserves have been treated like mineral reserves and were therefore subject to real estate assessment and associated local property taxation. This changed when a 2002 decision from the Pennsylvania Supreme Court¹⁰⁰ exempted leased oil and gas reserves and operating wells from local property tax assessments. Currently, few other industry sectors are exempt from local property taxes: churches, hospitals, schools, nonprofits, and governments. A 2002 Pennsylvania Supreme Court decision exempted the oil and gas industry from local property taxes, making it the only exempted commercial enterprise in the state.

In large gas production states like Pennsylvania, it is common for gas producers to pay both property taxes and a tax on production (i.e. severance tax). In Texas, for example, the oil and natural gas industry paid \$4.0 billion in property taxes and \$5.6 billion in production taxes in FY 2019.¹⁰¹

With neither property taxes nor production taxes for oil and gas industries, it is counties, municipalities and school districts that experience the most acute losses. This requires other local taxpayers to assume increased burdens for local financial liabilities while providing oil and gas companies with an unfair competitive advantage.

- Jeff Kern of Resource Technologies Corporation estimated the value of this exemption to be \$477.7 million in 2012, \$600 million in 2013, and \$977 million in 2014.^h Extrapolating these estimations using the annual shale gas citygateⁱ price in Pennsylvania and marketed production in Pennsylvania,¹⁰² we estimate that the oil and gas local property tax exemption cost Pennsylvania approximately **\$1,063.4 million in 2018.**



^h Estimates provided November 30, 2011.

ⁱ According to the American Gas Association, citygate refers to “the point where natural gas is transferred from an interstate or intrastate pipeline to a local natural gas utility.”

Section 9: Motor License Fund Tax Subsidies

The Motor License Fund is designated to cover the costs of construction, reconstruction, maintenance, and safety for highways and bridges. About 64 percent of total non-restricted revenues to the Fund in FY 2019 came from taxes on motor fuels. In order of magnitude of revenue collected, motor fuels taxes include the Oil Company Franchise Tax, the Motor Carriers Road Tax and International Fuel Tax Agreement (IFTA), the Liquid Fuels Tax, and the Alternative Fuel Tax.

- The Oil Company Franchise Tax was amended to increase its revenue generation potential and create revenue neutrality while the Liquid Fuels Tax is phased out. Despite this intention, revenues from motor fuels taxes have been on the decline since FY 2019.¹⁹³ For more information, see the discussion of Gasoline and Motor Fuels Exemption in the Sales and Use Tax section earlier in this chapter.
- Motor Carrier Road Tax/IFTA: IFTA is an agreement between the U.S. and Canada to simplify reporting of fuel use by motor carriers of qualified vehicles that operate over multiple states and jurisdictions. Qualified vehicles operated in Pennsylvania for intrastate-only activities are also subject to fuel taxation under the Motor Carrier Road Tax. Both taxes are imposed on fuel consumed by qualified motor vehicles (large vehicles such as hauling trucks) operated within Pennsylvania. The tax rate is equivalent to the Oil Company Franchise Tax or Alternative Fuels Tax rate per gallon.

Unlike taxes that feed into Pennsylvania's General Fund, taxes on motor fuels act more like user fees, with collected revenues reserved for the building and maintenance of transport-related infrastructure and operations. To underline this, consider four related exemptions from the Motor License Fund Tax:

A full refund of tax paid is granted for fuel consumed in an off-road manner in the case of agricultural use, farm vehicles, power take-off equipment, and truck refrigeration units.¹⁹⁴

In contrast, Motor License Fund tax breaks for entities using common infrastructure without paying for its upkeep are fossil fuel subsidies because they artificially deflate the price of gasoline and other motor fuels and thus incentivize its use. For the purposes of our analysis, we consider these subsidies to be “industry specific” in that they almost exclusively apply to fossil fuels. However, it is important to note that these subsidies flow directly to consumers, while providing an indirect boost to fossil fuel companies that may benefit from the increased demand resulting from artificially deflated fuel prices.

Political Subdivision Exemption

The purchase of shale gas, fuel oil and kerosene, steam, manufactured gas, and electricity (and related equipment, machinery, parts and supplies)¹⁹⁵ by the U.S. and state governments and political subdivisions are exempt from the Oil Company Franchise Tax and Motor Carriers Road Tax/IFTA.¹⁹⁶ The purchase, use, lease, repair or maintenance of equipment and supplies (e.g. storage tanks, wires, meters) used in connection with the consumption of these fuel sources are also exempt. According to government documents, this exemption is an indirect means of assistance to local governments.

- Approximately 3,130 governmental units benefit from these tax subsidies at a combined cost of **\$92.4 million in FY 2019**.¹⁹⁷

MOTOR LICENSE FUND SHORTFALL – AND ONE FORGOTTEN SOLUTION

According to a 2010 report of the Pennsylvania State Transportation Advisory Committee, the state needed to invest an additional \$3.5 billion annually to meet the needs of the transportation system (i.e. highways, bridges, public transportation¹⁰⁸ and local government road needs). The report determined that current funding structures for transportation were not adequate to meet existing or long-term transportation funding needs, citing:

“The current funding structure that relies primarily on gasoline taxes is not sustainable in the long term and is likely to erode more quickly than previously thought.”¹⁰⁹

The 2010 report examined several sources and strategies to augment transportation funding in Pennsylvania and identified imposition of a sales tax on fuel as the highest yield potential revenue generator available to fund highways, bridges, and transit.¹¹⁰

In 2011, the Pennsylvania Governor’s Transportation Funding Advisory Commission (TFAC) released its final report on transportation funding, noting the \$3.5 billion funding gap in 2010 could grow to a \$7.2 billion gap if action was not taken to increase transportation funding.¹¹¹ The TFAC report considered dedicating 1 to 2 percent of the existing sales tax revenue from the General Fund to transportation funding purposes but did not consider repealing the sales tax exemption on liquid fuels or boosting the liquid fuels tax rate to a level as high as the sales tax. It is noteworthy that the single largest potential revenue generation strategy identified in the 2010 report was not examined or discussed in the TFAC’s final report.

Ten years later, policymakers have yet to agree upon a long-term solution to the growing budget shortfall.¹¹² According to the Transportation Advisory Committee in 2019, interstate highway and bridges require an additional \$2.5 billion annually, while the national highway system



requires an additional \$1.8 billion annually.¹¹³ Meanwhile, Pennsylvania’s under maintained roads, bridges, highways, and interstates continue to crumble, falling further behind federal standards.

The Oil Company Franchise Tax (OCFT), signed into law in 2013, was in part intended to address this shortfall.¹¹⁴ While many changes have been proposed by legislators in recent years (and just as many rejected), removing the sales tax exclusion for gasoline and motor fuels remains the most impactful solution available. Doing so would free up an additional \$1 billion annually and go a long way in restoring our state transportation infrastructure. It would also address market failures which reduce the cost of motor fuels relative to other options, including electric, hybrid, and fuel-efficient vehicles.

Aside from being the most impactful solution, it also has precedent. Other states – including Florida, Georgia, Hawaii, Michigan, and West Virginia – impose a sales tax on motor fuels in addition to a variety of other gasoline and diesel taxes.¹¹⁵ Because sales taxes are regressive, however, the additional burden placed on low- and middle-income households should be offset elsewhere.

Volunteer Emergency Vehicles

Fuel purchased by volunteer fire companies, ambulance services or rescue squads, and used solely in official vehicles, is exempt from the Oil Company Franchise Tax and Motor Carriers Road Tax. Because these emergency organizations provide a public service that benefits citizens, this tax subsidy is meant to reduce their costs of operation.

- Approximately 1,800 volunteer fire departments and an unknown number of other volunteer organizations benefitted from these tax subsidies at a combined cost of **\$32.2 million in FY 2019**.¹¹⁶

Nonprofit Nonpublic School

The purchase of fuel by any nonprofit, non-public school in which a state resident may legally fulfill compulsory school attendance requirements is exempt from the Oil Company Franchise Tax.

- Up to 2,900 nonprofit, non-public schools benefit from this tax subsidy at a cost of **\$0.3 million in FY 2019**.¹¹⁷

Electric Cooperatives

Fuel purchases for vehicles operated by electric cooperatives are exempt from the Oil Company Franchise Tax and Motor Carriers Road Tax.

- A total of 13 electric cooperatives benefit from this tax subsidy at a cost of **\$0.3 million in FY 2019**.¹¹⁸

Distributor Discount

Fuel distributors are permitted a discount on amounts due if the returns are filed in a timely manner. This allowance is in stark contrast to most government taxes where timely filing is assumed, and penalties and interest accrue from the moment it is late. The variable percentage discount is based on the gross tax due on the Oil Company Franchise Tax.

- Approximately 830 distributors benefitted from this discount at a cost of **\$5.4 million in FY 2019**.¹¹⁹

Buses

Bus companies may receive a refund equal to 55 mills of the Oil Company Franchise Tax imposed on fuels consumed by motorbuses within the state.

- Approximately 80 bus companies benefitted from this tax subsidy at a cost of **\$0.5 million in FY 2019**.¹²⁰

School Buses

Buses designed to carry 11 or more passengers used for the transportation of pre-primary, primary, or secondary school students to or from public, private, or parochial schools or school-related activities or events are exempt from the Motor Carrier Road Tax.

- Approximately 6,100 schools benefit from this tax subsidy at a cost of **\$14.7 million in FY 2019**.¹²¹

Charitable and Religious Organizations

Vehicles operated by charitable and religious organizations are exempt from the Motor Carrier Road Tax.

- Approximately 25,200 charitable and religious organizations may benefit from this tax subsidy at a cost of **\$2.7 million in FY 2019**.¹²¹

Various Motor Fuels Tax Exemptions with No or Nominal Values Reported:

- Second Class County Port Authorities: Purchases of fuel by second class county port authorities are exempt from the Oil Company Franchise Tax. Only one second class county port authority benefits from this tax subsidy. The associated costs are not disclosed.¹²³
- Foreign Diplomat: Fuel purchased by foreign diplomats whose countries have entered into a treaty with the United States is exempt from payment of the Oil Company Franchise Tax.¹²⁴
- Churches: A motorbus owned by and registered to a church, exempt under section 1901 of Title 75, is exempt from the Motor Carrier Road Tax.
- Vehicles Needing Emergency Repairs: A qualified motor vehicle needing emergency repairs and which was granted authorization from the Pennsylvania State Police to enter the Commonwealth is exempt from the Motor Carrier Road Tax.¹²⁵
- Vehicles Securing Repairs or Reconditioning: Exemption from the Motor Carrier Road Tax is provided for unladen or towed motor vehicles, or unladen trailers, entering Pennsylvania solely for the purpose of securing repairs or reconditioning.¹²⁶
- Recreational Vehicles: Qualified motor vehicles such as motor homes, pickup trucks with attached campers, and buses when used exclusively for personal pleasure by individuals, are exempt from the Motor Carrier Road Tax.¹²⁷

Conclusion

In total, Pennsylvania subsidized the fossil fuel industry with an estimated \$3.7 billion worth of foregone revenues in FY 2019 (**Figure 1**). This number is projected to continue to grow as newer tax subsidies – including the Pennsylvania Resource Manufacturing Tax Credit and Local Resource Manufacturing Tax Credit – come online. While some of these subsidies serve a net public good, many either no longer serve their intended purpose or have a purpose misaligned with meeting Pennsylvania’s public health, environmental protection, and climate change mitigation goals. Regardless, all the foregone revenues identified distort the market in favor of the fossil fuel industry, causing harm to the public in the long run.

A full summary of all foregone revenues reviewed can be found in **Appendix 1**.

Figure 1. SUMMARY OF FOSSIL FUEL FOREGONE REVENUES

This table provides a generalized overview of the main types of revenues foregone and the total estimated fossil fuel subsidy for fiscal year 2018-2019.

Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Government underpricing	Underpricing of government-owned resources, goods, and services.	\$530.4
Tax Credits	Provides a dollar-to-dollar reduction in tax payments for credit users.	\$14.3
Gross Receipts Tax Subsidies	Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.	\$322.9
Public Utility Realty Tax Subsidies	Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.	\$2.9
Sales and Use Tax Subsidies	Special exemptions from sales tax. Decreases revenues to the PA General Fund.	\$1,554.7
Personal Income Tax Subsidies	Special exemptions from income tax. Decreases revenues to the PA General Fund.	\$0.1
Realty Transfer Tax Subsidies	Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.	\$30.0
Local Property Tax Subsidies	Special exemption from property taxes collected by and for local governments	\$1,063.4
Motor License Fund Fuel Tax Subsidies	Special exemptions from multiple use taxes. Decreases revenue to the Motor License Fund for the construction and maintenance of highways.	\$148.5
Total		\$3,667.2

PART 2: Direct Spending



Direct spending is perhaps the most straightforward type of subsidy, yet no easier to track down. It can take many forms: credit support, grants, and trust funds, among others. It has many intended purposes – environmental improvement, job creation, and long-term economic development, to name a few. Finally, it can be either direct – serving to immediately improve the economics of fossil fuel development and use – or, as is often the case for environmental improvement, indirect – serving to address past regulatory failures that transferred industry liability to the public.

The difficulty with tracking fossil fuel subsidies from direct spending arises when we consider not only government money spent, but how much of that money arose from taxpayer subsidies versus targeted industry fees. Environmental remediation to rectify legacy pollution or problems caused when an industry goes bust, for instance, may be funded in part by user fees on industry. To determine the fossil fuel subsidy in this case, we must identify the portion of taxpayer dollars spent on remediation, and, when there is industry funding, assess whether the annual spending adequately addresses the backlog of remediation or damage.

The challenge is that taxpayer dollars are commingled with fees from the fossil fuel industry over time, complicating attempts to track taxpayer subsidy amounts. Additionally, many taxpayer subsidies are initiated in lump sums and spent over decades, making it difficult to represent the subsidy value in a single fiscal year snapshot. When these cases arise, we note initial taxpayer funding but exclude these amounts in our subsidy total.

Spending on fossil fuels is directed through the departments responsible for achieving stated goals. While the departments themselves are not fully responsible for the subsidies they oversee, understanding their purpose and place within different government entities can shed further insight to guide our recommendations. For this reason, we explore fossil fuel spending as it is spent through five government entities: Department of Environmental Protection, Public Utility Commission, Department of Community and Economy Development, Department of Transportation, and Department of General Services.

Section 1: Department of Environmental Protection

Nearly two centuries of fossil fuel extraction in Pennsylvania has resulted in widespread environmental degradation. As such, the Department of Environmental Protection (DEP) must address everything from abandoned mine reclamation to the promotion of alternative fuels. Paradoxically, the fossil fuel industry has sometimes ended up profiting from these exchanges. The following section provides an overview of such occurrences.

Coal and Clay Mine Subsidence Insurance

The Coal and Clay Mine Subsidence Insurance (CCMSI) Fund was created by Act 484 of 1961 to provide an insurance option for homeowners living above underground mines against subsidence (e.g. land sinking or cave-in) or interruptions in water supplies caused by mines. DEP is mandated to administer the program.



More than a million structures in Pennsylvania sit atop legacy mine voids. In Pennsylvania, subsidence of these defunct mines causes millions of dollars of property damage every year.¹²⁸ Despite the risks, only about 5 percent of at-risk structures were insured in FY 2016. This means that most of the damage caused by collapsed mines is borne entirely by the property owner, often resulting in costs upwards of \$40,000 per damaged structure.¹²⁹

Over decades of operation, a lack of industry responsibility for mine collapse inevitably resulted in inadequate attention and investment in risk reduction. Until the Bituminous Mine Subsidence and Land Conservation Act was passed in 1966, Pennsylvania's property rights were broken into three classes: Surface, support, and mineral. This meant that while a homeowner may own the surface rights to their property, mine operators could own the rights to the support estate and the minerals beneath and were thus exempt from preventing or repairing damage on the surface. The result: the cost of insuring subsidence risk was displaced from the coal industry and onto the surrounding population, decreasing incentives for mining companies to take appropriate action to minimize long-term subsidence damage risks.

Taxpayers, insurance holders, and uninsured at-risk homeowners are paying the costs of these ongoing liabilities.

- 63,508 insurance subscribers paid a total of **\$6.7 million** in FY 2019, with just over \$1 million worth of claims.¹³⁰ However, because CCMSI only covers about 5 percent of at risk-structures, we estimate that these claims represent just 5 percent of the total value of damage. That means that in FY 2019 there was an estimated **\$20 million** in uninsured damage from mine collapse. Data from the previous fiscal year shows that just 5 percent of claims made by insured parties were fulfilled, suggesting that these figures may in fact be an underestimation.¹³¹
- From 2013 to 2018, nearly 29,000 more acres of Pennsylvania were undermined by underground bituminous coal mines, including 3,612 structures, 2,353 water supplies, and 127 miles of streams.¹³²

Operation Scarlift

Following over a century of unregulated coal mining, Pennsylvania passed the Land and Water Conservation and Reclamation Act of 1968. This act authorized a \$500 million environmental bond for a variety of issues, \$200 million of which was devoted exclusively toward abandoned mine reclamation and mine drainage abatement, allocated as follows:

- \$120 million for abatement of stream pollution and abandoned mine drainage

- \$20 million for abatement of air pollution from burning refuse banks
- \$40 million for the control of underground mine fires
- \$20 million for the control of surface subsidence over abandoned mines

From 1968 to 1981, Operation Scarlift – funded by the \$200 million bond – successfully completed 500 stream abatement projects, extinguished 76 underground mine fires, stabilized areas susceptible to mine collapse, and prevented air pollution at burning refuse banks.¹³³

While the program has reached its conclusion, abandoned mines pose an ongoing liability to the state and its residents. An estimated \$15 billion is still needed for abandoned mine reclamation in Pennsylvania, which includes 2,500 miles of polluted streams from acid mine drainage, 250,000 acres of unreclaimed surface mine land, 100 million cubic feet of burning coal refuse, and potential subsidence issues for thousands of acres.¹³⁴

The Federal Surface Mining Control and Reclamation Act (SMCRA) of 1977 is now wholly responsible for funding the reclamation of abandoned coal sites in Pennsylvania. Under SMCRA, mine operators pay a fee per ton of coal mined into a fund which is then redistributed to states in the form of annual grants.¹³⁵ In FY 2019, Pennsylvania received just \$55 million in SMCRA funding, about \$30 million of which was made available through a now-expired pilot program for states with the highest amount of unfunded coal-related problems. The expiration of this pilot program, coupled with the fact that the fund is dependent upon fees paid by an industry in decline, means that sufficient funding for abandoned mine reclamation in Pennsylvania is unlikely to materialize without further intervention.¹³⁶ In the meantime, Pennsylvania residents are shouldering the multi-billion-dollar environmental costs in the form of negative public health and safety impacts, decreased quality of life, and looming climate destabilization. These negative externalities will be explored further in Part 3, specifically as they relate to the shale gas industry.

- Operation Scarlift cost Pennsylvania \$200 million in public debt which has since been paid back in full.
- Currently, Pennsylvanians are not directly funding abandoned mine reclamation costs in excess of SMCRA, but they are shouldering the cost of reduced environmental quality and any resulting adverse health outcomes.

Transition to the Conventional Bonding System

In addition to enabling the reclamation of abandoned mines, SMCRA is also intended to reduce the likelihood of ongoing mine abandonment. In 1982, Pennsylvania acquired primacy status, which granted the state primary enforcement authority for regulation of surface mining activity under SMCRA.¹³⁷ To do so, Pennsylvania initially used an alternative bonding system (ABS)^j that required certain categories of mine operators to post site-specific reclamation bonds set below the full cost of reclamation and pay an additional fee into a statewide pool to compensate any shortfall when a site-specific reclamation bond was forfeited and collected.

However, by 1991, the statewide pool had been depleted, and the federal government decided that Pennsylvania's ABS was failing to meet SMCRA's standards. Following a 1999 lawsuit,¹³⁸ Pennsylvania began to transition from the ABS to a conventional bonding system (CBS) which set site-specific bonds at the full (estimated) cost of reclamation.

During the transition from ABS to CBS, some mine operators were unable to obtain the additional bonds needed to meet the full-cost standard. To fill this gap, the General Assembly appropriated

^j Specifically, the ABS covered surface coal mines, coal refuse reprocessing operations, and coal preparation facilities.

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\$7 million in 2001 against which the state could write up to \$70 million in site-specific “conversion assistance” reclamation guarantees,¹³⁹ called “Land Reclamation Financial Guarantees” (LRFGs).¹⁴⁰ In the event of bond forfeiture, the LRFG Account covers the amount of the financial guarantee written against it.

Dozens of mines bonded under ABS had already suffered forfeiture by the time the transition to the CBS began in 2001. Those ABS “legacy” mines left behind two kinds of reclamation liabilities. The first were land reclamation liabilities. To address this legacy, the **General Assembly appropriated \$5.5 million.**¹⁴¹

The second and more costly liability is the dozens of untreated discharges of polluted mine drainage flowing from the forfeited ABS mines. Pennsylvania attempted to relegate these discharges to the federal abandoned mine program but a 2007 ruling determined that they remained the responsibility of Pennsylvania’s ABS.¹⁴² As a result, the state was required to develop financial mechanisms to fund their perpetual treatment. In 2008, DEP devised a plan and created two new trust accounts: the ABS Reclamation Fee O&M Trust Account and the ABS Legacy Sites Trust Account.¹⁴³

The Reclamation Fee O&M Trust Account pays for the operation and maintenance (O&M) of treatment systems at ABS Legacy Sites. Revenues for this Account come from several sources, including civil penalties assessed against coal mine operators. DEP is also authorized to charge specific newly permitted mining operations a per-acre “reclamation fee” to maintain the required minimum balance of \$3 million in the account.¹⁴⁴ In addition, a law enacted in 2012 enabled DEP to appropriate certain fees and interest from the LRFG Account and up to \$2 million from the gross receipts tax on sales of electric energy annually.¹⁴⁵ DEP used this final option in FY 2017, when it appropriated **\$0.5 million** from the gross receipts tax on sales of electric energy for the Account.¹⁴⁶

DEP faced another lawsuit regarding ABS Legacy Sites in 2016, and in 2017 approved an amendment pursuant to the settlement agreement.¹⁴⁷ This amendment effectively expedited DEP’s reclamation timeline and tightened reporting requirements. According to the original amendment, land reclamation and water treatment work on all ABS Legacy Sites was to be completed by the end of 2018. However, as of the January 2020 report, there are still six sites requiring land reclamation work and nine sites requiring treatment system work. According to DEP’s revised timeline, all work would have been completed by the end of 2020. Once work is completed, these sites will remain ABS Legacy Sites, alongside over 50 other mines, unless funding is secured for permanent site maintenance.¹⁴⁸ While some sites are eventually delisted, others may be added to the list if their bonds under CBS are insufficient.

- In total, taxpayers have subsidized the transition from ABS to CBS through appropriations totaling \$13.0 million for the reclamation of ABS legacy mines and ABS-CBS conversion assistance for active miners.

Anthracite Emergency Bond Fund

The Anthracite Emergency Bond (AEB) Fund was established in 1986 to address problems faced by anthracite deep mine operators in obtaining reclamation bond coverage. Mine operators who have been rejected by at least three bonding companies, or had their bonds canceled due to bankruptcy or insolvency of an insurance company, were eligible to obtain needed coverage from AEB.¹⁴⁹ The mine operator is expected to pay a minimum participation fee of \$1,000 to the Department of Environmental Protection, and is assessed a \$0.25 fee for each ton of coal removed. The AEB Fund then provides the operator with a loan so that it can obtain bonding. Since its establishment in 1986, the Fund has received three transfers of \$50,000 each from the general fund but has otherwise remained solvent. The fund currently has a balance of approximately \$700,000.

- The primary subsidy is the offering of a program to make insolvent or otherwise financially insecure mining operators eligible for reclamation bonding. The cost of the subsidy has been financed by **\$0.2 million** in taxpayer funds.

Growing Greener Grants

Originally approved by the General Assembly in 1999, the Growing Greener Grant program was created with a \$1.27 billion bond to “address Pennsylvania’s critical environmental concerns.” Growing Greener dollars are divided between four agencies, with the Department of Environmental Protection receiving nearly half (\$547.7 million) of total funding. Eligible projects awarded under DEP include watershed restoration and protection; abandoned mine reclamation; and abandoned oil and gas well plugging projects. Of the \$471 million in DEP grants identified in the 2015 Fossil Fuel Subsidy Report, about 19 percent were allotted to projects involving impact mitigation from fossil fuels, especially to limit acid mine drainage.^k

Any amount of remediation for fossil fuel impacts not paid by the industry at fault is a fossil fuel subsidy. Unfortunately, parsing out the details of fund origination and destination is not so simple. Debt service for the Growing Greener program is funded primarily by revenues from a waste tipping fee (\$4/ton) by all industries. However, in 2012, the General Assembly also authorized an annual transfer from the Marcellus Legacy Fund, which is funded by the shale gas industry. Then, in 2019, Act 20 decreased the contribution from the Marcellus Legacy Fund, offsetting this revenue with an annually authorized transfer from the personal income tax.

Essentially, this means that the fossil fuel subsidy in this case is any revenue from the waste tipping fee and personal income tax (i.e. revenues not derived from the fossil fuel industry) that are used to pay for remediation of fossil fuel-related damages.

- Growing Greener Grants are subsidies for legacy fossil fuel impacts, directly costing taxpayers today for environmental degradation initiated by companies that often no longer exist.
- Further research is needed to determine the exact value of value of fossil fuel subsidies resulting from Growing Greener Grants on a year-to-year basis. To provide an approximation for FY 2019, **\$20.0 million** in personal income taxes were authorized for FY 2020 to offset the decrease in fossil fuel industry contributions via the Marcellus Legacy Fund.
- Assuming a 19 percent allotment to fossil fuel-related projects through to the program’s end, Growing Greener Grants for fossil fuels will total **\$104.0 million**.

Natural Gas Vehicle Development Program

Among other things, Act 13 of 2012 established a \$20 million, three-year Natural Gas Vehicle Grant Program at the Pennsylvania DEP. Funded by impact fees paid by the shale gas industry, the grant program provided monetary assistance in the purchase and conversion of shale gas vehicles (NGV).¹⁵⁰

While this Program is funded using fees collected from the shale gas industry, it is still a subsidy because it is using fees meant to compensate for the adverse impacts of the shale gas industry to instead expand markets for shale gas sales to the transportation sector.

- 62 organizations and companies were awarded a total of **\$20 million** in Act 13 Natural Gas Vehicle grants from 2013 to 2016.¹⁵¹

^k This is a conservative estimate calculated by adding up past awards that were explicitly fossil fuel-related based on brief project descriptions. A complete list of Growing Greener grants award by the DEP may be found at: <http://cedatareporting.pa.gov/Reportserver/Pages/ReportViewer.aspx?/Public/DEP/Grants/SSRS/GrantSearch>

ALTHOUGH THE ALTERNATIVE FUELS INCENTIVE ACT AIMS TO BE FUEL NEUTRAL, THE MAJORITY OF FUNDING SUPPORTS PROJECTS THAT USE COMPRESSED NATURAL GAS OR PROPANE.

Alternative Fuels Incentive Act

The Alternative Fuels Incentive Act Fund is funded with an annual allocation from the General Fund representing 0.25 mills of utility gross receipts tax, which typically amounts to around \$5 to \$6 million annually. The Fund is intended to reduce mobile source emissions, improve air quality and promote use of domestically produced fuels through four programs:

1. Alternative Fuels Incentive Grant (AFIG): Awards up to \$5 million in grants per year for the purchase or retrofit of alternative fuel vehicles (AFV), construction of alternative fuel infrastructure, and innovative technology related to AFV
2. AFV Rebate Program: Rebate Pennsylvania residents for the purchase of AFV
3. FAST Act Infrastructure Program: Awards up to \$1 million in grants per year for alternative fuel infrastructure projects located along specified highway corridors
4. Alternative Fuels Technical Assistance Program: DEP assigns professional consulting firm to eligible organizations working to develop alternative fueling strategies

Although the Alternative Fuels Incentive Act aims to be fuel neutral, the majority of funding supports projects that use compressed natural gas or propane. Other fuels supported include ethanol, biodiesel, liquefied natural gas, hydrogen, hythane, liquefied petroleum gas, electricity, and fuels derived from coal and biomass.

- In FY 2018, the Fund expended \$5.3 million. All but two AFIG and FAST funded projects were for fossil fuel-related vehicles and infrastructure, while the AFV Rebate Program funded exclusively EV and hybrid vehicles.¹⁵² After we exclude non-fossil fuel-related projects as well as funding for the technical assistance program, the related fossil fuel subsidy amounts to **\$4.3 million**.
- While data is not yet available, the same value will be used for following fiscal years.

Section 2: Public Utility Commission

The Public Utility Commission (PUC) works with utilities and consumers to ensure safe and reliable utility service at reasonable rates while protecting the public interest, and fostering new technologies, economic development, and consumer education. PUC works closely with DEP to administer and evaluate the AEPS Act.

Tier II of the Alternative Energy Portfolio Standard

The Alternative Energy Portfolio Standard (AEPS) Act of 2004 requires electric distribution companies and generation suppliers to supply a percentage of electricity sold by renewable (Tier I) and alternative (Tier II) resources. While the Tier I requirement mirrors renewable portfolio standards in many other states, the Tier II requirement is quite unusual. It mandates that 10 percent of electricity sold by 2021 come from not only less renewable resources such as municipal solid waste but from fossil fuels such as waste coal.¹ Even more innocuous Tier II sources like hydro pumped storage pull heavily from our primarily fossil fuel-powered grid. By pumping water uphill when electricity prices are cheap at night and then releasing it downhill to create electricity when power prices are high during the day, pumped storage provides a valuable dispatchable resource to meet peak power needs. However, it uses more power than it generates and relies heavily on our fossil fueled grid.

¹ Tier II sources include waste coal, distributed generation systems, demand side management, large scale hydropower, municipal solid waste, generation of electricity outside of Pennsylvania utilizing by products of the pulping process and wood manufacturing process including bark, wood chips, sawdust and lignin in spent pulping liquors and integrated combined coal gasification technology.

Electricity distribution and generation supply companies typically comply with AEPS by purchasing credits that are generated by qualified facilities. The aggregate cost of the credits provides a good estimate for the subsidy conferred by the purchase mandates.

- Tier II credits came at cost of just over \$3.6 million in FY 2019. Because waste coal made up 49.1 percent of Tier II credits and hydro pumped storage made up another 38.8 percent (and Pennsylvania’s electricity mix is 59 percent fossil fuel derived), the fossil fuel subsidy amounts to **nearly \$2.6 million**.¹⁵³ Electricity customers pay this extra cost through a charge on their electricity bills.
- The already substantial costs of the Tier II requirement will most certainly rise in FY 2020 and FY 2021 due to two factors:
 1. While the cost of solar credits declined by 86 percent from 2008 to 2020, the cost of Tier II credits has nearly tripled.¹⁵⁴ This increased cost – to subsidize fossil fuels, no less – is paid directly by consumers.
 2. Exacerbating this issue, a 2020 AEPS amendment requires that all Tier II sources must be sourced from within the state – a requirement which disproportionately benefits waste coal plants.¹⁵⁵

Section 3: Department of Community and Economic Development

The Department of Community and Economic Development provides strategic technical assistance, training, and financial resources to reach the governor’s goal to sustain and create pathways for “jobs that pay.”¹⁵⁶ One core aspect of this work is business assistance. DCED has over 50 programs that provide direct financial assistance to businesses in the form of grants, loans, loan guarantees, tax credits, and bonds. Relevant tax credits – including Keystone Opportunity Zones – are covered in Section 1, while all other forms of financial assistance are discussed below.¹⁵⁷ These programs cover a wide array of strategic focus areas, from marketing to attract businesses to job creation and business development.

Marketing

One of the core functions of DCED is to attract businesses to the state, which involves anything from organizing meetings and tours with interested parties to developing promotional materials. Because the Department considers shale gas and plastics as two of the state’s six key industries, it is likely that much of its marketing activities are devoted to attracting these fossil fuel industries. While many of the Department’s activities are not publicly accessible on its website, the resources explored below provide insight into marketing activities and expenditures that promote fossil fuel development.

- **Department events to attract international fossil fuel companies.** Using an open records request, Clean Air Council obtained details on a DCED attempt to attract ExxonMobil to the state in the fall of 2019. According to their report, the Department regularly sends officials to attend petrochemical conferences. Following one such conference, DCED Secretary Dennis Davin had a dinner meeting with Exxon Chemical executives and later invited two of the executives for a four-day tour of Southwestern Pennsylvania. On the trip, Exxon officials received a tour of potential sites for a petrochemical plant, visits to local shale gas and plastics plants, suite seats to a Steelers game, and meetings with environmental regulators and economic development officials. These types of tours and events are quite common for the department, which arranges about 100 per year. In fact, Secretary Dennis Davin used similar methods over a multi-year period to attract the Shell Petrochemical plant to Beaver County. The exact price tag of these activities is unknown.¹⁵⁸

- **Promotional materials to attract fossil fuel companies.** In FY 2019, \$2.0 million was appropriated from the PA General Fund for marketing to attract businesses.¹⁵⁹ Some examples of marketing activities directed to the fossil fuel industry include regular newsletters for those seeking government resources in the shale gas and plastics industries,¹⁶⁰ a DCED commissioned report entitled “Prospects to Enhance Pennsylvania’s Opportunities in Petrochemical Manufacturing,”¹⁶¹ and a 2016 promotional video called “Pennsylvania Plastics Industry.”¹⁶² For the purposes of this analysis, we will assume 10 percent – or **\$0.2 million** – of DCED’s marketing activities targeted fossil fuel companies.
- **Regional Investment Marketing (RIM).** In addition to its own marketing activities, DCED also funds the marketing activities of regional alliances that share DCED’s industry-focused economic development model through \$5,000 grants made through the RIM Grant Program.¹⁶³

Site Acquisition, Preparation & Remediation

Beyond marketing, DCED has several programs directed to businesses and governmental bodies – including municipalities, redevelopment authorities, and industrial development agencies – that decrease the cost of real estate through acquisition, preparation, and remediation assistance. Oftentimes, these programs have dual goals of reclaiming underutilized or environmentally degraded land and encouraging economic development, especially in priority industry areas like shale gas and plastics. When funded by taxpayer dollars, these programs may create fossil fuel subsidies that are potentially two-fold: 1) they shift the burden of environmental remediation from the party originally at fault to the public and 2) they subsidize real estate costs for industries.

- **Building Pennsylvania Program.** This \$150 million loan program provides financing for high-impact real estate projects, especially those that increase resources for competitive and emerging industries, revitalize blighted areas or brownfield sites, and are in low-income or low-opportunity communities.¹⁶⁴ These loans are made through the Commonwealth Financing Authority, which receives funding from sources including the Marcellus Legacy Fund, revenues from sales and use tax, the Multimodal Transportation Fund, and the Pennsylvania Gaming Economic Development and Tourism Fund, among others.¹⁶⁵
- **Business in Our Sites Program.** The issuance of \$300 million in bonds in 2004 provided initial funding for the program, recapitalized in 2016 with an additional \$75 million from underutilized Commonwealth Financing Authority programs.¹⁶⁶ This program provides grants and loans to Industrial Development Agencies and others to prepare previously utilized or undeveloped sites for future use.¹⁶⁷ One example of this is a \$175,000 grant to the Beaver County Corporation for Economic Development¹⁶⁸ to improve the Aliquippa Industrial Park for the Shell Petrochemical plant.¹⁶⁹
- **Industrial Sites Reuse Program (ISRP).** This program provides low-interest loans and grants to eligible parties for environmental assessments and remediation with the intention of bringing blighted land into productive reuse. Funding priority is given to projects at sites with known contamination, sites that present the greatest potential for redevelopment, and sites that are local or regional development priorities.¹⁷⁰ ISRP is funded by hazardous waste management and transportation fees via the Industrial Sites Cleanup Fund, which had \$6.2 million in DCED spending in FY 2019.¹⁷¹ It is unclear if this program provides a subsidy to the fossil fuel industry.
- **Infrastructure and Facilities Improvement Program (IFIP).** This multi-year program provides debt service to eligible parties for debt incurred to pay the costs of specific infrastructure and facilities improvement projects that enhance economic development. Eligible projects include industrial enterprises and manufacturing, among others.¹⁷² IFIP received \$16 million from the PA General Fund in FY 2019.¹⁷³ For the purposes of this analysis, we will assume 10 percent – or \$1.6 million – of IFIP funding subsidizes fossil fuel companies.

Job Creation & Workforce Development

When it comes to economic development, generating jobs is only half the equation. DCED must also ensure that Pennsylvania residents have the necessary skills, qualifications, and connections to fill job vacancies and earn life-sustaining wages. Otherwise, as is the case with the shale gas and petrochemical industry, job creation will not necessarily accumulate to the local population, but instead to a transient job force composed of out-of-state workers. As DCED attempts to fill the gap between the number of job vacancies and qualified applicants, it creates benefits that accrue to the targeted industry. Below is a list of DCED programs targeting job creation and workforce development which may also serve to subsidize the fossil fuel industry.

SHELL CHEMICALS
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SAME PURPOSE.

- **Workforce and Economic Development Network of Pennsylvania (WEDnetPA).** By providing training funds to qualified companies through a network of educational institutions, WEDnetPA seeks to help companies improve the skills and productivity of Pennsylvania workers. As an example, Xpress Natural Gas was awarded \$11,050 in WEDnetPA funding for employee training as it built a CNG fueling station for its “virtual pipeline” fleet.¹⁷⁴ This program is funded by a DCED appropriation.¹⁷⁵
- **EDA Power Grant.** In FY 2019, DCED oversaw \$3.0 million in federal funding for the Power Initiative,¹⁷⁶ which provides grant funding and technical assistance to assist coal mining communities affected by job losses. Examples of award recipients located in Pennsylvania include \$1.1 million for Clarion University of Pennsylvania for job training in the petrochemical industry (October 2018), \$653,400 to Washington Greene County Job Training Agency to retrain former coal workers for shale gas utility and pipeline careers (January 2017), and \$587,950 for Community College of Beaver County for education and training programs for energy and advanced manufacturing industries (October 2018).¹⁷⁷ Due to the nature of its funding, this program is not a state subsidy. However, DCED and the Appalachian Regional Commission ultimately have the authority to decide if this program will be used as a fossil fuel subsidy or otherwise.
- **Manufacturing Pennsylvania.** Designed to support Pennsylvania’s manufacturing community, this initiative includes a workforce development grant, seven technical assistance centers, and grant funds to support science and engineering at Carnegie Mellon University.¹⁷⁸ In FY 2019, the initiative received \$12 million from the PA General Fund.¹⁷⁹ According to the National Association of Manufacturers, 39.7 percent of the value of manufacturing in 2017 came from fossil fuels and their derivatives (petroleum and coal products, plastics and rubber products, and chemicals).¹⁸⁰ For purposes of analysis, a 39.7 percent of the value, or **\$4.8 million** is being reported as a fossil fuel subsidy.
- **Pennsylvania First Program (PA First).** This program facilitates increased investment and job creation by providing grants, loans, and loan guarantees necessary for the operation of eligible businesses.¹⁸¹ PA First consolidated three DCED grant programs, eliminating much of the underlying restrictions and limitations to create a flexible program that would serve a variety of purposes.¹⁸² This paved the way for larger awards with fewer job guarantees. As an example, Shell Chemicals Appalachia was awarded a \$10 million Pennsylvania First Grant for the creation of just 400 jobs.¹⁸³ This is on top of the \$1.65 billion tax credit it received for the same purpose, explored previously in Part 1. In FY 2019, PA First received \$15 million from the PA General Fund.¹⁸⁴ For the purposes of this analysis, we will assume 10 percent – or **\$1.5 million** – of IFIP funding subsidizes fossil fuel companies.
- **Pennsylvania Industrial Development Authority (PIDA).** PIDA offers low interest loans to companies as they expand their industrial capacity through land and building acquisition, construction and renovation, and industrial park development.¹⁸⁵ As an example, Beaver County Corporation for Economic Development was awarded a \$550,000 low interest loan for Andrew Logistics, a trucking company specialized in asset-based bulk liquid and hazardous materials transport like petroleum products and chemicals.¹⁸⁶ In FY 2019, PIDA received \$1.6 million from the PA General Fund.¹⁸⁷ For the purposes of this analysis, we will assume 10 percent – or **\$0.2 million** – of PIDA funding subsidizes fossil fuel companies.

A WHOLE LOT OF SUBSIDIES FOR SHELL CHEMICALS

Royal Dutch Shell ranks in the top ten for the most public subsidies generated by a foreign company in the United States. In total, the company has brought in an estimated \$1.8 billion.¹⁸⁸ Most of this support comes from Pennsylvania.

Beginning in 2011, Shell Chemicals announced plans to build a massive petrochemical complex in either Ohio, West Virginia, or Pennsylvania, pitting the three states against each other in a competition to land the company.

Initially, Pennsylvania's bid for Shell Chemicals likely resembled DCED's recent attempt to win over Exxon Chemical: private meetings, tours of Western Pennsylvania's assets, and flattery.¹⁸⁹ As Shell Chemicals continued to express interest, however, these gestures quickly devolved into something much more insidious: colossal, long-term fossil fuel subsidies.

By 2012, three major developments put Pennsylvania first in line for the proposed Shell facility. First, DCED granted the Beaver County Corporation for Economic Development a modest \$175,000 to begin preparing a site for Shell in Beaver County (see Business in Our Sites Program).¹⁹⁰ While the site was being prepared, the second major development was well underway in Harrisburg: the Pennsylvania Resource Manufacturing Tax Credit. At \$1.65 billion, this tax credit is the largest corporate subsidy in Pennsylvania's history and the sixth largest of any US state. And it earns that distinction by an overwhelming margin: the state's second largest subsidy was just a fifth of the size.¹⁹¹

Luckily for Shell, this multi-billion dollar tax credit was transferable, paving the way for the third development: Fifteen years of tax amnesty. This freed the corporation from paying most state and local taxes, essentially allowing Shell to sell its \$1.65 billion in tax credits to other companies and pocket the proceeds.¹⁹²

Following these developments, on March 15, 2012, Shell Chemicals announced plans to build its petrochemical complex in Beaver County, Pennsylvania. Yet the subsidies still did not stop.



In September 2013, the Keystone Opportunity Zone, which partially covered the site of the future plant, was expanded to include the entire site and extended for a duration of 22 years.¹⁹³ This effectively broadened the tax amnesty through a series of specified credits, waivers, and broad-based tax abatements.¹⁹⁴

The final subsidy we were able to identify came in the form of a \$10 million PA First Grant awarded to Shell Chemicals for creating 400 jobs.¹⁹⁵ The Pennsylvania Resource Manufacturing Tax Credit also stipulated job creation. This redundancy, however, was apparently not enough to stop overzealous legislators from giving out yet another handout.

The generous funding of this multi-billion dollar, foreign corporation comes at a real cost to Pennsylvania residents, and the billions of sacrificed tax dollars are just the beginning. In Part 3, we will explore the negative impacts of fossil fuels on everything from quality of life to the environment. Here's a sneak peek: According to our estimates, Shell Chemicals will produce an estimated \$400 million in air pollution externalities each year once the plant is in full operation, harming public health, the environment, and climate.

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AND ENERGY
EFFICIENCY.

Business Development

DCED provides grants, loans, and loan guarantees to support the operation of expansion of existing businesses. Because fossil fuels have such a large presence in the state, they undoubtedly benefit from neutral programs. Further, one program – shorthand as “PIPE” – is targeted specifically at the development and consumption of the state’s shale gas.

- **Alternative Clean Energy Program (ACE).** Administered jointly by DEP and DCED, ACE uses Commonwealth Financing Authority funds to provide grants, loans, and loan guarantees to businesses, economic development organizations, and political subdivisions for the utilization, development, and construction of alternative and clean energy projects. Eligible energy sources include waste coal, ethanol, compressed natural gas, and liquified natural gas, among others.¹⁹⁶ In 2019, ACE distributed \$12 million worth of financial support, including **\$2.9 million** in grants and \$1.1 million in loans for shale gas-related projects.¹⁹⁷
- **Ben Franklin Technology Development Authority (BFTDA).** Through a series of programs, BFTDA supports the advancement of technologies for companies, entrepreneurs, and innovators to proactively respond to changing markets in key industry areas. In FY 2019, BFTDA received \$14.5 million from the PA General Fund.¹⁹⁸ For the purposes of this analysis, we will assume 10 percent – or **\$1.5 million** – of BFTDA funding subsidizes fossil fuel companies.
- **Global Access Program (GAP).** Administered by the Office of International Business Development (OIBD), GAP provides up to \$5,000 in grants to small and mid-sized companies for export promotion activities.¹⁹⁹ GAP grants are awarded to businesses in many industries, including the fossil fuel industry. As an example, Klinge Corporation – a business that provides refrigerated transport containers for industries including chemical, oil, and gas²⁰⁰ – received \$3,500 in GAP funding to attend an international trade show in 2016.²⁰¹ In FY 2019, the OIBD received \$5.9 million from the General Fund to support GAP and other priorities.²⁰² For the purposes of this analysis, we will assume 10 percent – or **\$0.6 million** – of GAP funding subsidizes fossil fuel companies.
- **Pipeline Investment Program (PIPE).** Initiated in 2016 to “fully realize the benefits of Pennsylvania’s vast energy resources,” PIPE provides up to \$1.5 million in grant funding per project to construct the last few miles of shale gas distribution lines to business parks and existing industrial and manufacturing enterprises.²⁰³ The program is managed by the Commonwealth Financing Authority, which receives funding from sources including the Marcellus Legacy Fund, revenues from sales and use tax, the Multimodal Transportation Fund, and the Pennsylvania Gaming Economic Development and Tourism Fund, among others.²⁰⁴ PIPE’s funding specifically came from a \$24 million appropriation from the underutilized Alternative Energy Investment Act, which supports wind, solar, and energy efficiency.²⁰⁵ Since it began in November 2016, PIPE has awarded \$20.3 million in grants, or an average of about **\$12.1 million** per fiscal year.²⁰⁶

Section 4: Department of Transportation

Pennsylvania’s Department of Transportation, PennDOT, is responsible for programs and policies impacting our highways, public transportation, airports, ports, railroads, and waterways.²⁰⁷ Much of PennDOT’s budget is devoted to roads and bridges: infrastructure that is vitally important to the fossil fuel industry and considerably degraded by its intensive use, a subject with will be explored further in Part 3: Negative Externalities. Beyond this, however, PennDOT also oversees several programs, three of which directly target the shale gas industry.

Rail Freight Assistance Grant Programs

PennDOT manages two grant programs intended to stimulate the state's rail freight network: Rail Transportation Assistance Program (RTAP) and Rail Freight Assistance Program (RFAP).²⁰⁸ As emphasized in Part 1, coal was the largest commodity category shipped by rail in Pennsylvania in 2011.²⁰⁹ While coal tonnage has certainly decreased since, multimodal freight transportation has experienced a level of demand not seen since the beginning of the coal industry due to increased shale gas production. A single well pad requires up to 40 rail carloads of equipment for drilling including sand, pipes, and chemicals. Indeed, rail shipments for gravel and sand and miscellaneous organic chemicals are expected to increase by 86 and 57 percent, respectively, by 2040 from 2011 levels.²¹⁰

- According to a December 2018 review of the two programs, 48 funded projects served the energy market, 13 for plastics, and 17 for chemicals. This means that roughly 56 percent of the 139 projects funded benefitted the fossil fuel industry.²¹¹ If that trend holds, then RTAP and RFAP collectively provided **\$22.4 million** in fossil fuel subsidies in the 2019 grant period.²¹²
- RTAP is funded with bonds while RFAP is funded by the Multimodal Fund which receives its revenues from the Pennsylvania Turnpike Commission, motor vehicle fees, and road use taxes.²¹³ PennDOT also receives a portion of its funds from the Unconventional Gas Well Fund for the specific purpose of providing rail freight grants for projects related to or directly benefitting the state's shale gas industry.²¹⁴

CNG Fueling Stations Public-Private Partnership

With the intention of providing public transit agencies with access to cheap and clean fuel, PennDOT partnered with Trillium CNG to build and operate 29 compressed natural gas fueling stations at a cost of \$84.5 million.²¹⁵ If costs are distributed equally across all fueling stations, then the six projects completed in 2018 came at a cost of **\$17.5 million**.²¹⁶

Section 5: Department of General Services

The Department of General Services (DGS) supports the operations of all state agencies, including construction and design of all non-highway, capital construction state projects.

Coal Use in Government Buildings

Act 28 of 1990 requires that any heating systems or units installed in state-owned facilities be fueled by Pennsylvania coal. Heating systems built after 1990 may be exempted under the following conditions:

- Using coal would violate environmental laws or regulations;
- After performing a 25-year life cycle cost analysis, it is determined that coal is not cost effective;
- Using electricity generated primarily from the combustion of coal would be more cost effective than using coal as the fuel for the heating system; or
- Pennsylvania shale gas or wood is at least as cost effective and will be used as the principle fuel.

It is unclear if the Department of General Services is enforcing this antiquated provision and/or how often they are allowing for exemptions to the coal heating requirement. While this is clearly a subsidy, more research is needed to determine how widely this subsidy is being employed in Pennsylvania.

**A LACK OF
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Conclusion

Pennsylvania’s long history of fossil fuel entanglement has led to the development of a wide variety of programs and funds that support, promote, incentivize, and subsidize fossil fuel use. Unfortunately, a lack of transparency makes it difficult to assess exact subsidy amounts. Using available data, we determined that Pennsylvania subsidized the fossil fuel industry with at least \$118.9 million in direct spending in FY 2019 (**Figure 2**).

Much of Pennsylvania’s past spending has been channeled through the Department of Environmental Protection to address legacy environmental issues resulting from poor regulations. In these cases, there is often public money, corporate user fees (sometimes from revenue streams originally meant to support general state spending), and a huge remaining backlog of unfunded cleanup. Although the Commonwealth now has multiple trust funds in place to deal with remediation linked to fossil fuel development, too often these structures are added only after substantial environmental or economic losses. The scale of remediation costs underscores the importance of properly identifying the impacts of fossil fuel development early in its development process or else erring on the side of caution and establishing funding and oversight mechanisms to ensure remediation costs are paid by the causal industry rather than the public many years later. This issue will be further addressed in the next section on negative externalities.

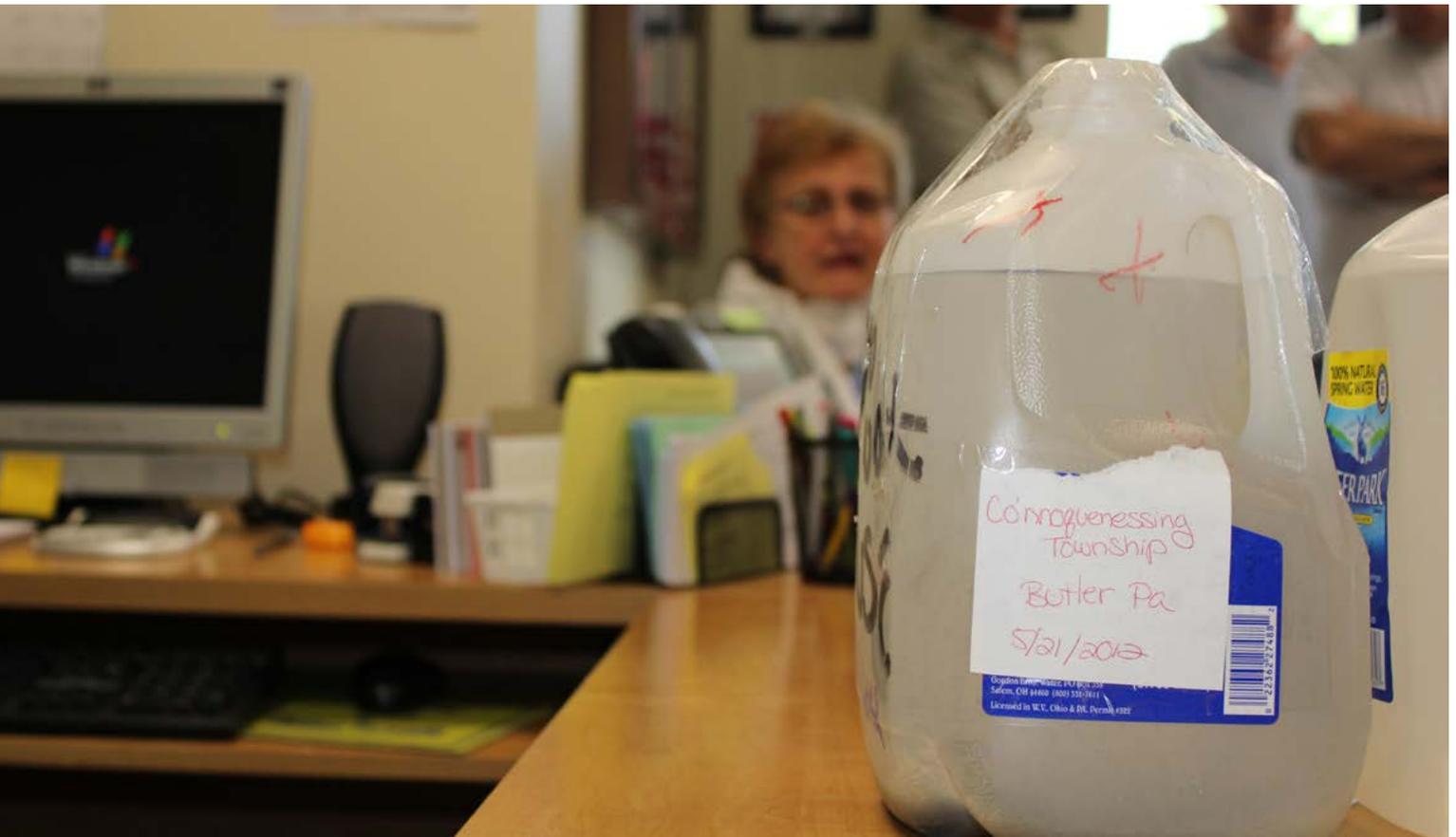
In contrast, current spending is intended primarily for economic development. While much of DEP’s spending can be attributed to past regulatory failures, DCED and PennDOT spending directly improve the economics of the present-day fossil fuel industry, either by intentionally targeting its growth or by the passive encouragement of untargeted programming. A full summary of all direct spending reviewed can be found in **Appendix 2**.

Figure 2. SUMMARY OF DIRECT SPENDING ON FOSSIL FUELS

While many uncertainties exist, this table summarizes known fossil fuel subsidies arising from direct spending.

Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Department of Environmental Protection	Addresses legacy impacts from fossil fuel extraction, sometimes using taxpayer money to supplement fees from the fossil fuel industry; also benefits fossil fuel companies with spending related to climate change mitigation.	\$51.0
Public Utilities Commission	Oversees PA’s Alternative Energy Portfolio Standard to reduce greenhouse gas emissions, yet includes some fossil fuels in its electricity sourcing requirements	\$2.6
Department of Community and Economic Development	Marketing to attract fossil fuel companies and supports their activities with grants, loans, and loan guarantees for site acquisition, preparation, and remediation, job creation and workforce development, and business development	\$25.4
Department of Transportation	Responsible for programs and policies impacting transportation, PennDOT has a rail freight grant program and a CNG fueling station public-private partnership which directly support shale gas	\$39.9
Department of General Services	In its role to support the operations of all state agencies, DGS implements a 1990 act that requires use of PA coal in any heating systems or units installed in state buildings	Unknown
Total		\$118.9

PART 3: Negative Externalities: An Examination of Shale Gas



Negative externalities are industry-created costs that are incurred by society rather than the industry at fault. As discussed in the introduction, negative externalities are not consistently included in fossil fuel subsidy calculations due to the difficulty in assigning a dollar value to often immeasurable costs, such as reduced quality of life, global climate instability, and environmental degradation. Yet as difficult as they are to quantify, negative externalities from fossil fuels have immediate and significant consequences that far outweigh any tax subsidies or direct spending. They thus warrant our in-depth consideration.

To limit the scope of the immense undertaking of defining negative externalities while still providing a taste of the scale, this chapter will focus exclusively on externalities arising from unconventional gas. Nonetheless, many of the subsidies identified below may also apply to oil, coal, and conventional gas. Because of the limited scope of our analysis, negative externalities will be considered separately from our subsidy total.

Section1: Hydraulic Fracturing

The actual process of extracting unconventional gas – hydraulic fracturing – has been attributed to a wide range of impacts on the environment, local communities, and public health. In this section, we provide a limited overview of negative externalities associated with hydraulic fracturing, followed by separate sections on processing and downstream uses of shale gas and climate impacts from greenhouse gas emissions.

Degradation of the Natural Environment

Hydraulic fracturing often occurs in remote areas of Pennsylvania, with serious impacts for the natural environment. DCNR's Shale Gas Monitoring Report sums up these impacts:

“Existing native vegetation is often cleared to build new roads, pipelines, and pads. Beyond the visual impact of clearing forest, shale gas infrastructure development increases forest fragmentation, reduces the amount of core forest habitat, and alters the recreational experience of forest users.”²¹⁷

In addition to the land use, water use for hydraulic fracturing is also intensive. Each unconventional well requires an average of 12 million gallons, sourced from both natural sources as well as recycled from previous operations. When naturally sourced, this water is often withdrawn over a short period of time from smaller, remote forested streams to minimize transport distances, posing concerns for sensitive ecosystems.

- From 2008-2018, about 1,770 acres of state forest land were converted from forest to shale gas infrastructure.
- Using estimates from a 2019 report by ECONorthwest, habitat loss from shale gas development produces an estimated **\$7.3 million** in damages annually. This estimate accounts for carbon sequestration, groundwater recharge, stormwater runoff, erosion prevention, nutrient uptake, and wildlife habitat. It does not include habitat fragmentation, habitat pollution, groundwater contamination, aesthetic loss, seismic activity, or bioaccumulation.²¹⁸

Water Consumption

Water is an essential ingredient for high-volume hydraulic fracturing, commonly known as fracking. On average, approximately 12 million gallons of naturally sourced and industrially recycled water is used for each fracking well.²¹⁹ Withdrawals are managed across three primary water basins: the Susquehanna, Delaware, and Ohio River Basins. DEP coordinates with two multi-state agencies – the Susquehanna and Delaware River Basin Commissions – to create consistent rules for shale gas drillers for water withdrawal, usage, treatment, and disposal.²²⁰ All water withdrawal plans must be approved by DEP and, if operating in Susquehanna or Delaware River Basins, the applicable commission as well.²²¹

In the early days of fracking, costs associated with sourcing water could amount to up to 20 percent of the total cost of developing a well.²²² Since then, however, the industry has built a network of industry-owned and operated water sources,²²³ precluding the need to pay for water consumption and saving the industry tens of thousands of dollars per well.²²⁴

Without a per-gallon fee on water consumption, the permanent loss of Pennsylvania's water resources comes at virtually no cost to the industry. In the Susquehanna River Basin, for instance, the only costs imposed by the Commission are permitting fees, an annual compliance and monitoring fee, and a \$0.33 per 1,000 gallons mitigation fee.²²⁵

Just as shale gas drillers have established a foundation for sidestepping per-gallon fees on water consumption over the past decade, average water consumption rose 600 percent per well.²²⁶

Infrastructure Damage

In 2010, Scott Christie, Deputy Secretary for Highway Administration at the Pennsylvania Department of Transportation, estimated that repairing existing roads and those roads expected to be impacted by Marcellus Shale drilling would cost a total of \$265 million.²²⁷ Since then, researchers from the Rand Institute have estimated that each unconventional well results in \$5,400 to \$10,000

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in damages to state roads – and this excludes smaller, local roads where drillers typically strike agreements to pay for visible damages. However, much of the damage goes unseen. With between 625 to 1,148 one-way truck trips per well – each loaded with heavy materials including billions of gallons of water, drilling equipment, and building materials – shale gas activity shortens the lifespan of roads, even when damage is not visible.²²⁸

- **Road damage.** In 2018, 779 unconventional gas wells were drilled in Pennsylvania.²²⁹ Using Rand Institute’s estimates, this produced anywhere from **\$4.2 million to \$7.8 million in damage to state roads from 2018-2019.**
- **Other damages.** This intense vehicle traffic also contributes to increased air pollution, car accidents, dust, and noise, impacting public health, safety, and quality of life all while costing taxpayer dollars.²³⁰

Creation of Boomtowns

Shale gas development occurs primarily in rural communities where it provides positive community and economic development opportunities in places of otherwise low opportunity. Yet these benefits come with an important caveat: most benefits are non-local, inequitable, and temporary.

Local employment opportunities are limited and transient, meaning that most of the increase in local taxable income has been driven by increased rents and royalties from those that lease their land to drillers.²³¹ This means that benefits accrue primarily to those that own land, many of whom are non-local.²³² And wherever the income comes from, whether from employment or leased land, and wherever it goes, all of it is temporary. After drilling, 98 percent of shale gas development jobs dry up, and rents and royalties dry up soon after.²³³

Meanwhile, documented impacts include: an influx of young, unmarried male workers with few social ties to the areas in which they temporarily settle;²³⁴ an increase in sex trafficking and prostitution, sexually transmitted diseases,²³⁵ drug use, and drunk driving;²³⁶ a potential decline in post-secondary educational aspirations;²³⁷ a decrease in housing value for homes reliant on ground-water sources, for fear of water contamination;²³⁸ and more expensive rental housing, degraded quality of housing units, and housing shortages, due to the influx of short-term, transient workers and a related increase in homelessness.²³⁹

Related to this last point, a survey by the Center for Rural Pennsylvania found that, in general, respondents with lower incomes reported fewer positive impacts. Members of low-income households consistently attributed housing instability of themselves or people they knew to the shale gas industry, and a corresponding difficulty to land adequately paid jobs. Renters expressed especially negative views of the economic impact.²⁴⁰

Other concerns expressed directly by focus groups include community divisions and hostility and quality of life impacts.²⁴¹ The costs of these and related negative externalities has not been calculated.

Groundwater Contamination

In August 2020, DEP released data identifying 355 incidents of private well water damage since 2008.²⁴² Research from Public Herald suggests that this number massively undercounts the scale of the problem. At a time when the DEP had only counted 285 water supply impacts from oil and gas operations, the Public Herald found 4,108 cases of water supply complaints to the DEP. They also found evidence of malfeasance, misfeasance, and negligence on behalf of DEP resulting from failures to investigate, failures to resolve complaints within the required timeframe, and failures to issue a positive determination of water supply impacts despite samples revealing contamination, among others.²⁴³

While lack of water well standards may also make it more difficult to prove whether well contamination was a result of gas development,²⁴⁴ resident complaints of water supply impacts closely follow the number of unconventional wells drilled in the state each year.

- **Uncorrected or unpaid damages.** The subsidy is the cost of groundwater contamination resulting from unconventional gas development left uncorrected or unpaid by the responsible party. Costs include reduced property values, adverse health impacts, water treatment costs, and water availability issues, among others.
- **Connoquenessing Township: A Case Study.** Soon after Rex Energy began drilling in Connoquenessing Township, Butler County in 2011, local well water turned cloudy and orange-brown. Now, nearly a decade later, 50 to 60 households are still without potable water. Despite a \$159,000 settlement, these residents continue to rely upon water donated by the local church, averaging about 400-500 gallons per week.²⁴⁵
- A 2019 report calculates the costs of shale gas development in Pennsylvania on health, community, and the environment. In this analysis, they found that “groundwater contamination represents one of the largest potential future costs of fracking in Pennsylvania.” Although the report authors did not calculate the total costs of groundwater contamination, the cost of avoidance behaviors – like the purchase of water delivery, water filters, and direct water purchases – offer a low-end estimate. By their estimates, the total cost of avoidance in Pennsylvania is at least **\$22 million annually**.²⁴⁶

Air Pollution

When the many components of shale gas – compressor stations, well pads, pigging stations – are considered in isolation, emissions can seem relatively small, allowing companies to shirk more stringent air pollution regulations. Air pollution permits resulting from aggregation, by contrast, force consideration of the combined impact of multiple related sources in the context of other

regional sources of air pollution. Because this is how air pollution is actually experienced – as the combined impact of all local pollution sources – aggregation results in measures that are more protective for public health. In so doing, aggregation also increases costs to drillers.²⁴⁷

DEP’s guidance on whether multiple drilling and transmission facilities should be aggregated and treated as a single source of air pollution establishes a “rule of thumb” whereby sources that are within ¼-mile of each other and under common control are aggregated while sources beyond this arbitrary boundary are aggregated on a case-by-case basis. In practice, DEP largely treats the ¼-mile rule of thumb as a definite cutoff point.²⁴⁸

Under the Clean Air Act (CAA), aggregation is permitted when sources are 1) located on contiguous or adjacent properties and 2) under common control. However, the U.S. Environmental Protection Agency’s multiple interpretations of these provisions have led to broad-based uncertainty over how to interpret

and comply with the law, an issue which the EPA sought to clarify in a 2016 Rule.²⁴⁹ Yet as evidenced by the myriad of lawsuits on the subject, the state’s implementation of aggregation is still in flux. In 2017, a Pennsylvania intermediate appellate court found that related fracking facilities owned and operated by two subsidiaries of the same parent company were not under common control and could thus not be aggregated.²⁵⁰ In 2019, the Pennsylvania Environmental Hearing Board found that DEP had improperly defined “contiguous” or “adjacent” in its decision not to aggregate related components of a project at a Marcus Hook petrochemical plant.²⁵¹ These recent court cases highlight the highly controversial nature of Pennsylvania’s approach to aggregation and illustrate some of the cases in which related facilities are regulated as a single source at the expense of public health.



Pennsylvania's implementation of the CAA's aggregation policy is not protective of public health, resulting in reduced costs to the drilling industry which are then externalized as negative public health outcomes.

Pipeline Leaks and Ruptures

According to a study by the Fraser Institute, pipelines are the cheapest and safest way of transporting shale gas.²⁵² Despite their findings, however, pipelines continue to pose serious risks of leaks and ruptures due to pipe corrosion, excavation damages, incorrect operations, equipment failure, and damage from outside forces. In the case of shale gas, methane leaks directly contribute to greenhouse gas emissions – explored more in the section on climate impacts – and pose risks for fire and explosions if ignited.²⁵³ Other shale gas-related materials transported via pipeline include drilling liquids and highly volatile shale gas liquids like ethane and propane, both of which pose serious threats to human health and safety and ecosystems when incidents occur.

- **An extensive network of pipelines.** In 2019, Pennsylvania was home to over 50,000 miles of pipelines for shale gas and 24.4 miles of pipelines for highly volatile liquids, including ethane and propane.²⁵⁴ These pipelines caused about one reported incident every 19 days, resulting in a total of two injuries, two fatalities, 598 barrels of hazardous liquids spilled, and \$13.4 million in reported costs.²⁵⁵
- **Disrupted land.** Pipeline installation and maintenance also disrupts the land through which it passes. By 2030, 60,000 to 150,000 acres of forest are expected to be cleared for pipeline development.²⁵⁶ Further, when passing through public land or private property, pipeline developers often deploy eminent domain, sometimes even beginning construction before issues like landowner appeals and just compensation are resolved.²⁵⁷
- **Regulatory gaps.** Pipeline safety is overseen by the Pennsylvania Public Utility Commission (PUC) and, for interstate pipelines, the Federal Energy Regulatory Commission (FERC) and the Pipeline and Hazardous Materials Safety Administration (PHMSA).²⁵⁸ Between these agencies, however, there are many gaps, especially when it comes to gathering pipelines. Only about 5 percent of these pipelines, which transport gas from wellheads to processing facilities,²⁵⁹ are subject to federal safety regulations, and almost none within Pennsylvania are subject to state safety regulations.²⁶⁰
- **A litany of failures for Mariner East.** Since 2014, the Marine East pipeline project has been the subject of over 100 violations, multiple moratoria orders, and three criminal investigations.²⁶¹ Despite the demonstrated failures of project leadership, the Mariner East project continues. In August 2020, a construction accident led to the release of about 10,000 gallons of drilling mud in a Chester County State Park.²⁶²

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THE
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TIME.

Disposal of Fracking Waste

Unconventional drilling results in both liquid and solid wastes, including produced water, drill cuttings, fracking sand, filter socks, and contaminated soil. Over 80 percent of waste generated ultimately stays in-state, while the remaining 20 percent is exported to states like West Virginia and Ohio. DEP's Office of Oil and Gas Management oversees waste monitoring, storage, treatment, and disposal.²⁶³

The two largest waste streams are wastewater and drill cuttings.²⁶⁴

1. **Wastewater.** Publicly owned wastewater treatment facilities accepted hydraulic fracturing wastewater until EPA announced a nationwide “zero-discharge rule” – effective beginning August 2019 – in response to chronic drinking water contamination found in Pennsylvania. According to EPA officials, the contamination uncovered in Pittsburgh drinking water was “one of the largest failures in U.S. history to supply clean drinking water to the public.” Now, wastewater from unconventional wells in Pennsylvania is processed by centralized wastewater treatment facilities that specialize in processing industry wastewater for reuse or discharge into waterways. Most hydraulic fracturing wastewater is ultimately disposed in underground “injection wells,” many of which are outside of the state due to unsuitable geography.
2. **Drill cuttings and other solid and semi-solid wastes.** Drill cuttings and other solid wastes are typically disposed of in municipal and industrial landfills, where regulatory authority shifts to DEP's Bureau of Waste Management. From here, leachate – the landfill's liquid waste runoff – is treated in municipal treatment facilities and released into Pennsylvania's waterways.

Hydraulic fracturing waste poses environmental and public health threats through all stages of management and disposal, many of which are not regulated with the same standards applied to waste resulting from other industries. Instead, Pennsylvania residents bear the brunt of the negative externalities.

- **Radioactive materials.** A radioactive element naturally occurring underground called radium is commonly found in dangerous levels in hydraulic fracturing waste. The concentration of radium in Marcellus shale wastewater is over 300 times the limit for drinking water, and its radioactivity increases over time. This known carcinogen also occurs in solid and semi-solid hydraulic fracturing wastes. After a string of unexplained cancers erupted downstream of a treatment plant near Pittsburgh, Southwest Pennsylvania Environmental Health Project has begun investigating the environmental connections between wastes containing radium and impacted communities.²⁶⁵
- **Hazardous waste loophole.** Despite containing radium, heavy metals, and other toxins, the oil and gas industry has been exempted from hazardous waste laws since 1976 because of industry lobbying. This means that hydraulic fracturing waste is subject to less testing, tracking, and management than similarly hazardous waste from other industries.²⁶⁶
- **Undisclosed chemicals.** To make matters worse, unconventional drill operators are largely exempted from laws that would otherwise require them to reveal the chemicals they use in operations. Not knowing the composition of the waste makes it more difficult to properly test and treat it.²⁶⁷
- **Spills, leaks, and other violations.** Between 2015 to 2018, DEP issued over 1,000 violations resulting from failed storage. Violations include anything from spills and leaks to the improper treatment of waste. Communities living downstream bear the most severe risk.²⁶⁸
- **Increased waste production per well.** In 2018, the unconventional gas industry produced 69.3 million barrels of liquid waste and 1.4 million tons of solid waste, a 20 percent and 36 percent increase from the year prior, respectively. As the amount of waste produced per well increases, the urgency of establishing regulations protective of public health and the environment intensifies.²⁶⁹

DISENTANGLING HEALTH IMPACTS

With 13 percent of Pennsylvanians already living within one mile of active oil and gas development, the emergence of hydraulic fracturing in the past two decades has opened the door to many questions about human health risks.²⁷⁰ While establishing direct causation in such a short time frame is challenging, emerging data and studies are clarifying that hydraulic fracturing alters the environment in which people live, work, and play. It introduces chemical hazards like volatile organic compounds and benzene into our air, soil, and water; physical hazards like noise, light, and vibration; and psychosocial hazards like heavy truck traffic, changes in land and home values, and transient workforces.²⁷¹



These environmental hazards translate directly into health outcomes, some of which is explored above. While the exact pathway of health impacts is not always clear, scientists have already identified an association between hydraulic fracturing and high-risk pregnancy, preterm birth, asthma exacerbations, respiratory problems, migraines, fatigue, and rashes, among others.²⁷² Testimony presented in the 2020 Attorney General Report also includes health outcomes like frequent nose bleeds; chronic stress; the inability to sleep due to bright lights, noise, and vibrations through the night; intense stomach

pains; and the feeling of isolation and lack of control as property values dropped and prevented homeowners from relocating. As one resident recounts:²⁷³

We started getting sores all over us. And we were sick to our stomachs and having problems with breathing whenever we were in the shower. And it would burn our eyes, nose, and throat; and it just – it was putrid. It was embarrassing.

Because so little time has transpired since the expansion of hydraulic fracturing, associations with short-latency health outcomes are not well established and associations with long-latency health outcomes like cancers and neurodegenerative diseases are just beginning to emerge,²⁷⁴ including a string of rare childhood cancers emerging around a site of shale gas waste contamination that is currently under investigation by Pennsylvania’s Department of Health.²⁷⁵

A 2019 report calculated the annual cost of shale gas development on public health in Pennsylvania, and found the following:²⁷⁶

Health Impact	Annual Cost
Low Birth Weights	\$25.2 million
Asthma & Respiratory Afflictions	\$1.2 million
Depression	\$86.4 million
Total	\$112.8 million

This analysis does not include health costs associated with cancer, migraines, sinus afflictions, and occupational hazards, among others. It does, however, begin to put the daily afflictions of impacted Pennsylvanians into context, and to highlight the negative impacts of shale gas development that local low-income residents strongly believe policymakers ignore.

Although not associated with any single of the negative externalities laid out in the Hydraulic Fracturing section – but instead with all of them – the \$112.8 million in annual health impacts will be included in our negative externalities total.²⁷⁷

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Insufficient Bonding Requirements

While hydraulic fracturing certainly poses environmental and health risks through the duration of well operation, the impacts do not end when the well stops producing. Well sites must be stabilized or retired and degraded land must be reclaimed, the processes for which are highly contested even as more wells are being drilled.

According to a report by the U.S. Government Accountability Office, “the oil and gas industry’s boom-and-bust cycles can lead operators to drill wells when prices for oil and gas are high but can contribute to bankruptcies when prices are low. As a result, operators may not always have the resources to reclaim lands around wells that have been degraded by drilling and production.”²⁷⁸

This is where bonding comes in. In Pennsylvania, it is standard practice to require natural resource extraction industries to provide upfront financial assurance for potential damages in the form of surety bonds, personal or collateral bonds, trust funds, or insurance. That way, when a well reaches the end of its life, there are financial resources to pay for plugging the well even if the operator goes bankrupt.

Unfortunately, Pennsylvania’s oil and gas bonding has fallen short. The state is already responsible for up to 560,000 abandoned wells, and the list continues to grow as inadequate bonding requirements fail to cover reclamation of newly abandoned wells.²⁷⁹ According to a 2017 report, “more abandoned wells are being added to the state’s inventory than are being addressed through permanent plugging.”²⁸⁰ Meanwhile, the average reclamation cost for Pennsylvania wells was \$100,000 in 2011, a price tag which continues to creep upward for deeper wells as bonding requirements remain stagnant.²⁸¹

This growing shortfall between the required level of financial assurance and the actual cost of damages caused by unconventional wells is a subsidy epitomized by the following critical deficiencies:²⁸²

- **Inadequate bonding cost requirements.** In February 2012, Pennsylvania enacted a new bonding law for gas wells which incorporates key cost drivers such as well depth and the number of wells operated by the permit holder. Although these changes increased bonding requirements overall, they are still wholly inadequate. Complicating this matter, Pennsylvania law prevents private landowners from securing financial assurances from the drilling operator beyond what state regulations require.²⁸³
- **Lack of long term operational and maintenance costs in bonding requirements.** In Pennsylvania, bonded monies are released one year after DEP deems reclamation requirements have been met. As a result, there are no financial assurances to cover long term maintenance or reclamation, or assurances that funding will be available to deal with any post-closure liabilities that were not picked up in that first year.
- **Current structure allows for transfer of liabilities to potentially insolvent parties.** Large drilling companies often transfer ownership of marginally producing wells to smaller operators or surface owners. Pennsylvania’s Oil and Gas Act permits this activity as long as the new owner meets the bonding requirements. This effectively transfers contamination or damages caused by the initial large-scale drilling operator onto small scale operators who are often less financially secure and thus more likely to default on the bond. Risks associated with smaller operators include the potential for lower operational competency, reduced access to financial resources, and fewer assets to attach in litigation should problems arise on a site that are greater than bonding levels.
- **Insufficient funding mechanism to address growing backlog of abandoned wells.** In FY 2019, DEP received roughly \$1 million to find and plug some of Pennsylvania’s hundreds of thousands of abandoned wells, a job it is doing at a pace of less than a dozen per year. If this pace continues, it

will take DEP another \$6.6 billion and 17,500 years to finish the job.²⁸⁴ For now, DEP can only afford to plug abandoned wells “in emergency situations and/or when residents must be temporarily evacuated from their homes due to imminent threats that legacy wells pose when well integrity is compromised.”²⁸⁵

As DEP struggles to find and plug legacy wells, more wells are being abandoned each year. This problem is exacerbated by insufficient bonding requirements that incentivize well abandonment.

Section 2: Processing and Downstream Use

After extraction, shale gas is transported to a processing plant to separate the many components of the raw extracted material. This processed gas then continues to downstream uses, including combustion for energy, conversion to liquified natural gas (LNG) for export, and petrochemical manufacturing.²⁸⁶

Petrochemical manufacturing is becoming increasingly prevalent in Pennsylvania due to the high availability of cheap shale gas and the general industry shift away from energy production as the world attempts to reduce reliance on fossil fuels.²⁸⁷ This shift, however, has come to the detriment of those living within close vicinity to petrochemical plants who, as a result, are at increased risk for nerve, brain, and liver damage, hormonal disorders, birth defects, asthma, ulcers, and cancer, among other adverse health outcomes.²⁸⁸ In Pennsylvania and throughout the U.S., people of color and people living in poverty are disproportionately burdened by petrochemical and other polluting facilities.²⁸⁹ The burden of this subsidy, thus, is borne most directly upon these “sacrifice zones” as adverse health outcomes and environmental degradation.

- **The real cost of Shell Petrochemicals.** A 2020 Report by Carbon Tracker values air pollution externalities from plastics at somewhere between \$250 - \$500 per ton.²⁹⁰ At full capacity, the Shell petrochemical plant alone plans to produce 1.6 million tons of plastic each year.²⁹¹ Using Carbon Tracker’s lower-end estimates, this would mean \$400 million in air pollution externalities each year. Other externalities from plastics not necessarily limited to the place of production include greenhouse gas emissions, collection and sorting costs, and ocean cleanup.
- **Beyond Beaver County.** Of course, processing and downstream use of shale gas is not limited to Shell’s petrochemical plant in Beaver County. In addition, there are nine shale gas processing plants in Eastern Pennsylvania, dozens of shale gas power plants, one LNG storage facility, and at least two proposed petrochemical plants in Northeastern Pennsylvania.²⁹²
- **The future of fossil fuels.** Petrochemicals are predicted to make up the bulk of oil demand growth to 2040, predicted somewhere between 45 to 95 percent.²⁹³ The oil and gas industry is investing billions of dollars to make this forecast a reality, and Pennsylvania legislators have followed suit with direct spending, promotional materials, and millions of dollars of tax credits to situate the future of fossil fuels right here in our state. If this comes to fruition, negative externalities will only continue to multiply.

Section 3: Climate Impacts

In 2017, DEP reported that unconventional wells emitted 63,640 metric tons of methane, a potent greenhouse gas that is responsible for about a quarter of climate change. However, a 2020 analysis by the Environmental Defense Fund found that estimated emissions are much higher – 7 times the amount reported by DEP, coming in at 492,606 metric tons.²⁹⁴ To put that number in perspective, emissions from upstream unconventional gas wells are equivalent to adding another 2.7 million cars to the road.²⁹⁵ And that doesn’t even account for downstream emissions resulting from burning fracked gas for electricity or converting it into fertilizers, plastics, or other petrochemicals. The costs of the climate crisis are becoming clearer every day, even as the scale of this subsidy remain foggy.



- **Social cost of carbon.** Using estimates from DEP’s greenhouse gas inventory, 2017 emissions from fossil fuels amounted to 250 million metric tons of carbon dioxide equivalent.²⁹⁶ The IMF calculates the social cost of carbon in 2017 at about \$43.71 per ton.²⁹⁷ At this price, greenhouse gas emissions from fossil fuels were subsidized at a rate of **\$10,938.2 million in 2017**. Because this number is based off DEP’s undercount of methane emissions, even this is an underestimation. Data for 2018-2019 are not yet available, so this number will be used for the fiscal year estimate.
- **Federal rollback exacerbates state regulatory gap.** As the state advances on this proposed rule, the Trump administration eliminated industry requirements to monitor and repair methane leaks.²⁹⁸

Conclusion

Pennsylvania’s negative environmental and social impacts from early oil, coal, and conventional gas booms can provide valuable lessons as we attempt to balance resource development with public health, the environment, and climate change mitigation. Unfortunately, it appears the state has so far failed to heed the lessons of the past (**Figure 3**; for full summary, see **Appendix 3**). This chapter provided an overview of our multiple failings, with real implications for communities across Pennsylvania. While we were unable to quantify many of the negative externalities identified – totaling \$11.1 billion using low-end estimates – these impacts show up in the lives of everyday residents as reduced quality of life, degraded ecosystems, and liabilities that will plague Pennsylvanians far into the future. Despite these hard truths, the difficulty in quantifying the social and environmental costs of unconventional gas means that potential costs to the industry often supersede important environmental protections.

Figure 3. SUMMARY OF UNCONVENTIONAL GAS EXTERNALITIES

This table provides a generalized overview of the externalities discussed and the total estimated unconventional gas subsidy for 2018.

Category	Summary	Total Externality Estimate in 2018 (in millions)
Hydraulic Fracturing	Degradation to the natural environment, water consumption, infrastructure damage from increased truck traffic, and impacts to public health and safety. Due to lack of available information, estimate is incomplete.	\$146.3
Processing & Downstream Use	Air pollution which disproportionately burdens people of color and people living in poverty, as well as other externalities that are felt within and beyond Pennsylvania, including greenhouse gas emissions, plastic collection and sorting costs, and ocean cleanup	Unknown
Climate Impacts	Total greenhouse gas emissions from all fossil fuel use according to DEP, multiplied by the International Monetary Fund’s social cost of carbon	\$10,938.2
Total		\$11,084.5



Overview of Findings

Through tax documents, news articles, and a whole lot of digging, PennFuture was able to identify over 50 ways that our state and local governments subsidize fossil fuels.

Finding this information was not easy. Pennsylvania's fossil fuel subsidies are pernicious in part because they are buried out of sight and difficult to disentangle. This difficulty limited the accuracy and depth of our analysis. It is entirely possible – perhaps even probable – that we missed some subsidies. For the subsidies we were able to affirmatively identify, many were ultimately assigned no value due to lack of available information, while others could only be roughly estimated. While the estimates below are admittedly inexact, our expectation is that they likely undervalue the true scale of Pennsylvania's fossil fuel subsidies. Nonetheless, they provide a useful guide, a first step along the path to the elimination of fossil fuel subsidies, and eventually fossil fuels themselves.

Now, for the numbers. Based on the assumptions identified throughout, Pennsylvania provided **\$3.8 billion in fossil fuel subsidies in FY 2019**, or about \$296 per resident. This represents a 14 percent increase from our 2015 analysis of FY 2013 – a result both of increasing subsidy amounts and improved methods.

Of the over 50 subsidies identified, the ten largest subsidies comprised 96 percent of the total value (**Figure 4**). Most subsidies were specifically directed at the fossil fuel industry, with 85 percent of total subsidies taking the form of industry-specific foregone revenues like tax breaks (**Figure 5**).

Figure 4. In FY 2019, Pennsylvania provided \$3.8 billion in fossil fuel subsidies. The ten largest subsidies identified comprise 96 percent of the total subsidy value.

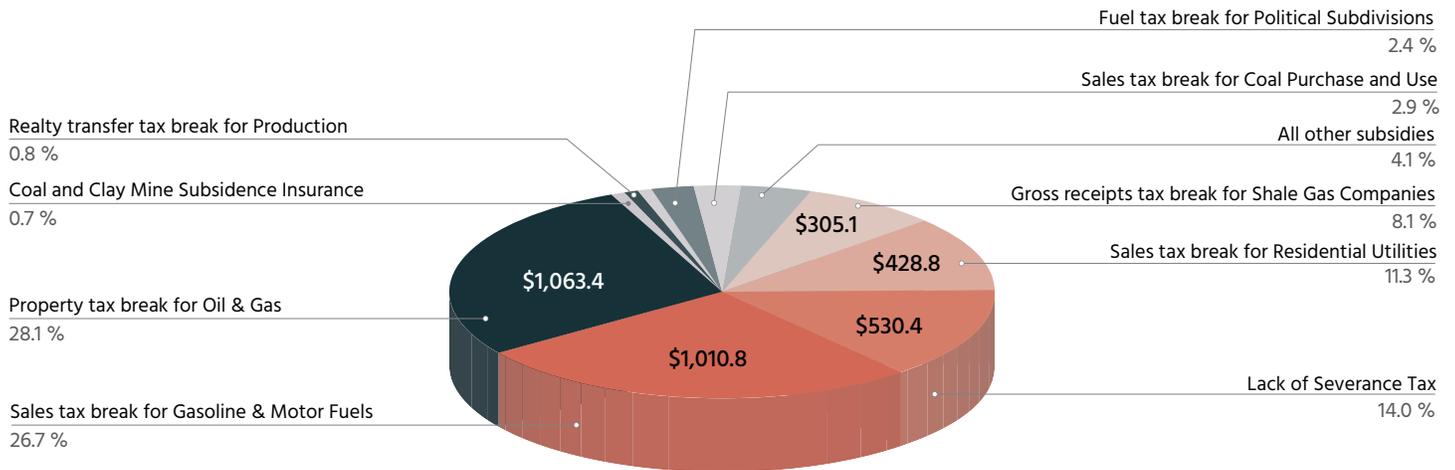
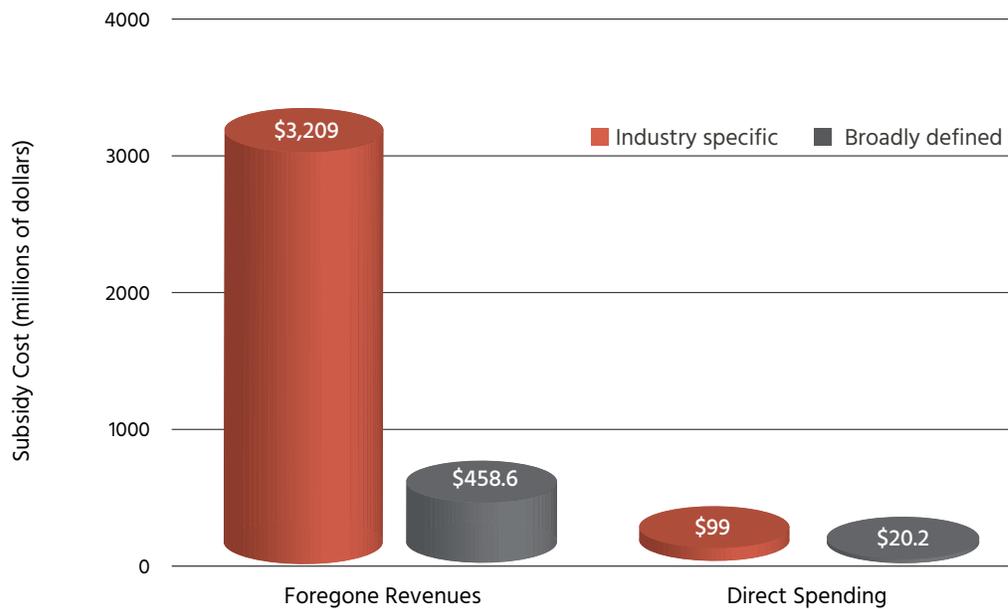


Figure 5. Nearly 97 percent of the subsidies identified were industry specific, meaning the entire value of the subsidy benefitted the fossil fuel industry. The remaining 3 percent of subsidies that applied to a broader range of industries like manufacturing or utilities (including gas, electric, and water) had to be estimated or otherwise deduced.



Further, our analysis of subsidies by fuel type reveals that the shale gas and petrochemical industry benefits the most from Pennsylvania’s fossil fuel subsidies (**Figure 6**). Of the \$3.8 billion total, the shale gas industry captured 52.1 percent, or \$2.0 billion. Another 13.4 percent could not be fully specified but benefitted both the shale gas and coal industries through subsidies for manufacturing, utilities, and environmental remediation. As coal continues to decline, these subsidies will flow even more towards the shale gas industry. The oil industry also captured a sizable share of Pennsylvania’s fossil fuel subsidies. It is worth noting, however, that Pennsylvania is not a major producer of oil. Thus, oil subsidies were primarily targeted at consumers rather than corporations.

In addition to subsidies resulting from foregone revenues and direct spending, Pennsylvania’s unconventional gas industry also caused **at least \$11.1 billion in negative externalities in FY 2019**, or \$867 per resident. Due to the difficulty in accurately calculating externalities and the limited scope of our analysis, this number vastly underestimates the true scale of harm, which will ultimately be realized as damages such as hospital bills for impacted workers and communities and environmental remediation costs paid by future generations.

Another subsidy excluded from the \$3.8 billion estimate demonstrates how negative externalities are later realized as direct spending. Since 1961, Pennsylvania has spent **\$213.2 million on remediation and liability assistance for the legacy coal industry**. Despite this significant taxpayer investment, another \$15 billion in unaddressed abandoned mine reclamation remains. Because these estimates do not fit neatly into our FY 2019 summary, this subsidy and the \$20 million spent on the Natural Gas Vehicle Development Program were excluded from our subsidy total. For a table summarizing all fossil fuel subsidies, see **Figure 7**.

More research is needed to better understand, identify, and calculate the value of Pennsylvania’s fossil fuel subsidies. Our analysis may inaccurately capture subsidy amounts due to inclusion or exclusion of subsidies, the inability to accurately estimate subsidy costs, sometimes resulting in no value, or by treatment of indirect subsidies. Further, our analysis also excludes federal subsidies which, as discussed in the introduction, are on the scale of \$27.4 billion to \$649 billion annually, depending on the methodology used.

Finally, estimates for FY 2019 represent a snapshot in time. From FY 2019 to FY 2021, foregone revenues from fossil fuel subsidies will increase by at least 4.5 percent and continue to grow for the foreseeable future as the Pennsylvania Resource Manufacturing and Local Resource Manufacturing Tax Credits come online.

Figure 6. The shale gas industry benefitted the most from fossil fuel subsidies, capturing \$2.0 billion in FY 2019.

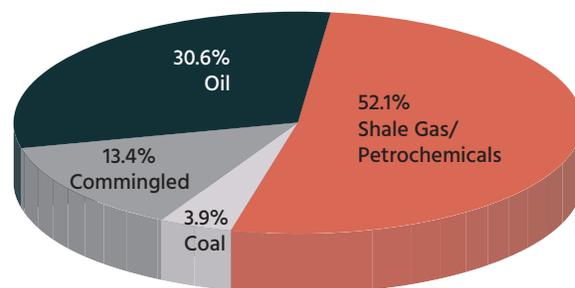


Figure 7. SUMMARY OF ALL FOSSIL FUEL SUBSIDIES

Category	Summary	Estimated Fossil Fuel Subsidy FY 2019
Foregone Revenues		\$3,667.2
Government Underpricing	Underpricing of government-owned resources, goods, and services.	\$530.4
Tax Credits	Provides a dollar-to-dollar reduction in tax payments for credit users.	\$14.3
Gross Receipts Tax Subsidies	Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.	\$322.9
Public Utility Realty Tax Subsidies	Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.	\$2.9
Sales and Use Tax Subsidies	Special exemptions from sales tax. Decreases revenues to the PA General Fund.	\$1,554.7
Personal Income Tax Subsidies	Special exemptions from income tax. Decreases revenues to the PA General Fund.	\$0.1
Realty Transfer Tax Subsidies	Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.	\$30.0
Local Property Tax Subsidies	Special exemption from property taxes collected by and for local governments.	\$1,063.4
Motor License Fund Fuel Tax Subsidies	Special exemptions from multiple use taxes. Decreases revenue to the Motor License Fund for the construction and maintenance of highways.	\$148.5
Direct Spending		\$118.9
Department of Environmental Protection	Addresses legacy impacts from fossil fuel extraction, sometimes using taxpayer money to supplement fees from the fossil fuel industry. Also benefits fossil fuel companies with spending related to climate change mitigation.	\$51.0
Public Utilities Commission	Oversees PA's Alternative Energy Portfolio Standard to reduce greenhouse gas emissions, which includes some fossil fuels in its electricity sourcing requirements.	\$2.6
Department of Community and Economic Development	Engages in marketing to attract fossil fuel companies and supports their activities with grants, loans, and loan guarantees for site acquisition, preparation, and remediation, job creation and workforce development, and business development.	\$25.4
Department of Transportation	Responsible for programs and policies impacting transportation, PennDOT has a rail freight grant program and a CNG fueling station public-private partnership which directly support shale gas.	\$39.9
Department of General Services	In its role to support the operations of all state agencies, DGS implements a 1990 act that requires use of PA coal in any heating systems or units installed in state buildings.	Unknown
Negative Externalities of Shale Gas Development		\$11,084.5
Hydraulic Fracturing	Degradation to the natural environment, water consumption, infrastructure damage from increased truck traffic, and impacts to public health and safety. Due to lack of available information, estimate is incomplete.	\$146.3
Processing & Downstream Use	Air pollution which disproportionately burdens people of color and people living in poverty, as well as other externalities that are felt within and beyond Pennsylvania, including greenhouse gas emissions, plastic collection and sorting costs, and ocean cleanup.	Unknown
Climate Impacts	Total greenhouse gas emissions from all fossil fuel use according to DEP multiplied by the International Monetary Fund's social cost of carbon.	\$10,938.2

Criteria for Recommendations

Fossil fuel subsidies are costing the Commonwealth billions of dollars each year, a fact that is antithetical to public health, environment, and climate imperatives. Yet with upwards of 50 identified subsidies, determining the path forward for each requires us to ask some difficult questions.

1. How much does the subsidy cost?

All subsidies come at a cost, both direct and indirect. The direct costs, or the fiscal impact on the government budget, can be dramatic – the sales and use tax exemption on residential utilities, for instance, costs nearly \$300 million in foregone revenues annually (see Figure 5 above). Yet often unaccounted for indirect expenses can be just as staggering. In the case of the exemption on residential utilities, indirect costs arise from market distortions which incentivize excessive use of utilities and disincentivize energy efficiency remediations.

2. Does the subsidy serve a net public good?

Subsidies are often implemented on the ground that they will meet public objectives like economic development or social equity goals. For some – like the sales and use tax exemption on residential utilities – the intention is clear: in this case, to lower the cost associated with use of an essential service.²⁹⁹ For others, however, the original intention has been lost or is no longer relevant in the current context. One example of this is the sales tax exclusion for coal purchase and use. Under “Purpose,” the 2020 Governor’s Executive Budget reveals that this exclusion “may have been perceived as providing or preserving employment when mining was a major employer within the commonwealth.”³⁰⁰

Once the intent is identified, the next, more complicated step is to determine the subsidy’s success in reaching its desired goal. In the case of residential utilities, the sales tax exemption is clearly successful at lowering costs for an essential service. Where this becomes more difficult to decipher is when a subsidy is implemented to achieve indirect goals. For instance, the Local Resource Manufacturing Tax Credit intends to increase job opportunities by attracting a petrochemical cluster to the state with economic incentives.³⁰¹ Its effectiveness, then, hinges on the influence of the tax credit in firm location decisions – a cause and effect scenario which can be difficult to determine for anyone outside of the decision-making process.

As challenging as these analyses might be, the subsidy’s costs must be continually weighed against its benefits to determine if a subsidy serves a net public good.

3. Is the subsidy efficient?

After determining the success of a subsidy to achieve its intended purpose, the next step is to consider the efficiency of the subsidy against viable alternatives. This is where the cost considerations from question (1) become particularly important. Returning to our residential utilities example, we can see that even this relatively direct subsidy creates unintended costs and, further, is largely inefficient – by design, the bulk of the subsidy flows to the high consumption, luxury use of utilities rather than the low-income users who spend a disproportionate amount of their income on utilities.³⁰² Thus, the question becomes whether there exists a more efficient alternative that comes at fewer costs, direct or otherwise.

4. Does the subsidy impact a vulnerable group?

The first three questions provide key insights as to whether a subsidy ought to be maintained, altered, or eliminated. Yet even if a subsidy – or, alternatively, its elimination – serves a net public good, the impacts are rarely distributed evenly. Fossil fuel production subsidies in particular weigh heaviest upon those bearing the burden of pollution and those most impacted by climate change – often communities of color and low income communities. Similarly, the elimination of fossil fuel subsidies can also cause unintended harms. France’s

Yellow Vests Movement provides a salient example of how a government, keen to take action on climate change, failed to fully account for the low-income residents most impacted by its fuel tax hike.³⁰³

Avoiding these shortfalls requires a robust understanding of those impacted by fiscal policy and, if necessary, mitigation of unintended consequences for vulnerable parties. This is relevant in the case of regressive taxes which weigh disproportionately on low-income residents.³⁰⁴ Because the sales tax exemption on residential utilities is indeed regressive, any elimination or alteration would require a subsequent action to mitigate the impact on low-income households. However, where the subsidies have environmental costs, addressing the regressivity in other ways is usually preferably to leaving the fossil fuel subsidies in place.

These considerations served as a guide as our team determined recommendations for the elimination and prioritization of Pennsylvania's fossil fuel subsidies. More details on the intent, impact, efficiency, and social justice implications of individual subsidies may be found in their respective sections. The below recommendations are the result of this analysis.

Recommendations

The recommendations that follow are not exhaustive. Rather, they offer a place to start on a much larger journey that will only reach its conclusion once fossil fuels and their subsidies are phased out completely. As we learn more, hopefully through the improved transparency and reporting requirements recommended later in this section, these priorities may shift and change.

End Economic Reliance on Fossil Fuels

From coal to shale gas, Pennsylvania has long relied upon fossil fuel extraction as a significant driver of its economy. This has led to some painful ups and downs. As commodities, these resources are vulnerable to a boom and bust cycle. It has also led to significant environmental degradation – certainly in the past when Pittsburgh was considered “hell with the lid off,” but continuing into today as the state is forced to cope with abandoned minelands, unplugged wells, and all the damages and dangers that come with them. Despite these troubles, the coal industry provided Pennsylvanians with a steady and solid source of income over the course of many decades. In some ways, shale gas is now taking coal's place, helping our country meet its energy demands while providing jobs and investment for our state.

Yet the shale gas industry is not the coal industry, and the twenty-first century is not the twentieth. Coal is now in rapid decline, and continued shale gas development poses the existential threat of catastrophic climate impacts. The age of fossil fuel dominance is over, and it is now time to redirect our precious state resources to industries that hold long-term economic promise and, beyond that, do not directly contradict the state's public health, environmental protection, and greenhouse gas reduction goals.

- **Discontinue petrochemical tax credits.** Tax credits like the Pennsylvania Resource Manufacturing (PRM) Tax Credit and Local Manufacturing Tax Credit are meant to attract petrochemical companies to the state, bringing jobs, investment, and increased demand for shale gas.³⁰⁵ Despite this intention, these tax credits are harmful and ineffective and must be discontinued.

Across the U.S., incentives to attract businesses and create jobs have tripled since the 1990s. At the same time, the per-job cost of firm-specific subsidies has skyrocketed, with the average annual cost estimated at about \$12,000.³⁰⁶ Based off recent job estimates, the PRM Tax Credit will cost taxpayers approximately \$57,000 per job per year³⁰⁷ while the Local Manufacturing Tax Credit will cost \$27,000.³⁰⁸ Even by today's distorted standards, these tax credits are incredibly inefficient.

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CAPITAL-LABOR
SUBSTITUTION.

What's worse is that many of these jobs might have existed without state intervention, as research shows that these types of incentives influence firm location decisions in only about 25 percent of cases. Of the jobs that are effectively created by these tax credits, many go to out-of-state workers, rather than to unemployed or under-employed Pennsylvanians who need the jobs the most.³⁰⁹ In fact, the substantial investment required by Pennsylvania's petrochemical tax credits is unlikely to accrue locally at all, with much of it tied up in capital expenditures for materials sourced from beyond the state's borders.³¹⁰ By subsidizing the cost of capital, these tax credits might even result in capital-labor substitution.³¹¹

Beyond being utterly ineffective, these types of tax credits also work to subsidize an industry that not only harms public health, the environment, and climate, but that has little to no long-term economic potential. A global petrochemical oversupply has meant that the value of plastics has rapidly declined, undercutting the profit projections of forthcoming petrochemical plants.³¹² Shell Chemicals Appalachia even admits that the short-term outlook will be challenging, but that the company is banking on long-term demand growth.³¹³ Yet, according to an IEEFA report, the long-term growth necessary to sustain petrochemical investments is unlikely to materialize.³¹⁴ Meanwhile, as Pennsylvania legislates billions of dollars in handouts to petrochemical companies, governments around the world are taxing, banning, or otherwise imposing restrictions on plastic use due to its many costly externalities.³¹⁵

Subsidies like the PRM Tax Credit and Local Manufacturing Tax Credit cost taxpayers billions of dollars, fail to achieve their stated goals, and seriously threaten public health, the environment, and climate stability. The General Assembly should discontinue their use and redirect spending toward proven economic development strategies that have a climate-neutral or climate-positive impact.

- **Transform DCED's approach to community and economic development.** As the fossil fuel industry continues to decline, communities dependent upon fossil fuel jobs will be hit the hardest. We are already seeing this trend in coal-dependent communities. Yet rather than diversifying locally impacted economies and strategically disinvesting from fossil fuels, DCED – with the help of elected officials – acts largely as an instrument of the shale gas and petrochemical industry, handing out inefficient subsidies and investing staff efforts in attracting petrochemical projects with minimal long-term economic potential.

As the past few years have made crystal clear, climate change mitigation and adaptation are not just “environmental” problems, and climate action cannot be siloed across departments. DCED's strategies, leadership, and priorities must be completely transformed to meet the challenges of the present, complementing rather than contradicting the Commonwealth's public health, environmental protection, and climate change mitigation activities to promote long-term community and economic development. This strategic realignment must include the following:

- Institute new climate conscious leadership that understands the necessity of transitioning to a zero-carbon economy, as well as the implications of this transition for impacted workers and communities.
- Break down silos and establish cross-departmental strategic alignment with agencies including DEP and DOH.
- An immediate phase out of any programs or activities specific to the fossil fuel industry, including the Pipeline Investment Program and fossil fuel-specific job training and marketing activities.
- Funding directives to limit and eventually eliminate grants, loans, and loan guarantees awarded to projects that encourage the growth of Pennsylvania's fossil fuel industry. These directives would apply to funding decisions in all DCED's programs, including Business in Our Sites, WEDnetPA, and PA First.

- The creation and implementation of a climate plan that would ensure that all Pennsylvanians are able to thrive in a clean energy future. This plan should aim to diversify local economies, strategically divest from the fossil fuel industry, and transition Pennsylvania’s coal, shale gas, and petrochemical workers into sectors with long-term growth opportunities, including renewable energy and energy efficiency.

Shift the Public Health Burden of Shale Gas Development to the Industry

When regulations are made weak to avoid burdening an industry, that burden does not go away. Decreased quality of life, health problems, injury, and death – this is the price our residents pay when regulators don’t hold fossil fuel companies to account for the external costs they inflict on society. Below is just a sampling of the actions the Commonwealth must take to minimize the public health and safety externalities imposed by shale gas development.

- **Expand the buffer between residents and hydraulic fracturing.** Those nearest to shale gas development face the most severe public health and safety costs resulting from the shale gas industry. The General Assembly should shift these external costs back onto the shale gas industry by expanding setback requirements, effectively distancing its residents from the harmful and unknown impacts of shale gas development.

Currently in Pennsylvania, hydraulic fracturing well pads and compressor stations and processing plants can operate as near as 500 feet and 750 feet, respectively, from the nearest occupied building. In light of emerging public health and safety research, many experts agree that this setback distance is not nearly protective enough. In a 2018 study by the Southwest Environmental Health Project (EHP), 16 of 18 consulted experts concluded that setback distances for hydraulic fracturing facilities ought to be at least 1,320 feet – double the current standard – in order to protect public health.³¹⁶ Similarly, the 2020 Attorney General Report recommends a minimum setback of 2,500 feet from residences and 5,000 feet from sensitive sites like schools and hospitals,³¹⁷ a recommendation which falls in line with a 2017 review of nationwide setback distances.³¹⁸ EHP goes even further. After its 2018 study, EHP ultimately recommends a residential setback of 3,281 feet from well pads and 6,600 feet from compressor complexes and processing plants, as well as a 1.25-mile setback for schools, daycares, hospitals, and nursing homes.³¹⁹

Some jurisdictions have gone further still. Due to the high uncertainty and existing evidence of harmful impacts, bans on hydraulic fracturing have been imposed across the country and world: In Vermont, New York, Maryland, and Washington in the U.S., and in countries including France, Bulgaria, Germany, Ireland, Scotland, Uruguay, Argentina, and Brazil. Many others have issued moratoriums and condemnations, while regional and international groups like the United Nations, the Inter-American Commission on Human Rights, and the Permanent Peoples’ Tribunal remain watchful of hydraulic fracturing impacts and, in some cases, recommend country-level and even global bans.³²⁰

While the approach to public health protections may vary across localities, states, and countries, it is clear from the sheer number of reported health issues that Pennsylvania’s current standard does not go far enough. Short of an outright moratorium or ban, the General Assembly should increase the no-drill zone in line with current research, establishing separate setback requirements for residential and other sensitive properties. Meanwhile, the Department of Health should treat hydraulic fracturing as the public health crisis it is, “unleashing the full force of the public health apparatus.”³²¹

- **Reduce environmental risk.** Even once the buffer between hydraulic fracturing wells and Pennsylvania residents is expanded, shale gas development will continue to impose external costs onto society with its pollution, waste transportation and management, and abandoned wells.

To address these issues, the General Assembly must work with DEP to enact comprehensive environmental regulations that are protective of public health. While the need for additional environmental regulations should be regularly reevaluated, policymakers should initially pursue the following:

- Enact common-sense protections from the 2020 Attorney General’s Report.³²²
- Close the hazardous waste loophole. Despite the recognition that oil and gas waste contained hazardous constituents, the Environmental Protection Agency decided to exempt the industry from rules that govern hazardous wastes. This determination was in no small part due to the concern over the economic impact proper regulation would have caused. Yet, without this regulation, it is Pennsylvania residents who pay the price. The General Assembly must close the hazardous waste loophole, displacing the burden from Pennsylvania residents to the industry at fault.³²³
- Develop a sustainable mechanism for capping wells: Develop a long-term plan to manage orphaned wells. Reduce the present rate of abandonment by increasing the cost and duration of bonding requirements.
- Protect overburdened communities: Bolster DEP’s Office of Environmental Justice with increased funding, capacity, and purview to prevent and mitigate environmental risks in overburdened communities and listen to and address community concerns. Require the Department of Health to treat fracking as the public health crisis it is, as recommended by Pennsylvania’s Attorney General report on fracking.
- **Pass common-sense protections for surface owners.** In Pennsylvania, protection from shale gas extraction is challenging for landowners who do not own the mineral rights beneath their land. The Commonwealth is not exempt from this predicament. Approximately 85 percent of state parks, 15 percent of state forests, and 50 percent of state game lands have so-called severed land rights.³²⁴ Further, even in the case of mineral rights abandonment, Pennsylvania’s Dormant Oil and Gas Act prioritize the historical mineral owner over the current surface owner.³²⁵

Modelled after Ohio’s Dormant Mineral Act, HB 97 of 2013 sought to amend Pennsylvania’s Dormant Oil and Gas Act to facilitate the transfer of abandoned mineral rights to the surface right owner. HB 97 unfortunately failed to pass the legislature.³²⁶ Seven years later, the issue is still unresolved, complicating the management of public land and endangering private landowners with unwanted mineral extraction on their land.

The General Assembly should pass an amendment to Pennsylvania’s Dormant Oil and Gas Act modelled after Ohio’s Dormant Mineral Act. Further, the General Assembly should pass comprehensive surface owners protections modelled after Oklahoma’s Surface Damage Act, which requires mineral owners to negotiate a written contract *before* entering a site with heavy equipment – a basic protection which is not currently granted to Pennsylvania’s landowners.³²⁷ Finally, the General Assembly should ban the use of non-disclosure agreements between impacted residents and extraction companies.

These common-sense protections would go a long way to protect the self-determination of every Pennsylvanian over their property, their health, and their future. These protections would also grant public officials more control over the scope, nature, and location of mineral extraction on state park, forest, and game land.

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- **Uphold existing protections.** An August 2014 report from the Pennsylvania Auditor General found that Department of Environmental Protection was underfunded, understaffed and either inconsistently applied, or failed to apply, departmental policies related to oil and gas.³²⁸ Six years later, Pennsylvania Attorney General Josh Shapiro released another report, this time finding that although government oversight and enforcement had recently shown signs of improvement, it was still sorely lacking. DEP’s 2019 Oil and Gas Annual Report confirms this concern, citing a need to establish a “long-term, stable source of funding” as permit applications – and their associated revenues – continue to decline.³²⁹

Departmental underfunding makes it more difficult to inspect spills and investigate citizen complaints – two failures that DEP was charged with in the 2020 Attorney General Report. The General Assembly should work alongside DEP to establish a long-term, stable source of funding for the Oil and Gas Program.

Reduce Subsidies for Greenhouse Gas Emissions

Over the past decade, Pennsylvania has leaned heavily upon shale gas to reduce greenhouse gas emissions. Meanwhile, greenhouse gas emissions comparable to the coal industry continues to leak from shale gas pipelines in the form of methane, a climate pollutant which poses an even more imminent threat of climate destabilization than carbon dioxide. This non-solution may seem attractive in the short-term but, in the long-term, severely threatens our ability to meet net-zero emissions by 2050 (as specified as absolutely necessary in the Intergovernmental Panel on Climate Change’s Report³³⁰) by locking us into a fossil fuel future.

It comes as no surprise that greenhouse gas emissions are the costliest of the negative externalities we quantified. The severe deterioration of public health, environmental quality, and general well-being is felt most acutely by those nearest fossil fuel development, but the destabilizing impacts of greenhouse gases are felt worldwide and for generations to come. It is difficult to fully capture the extent of this existential crisis, and nearly impossible to do so strictly in monetary terms. Despite the many uncertainties that lie ahead, it is clear that we are reaching the edge of allowable climate emissions, teetering towards the most catastrophic impacts.

Fortunately, we have the solutions in front of us. Clean energy is now technologically viable and highly affordable, and it is time we embrace it by committing to the phasing out of *all* fossil fuels, in part through the elimination of fossil fuel-specific subsidies. To do so, lawmakers must do the following:

- **Remove fossil fuels from among the desired outcomes of all clean or alternative energy programs.**
 - Eliminate the Natural Gas Vehicle Development Program. This funding could instead be used for the Oil and Gas Program which, currently, is severely underfunded.
 - Disqualify fossil fuel and fossil fuel-related infrastructure from receiving assistance under the Alternative Fuels Incentive Act and repurpose funds to expand the EV rebate program, targeting car-dependent rural areas and low- and moderate-income Pennsylvanians with older, more polluting vehicles.
 - Eliminate Tier II of the Alternative Energy Portfolio Standard (AEPS) and strengthen renewable energy goals.
- **Join the Regional Greenhouse Gas Initiative (RGGI).** While the price on carbon as determined by RGGI is not equal to the full social cost of carbon, it is one crucial step to reigning in the negative externalities of greenhouse gas emissions. According to the DEP and as evidenced by experiences from the ten-partner states, joining RGGI will save Pennsylvania billions of dollars,

WHAT IS A SOVEREIGN WEALTH FUND?

A Sovereign Wealth Fund is a government-owned investment fund that can capture a portion of the economic rents from natural resources to create a long-term endowment for the state's residents.

Despite multiple fossil fuel-related development booms, Pennsylvania has still not developed a sovereign wealth fund like other states. Such a fund would convert temporary booms into a permanent and diversified financial buffer for the state.

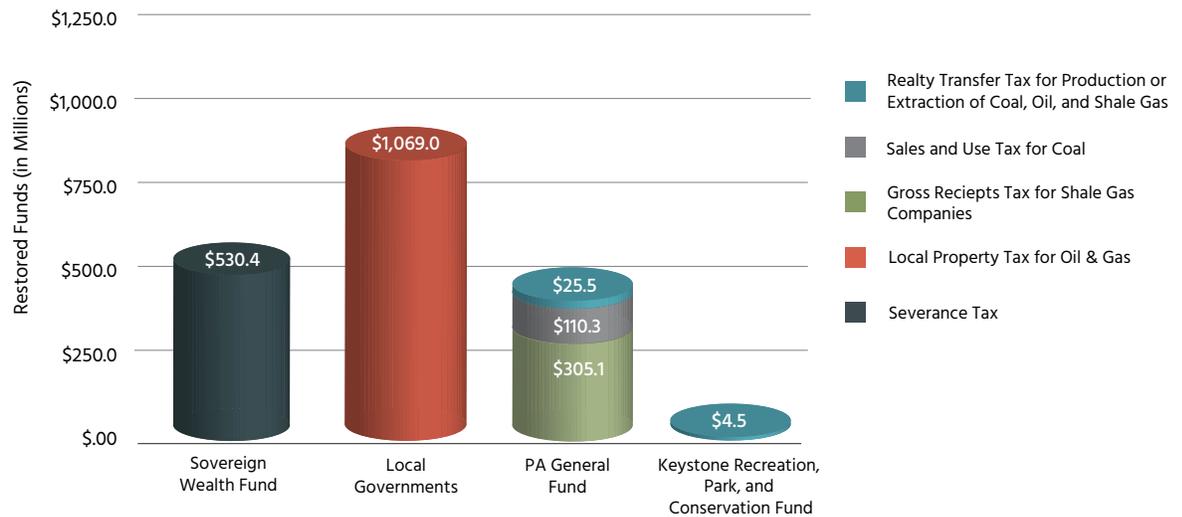
avoid hundreds of premature deaths, and prevent over 45,000 children from developing asthma. Unlike tax credits for petrochemical facilities and other fossil fuel subsidies, RGGI actually furthers our public health, environmental, and climate goals and *increases* revenues for state and local governments, all while creating 27,000 net jobs.³³¹ Revenues from RGGI must further support environmental justice and further foster the clean energy transition.

Restore Foregone Revenues

This broad-based priority realignment – for sustainable economic growth, greenhouse gas emission reductions, and public health and safety – must be followed by concrete action to restore billions of dollars of foregone revenues to the state (see **Figure 7** for summary of potential restored revenues). In so doing, the state government will force fossil fuel companies to operate on a level playing field and increase state capacity to address public needs.

- **Enact a severance tax.** Pennsylvania is the only major oil and gas producing state without a severance tax. The General Assembly should enact a severance tax at a lifetime effective rate of 5.5 percent.³³² This would put the state in line with other major oil and gas producing states by ensuring that shale gas companies are paying the fair price for severance of the Commonwealth's natural resources. To avoid state reliance on unstable revenues from fossil fuels, revenues from the severance tax should go towards establishing and supporting a sovereign wealth fund.³³³
- **Eliminate the most harmful tax subsidies (Figure 8).** Priority for elimination include the largest, most direct tax subsidies that are ineffective or inefficient at reaching their intended goals, resulting in a net public loss.
 - Local property tax subsidy for Oil & Gas. The General Assembly should pass legislation that restores the ability of local governments to assess property taxes on oil and gas reserves and designates pipelines as permanent – and thus taxable – property. This would increase local annual revenues by about \$1 billion and end an exemption otherwise reserved for non-commercial enterprises like hospitals and churches.
 - Gross receipts tax subsidy for Shale Gas Distribution Companies. The General Assembly should repeal provisions of Act 4 of 1999 that exempt shale gas distribution companies from the gross receipts tax.³³⁴ This would increase annual revenue to the PA General Fund by about \$305 million.
 - Sales & use tax subsidy for Coal Purchase and Use. The General Assembly should amend 61 P.S. § 31.3 to remove the outdated sales and use tax exclusion for coal, originally intended for “the encouragement of coal consumption.” This would end the encouragement of an economically and environmentally unsustainable industry while increasing annual revenue to the PA General Fund by over \$100 million.
 - Realty transfer tax subsidy for Production or Extraction of Coal, Oil, Natural Gas, or Minerals. The General Assembly should revoke provisions allowing for the realty transfer tax exclusion for the production or extraction of coal, oil, shale gas, and minerals. Pennsylvania does not currently track the scale of this subsidy. By our rough estimations, however, the elimination of this subsidy would increase annual revenue to the PA General Fund, the Keystone Recreation, Park and Conservation Fund, and local jurisdictions like school districts and municipalities by about \$30 million.³³⁵

Figure 8. Restoring the foregone revenues as recommended in this section would result in a \$2.0 billion budget increase, including \$1.1 billion in additional funding to local governments and \$440.9 million to the General Fund.



Track and Reduce Fossil Fuel Subsidies

The responsibility for identifying and rooting out fossil fuel subsidies ultimately falls upon Pennsylvania’s lawmakers. Here, we dig through tax documents, legislative history, and news articles to seek out and identify subsidies. Even with limited information, we identified over 50 ways that our state and local governments subsidize fossil fuels with at least \$3.8 billion dollars in taxpayer dollars. Yet large gaps in public information means that much of our analysis was insufficient. There are likely many more subsidies that we missed, and still more for which we were unable to identify the costs. These include the following:

- At least four significant industry specific subsidies are not tracked by government tax documents at all, including the gross receipts tax subsidy for shale gas distribution companies; the sales and use tax subsidy for tangible personal property or services in mining operations; the realty transfer tax subsidy for production or extraction of coal, oil, shale gas, or minerals; and the local property tax exemption for oil and gas.
- Many broadly defined subsidies did not disclose the necessary details to accurately ascertain fossil fuel subsidy values. This was especially true in the case of subsidies meant for community and economic development. Relevant subsidies include the Keystone Opportunity Zone Tax Credit, the Manufacturing Tax Credit, and nearly every one of the Department of Community and Economic Development’s (DCED) programs, including Building PA, WEDnetPA, PA First, and the Ben Franklin Technology Development Authority. While DCED’s website makes it clear that shale gas and plastics are central to their theory of economic development, the scale of their investment in these industries is largely undisclosed.
- In the case of most direct spending, the source of funding for individual programs was often obscured. This was true for both Department of Environmental Protection (DEP) and DCED programs. Without knowing the source of funding, it is often impossible to determine whether a program is a taxpayer-funded subsidy or an appropriate use of fees from the fossil fuel industry (i.e. a program that holds fossil fuel companies accountable for the damages they cause, such as a DEP well-plugging program funded with fees from the shale gas industry).

If we truly wish to address the climate crisis, we must first understand what is preventing us from taking action. These subsidies – which are buried out of sight, difficult to disentangle, and largely ignored – are a significant roadblock to our transition away from fossil fuels. To remove these roadblocks, lawmakers must shine a light on fossil fuel subsidies with the following actions:

- **Set targets and track.** Each year, Pennsylvania reports a cost summary of its various tax subsidies, which serves as an important tool in transparency for the public and as a significant starting place for policymakers to regularly reevaluate each program. Yet there is minimal reporting on the purpose, progress, and success of many of the state’s tax subsidies or other subsidy types, meaning that any evaluation is shallow at best. Further, there are several tax exemptions that are not included in the budget documents at all and no comprehensive source of information that identifies fossil fuel or overall energy subsidies and associated values.

These gaps are an impediment to climate action. The Governor’s Budget Office must track fossil fuel subsidies and set targets for their removal, using “Criteria for Recommendations” as a guide.

Consistent reporting. While programs like the Natural Gas Vehicle Development Program and the Alternative Fuel Incentive Act abide by strict reporting requirements, many other subsidies cost taxpayers millions of dollars with little to no public accountability. To properly evaluate the success of Pennsylvania’s various fossil fuel subsidies, we must first understand who they serve, at what cost, and to what end. None of this information is currently available for much of DCED’s programs. The General Assembly must require annual reports on the purpose, progress, cost, and success of DCED’s tax credit, grant, and loan programs. This will ensure that the Department can more effectively and efficiently expand economic development opportunities, while also providing necessary information that can guide decisions about fossil fuel subsidy elimination.



Conclusion



Fossil fuel subsidies distort Pennsylvania's economy in favor of an industry which degrades the environment, threatens public health, and destabilizes the climate, all while robbing our state and local governments of resources to pursue core functions including, ironically, the regulation of fossil fuel companies. Despite international calls to eliminate fossil fuel subsidies, Pennsylvania has doubled down with the recent passage of the Local Resource Manufacturing tax credit. Even before this subsidy was enacted, foregone revenues favoring the fossil fuel industry were already budgeted to increase substantially over the next several years. Coupled with significant direct spending and negative externalities, the scale and trajectory of fossil fuel impacts on Pennsylvania are absolutely staggering.

It is up to Pennsylvania's elected officials to end the centuries of harm caused by a poorly structured fossil fuel fiscal system by asking the following questions:

1. Do the fees and taxes on the fossil fuel industry cover all the costs that the industry forces the state to incur? Costs are both direct, like government employee time spent monitoring the industry, and indirect, like health and environmental externalities.
2. Do the taxes on the fossil fuel industry at least equal the tax rate on other goods and services? In other words, is the industry contributing equitably to the state treasury?
3. For the sale of a finite, non-renewable endowment, is the state charging market-level royalties and extraction taxes? These funds should be used in large part to accrue a permanent sovereign wealth fund for the benefit of the state's citizens and the diversification of future revenue flows away from the narrow natural resource base. If such a fund does exist, how does the amount collected (overall, per year, per unit extracted) compare to what other states or countries have done?

In investigating these critical questions, we identified \$3.8 billion worth of fossil fuel subsidies and \$11.1 billion worth of negative externalities from the fossil fuel industry. It is our belief that, with the Commonwealth's resources and access to internal documents, many more fossil fuel subsidies could be identified and, ultimately, rooted out. This report offers an important step toward that goal, an opportunity to restore \$2.0 billion in funding to state and local budgets, evaluate and improve economic development and climate action strategies, and equip Pennsylvania for a healthy and stable climate future.

Pennsylvania residents overwhelmingly support climate action, and the elimination of fossil fuel subsidies is one of the most simple, impactful solutions. It is time for elected officials to heed the concerns of their constituents over the duplicity of the fossil fuel industry and prepare Pennsylvania for a future free from the grips of oil, coal, and shale gas interests.



APPENDIX 1

Expanded Summary: Foregone Revenues

Foregone Revenues	Estimated Fossil Fuel Subsidy FY 2019 (in millions)	Projected Fossil Fuel Subsidy FY 2021 (in millions)	Subsidized Fuel Type	Subsidy Scope	Summary
Government underpricing	\$530.4	\$530.4			Underpricing of government-owned resources, goods, and services.
Severance of Natural Resources	\$530.4	\$530.4	Shale gas/ Petrochemicals	Specific	Failure to levy a tax on the loss or "severance" of the state's natural resources. Considered common practice in other oil & gas producing states.
Public Land Leases	Unknown	Unknown	Shale gas/ Petrochemicals	Specific	Failure to charge fair market value for public land leases & royalties.
Tax Credits	\$14.3	\$43.2			Provides a dollar-to-dollar reduction in tax payments for credit users.
Pennsylvania Resource Manufacturing (PRM)	\$0.0	\$17.1	Shale gas/ Petrochemicals	Specific	In exchange for job creation and capital investment, Shell Chemicals is eligible for up to \$1.65 billion in tax credits over a 25-year period. This is the biggest tax subsidy in PA's history, uplifting the fracked gas and plastics industry even as renewables replace fracked gas in electricity generation.
Local Resource Manufacturing	\$0.0	\$0.0	Shale gas/ Petrochemicals	Specific	Modelled after the PRM Tax Credit to attract investment from the petrochemical and fertilizer industries, this credit is worth \$667.5 million over a 25-year period.
Keystone Opportunity Zone (KOZ)	\$4.3	\$4.5	Mixed Shale gas/ Coal	Broad	Intended to encourage redevelopment of deteriorated properties. A relatively small portion of this \$82 million tax subsidy benefits fossil fuel companies, including Shell Chemicals.
Coal Refuse Energy and Reclamation	\$10.0	\$20.0	Coal	Specific	Intended to keep the coal refuse plant industry alive, maintain local jobs, and reclaim mined lands. The annual program cap was recently doubled to \$20 million.
Manufacturing	\$0.0	\$1.6	Mixed Shale gas/ Coal	Broad	Intended to increase manufacturing jobs.
Gross Receipts Tax Subsidies	\$322.9	\$323.4			Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.
Municipally Owned Public Utilities	\$4.5	\$4.3	Mixed Shale gas/ Coal	Broad	Applies to municipally owned or operated public utilities from business done inside the limits of the municipality. Disadvantages energy efficiency.
Electric Cooperatives	\$13.3	\$14.0	Mixed Shale gas/ Coal	Broad	Disadvantages energy efficiency.
Shale Gas Companies	\$305.1	\$305.1	Shale gas/ Petrochemicals	Industry Specific	Act 4 of 1999 created an exemption for all natural gas company and utility sales.
Public Utility Realty Tax Subsidies	\$2.9	\$2.9			Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.
Utility Easements	\$0.8	\$0.8	Mixed Shale gas/ Coal	Broad	Real estate tax subsidy for utility easements
Railroad Rights-of-Way	\$1.7	\$1.7	Mixed Shale gas/ Coal	Broad	Rail has experienced a level of demand not seen since the beginning of the coal resource extraction industry due to fracking. A single well pad requires up to 40 rail carloads of equipment for drilling including sand, pipes, and chemicals.
Municipal Utilities	\$0.4	\$0.4	Mixed Shale gas/ Coal	Broad	Real estate tax subsidy for municipal utilities
Sales and Use Tax Subsidies	\$1,554.7	\$1,692.1			Special exemptions from sales tax. Decreases revenues to the PA General Fund.
Coal Purchase and Use	\$110.3	\$117.1	Coal	Specific	Intended to encourage coal consumption.
Residential Utilities	\$428.8	\$628.4	Mixed Shale gas/ Coal	Broad	Third largest subsidy identified in this report.
Gasoline and Motor Fuels	\$1,010.8	\$941.4	Oil	Specific	Second largest subsidy identified in this report.

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APPENDIX 1

Expanded Summary: Foregone Revenues *(continued)*

Foregone Revenues	Estimated Fossil Fuel Subsidy FY 2019 (in millions)	Projected Fossil Fuel Subsidy FY 2021 (in millions)	Subsidized Fuel Type	Subsidy Scope	Summary
Commercial Vessel Fuel Purchase	\$0.7	\$0.8	Oil	Broad	Applies to the purchase or use of fuel, supplies, equipment, ships or sea stores, and cleaning or maintenance supplies.
Mining	Unknown	Unknown	Shale gas/ Petrochemicals	Specific	Applies to tangible property directly involved in mining. Mining includes exploring, extracting, blasting, transporting during the mining process, and drilling. For shale gas, it also includes cementing, fracturing, and acidizing.
Rail Transportation Equipment	\$4.1	\$4.4	Shale gas/ Petrochemicals	Broad	Applies to the purchase or use of rail transportation equipment by a business in the movement of its own personal property.
Personal Income Tax Subsidies	\$0.1	\$0.1			Special exemptions from income tax. Decreases revenues to the PA General Fund.
Intangible Drilling Costs	\$0.1	\$0.1	Shale gas/ Petrochemicals	Specific	Intangible drilling costs - comprising about 65 to 80 percent of the total cost of drilling a well - can be recovered over 10 years.
Realty Transfer Tax Subsidies	\$30.0	\$30.0			Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.
Production or Extraction of Coal, Oil, Natural Gas, or Minerals	\$30.0	\$30.0	Mixed Shale gas/ Coal	Specific	Leases for the production or extraction of coal, oil, natural gas, and minerals are excluded from the realty transfer tax.
Local Property Tax Subsidies	\$1,063.4	\$1,063.4			Special exemption from property taxes collected by and for local governments
Oil and Gas	\$1,063.4	\$1,063.4	Shale gas/ Petrochemicals	Specific	Largest subsidy identified in this report. Oil and gas are the only purely commercial enterprises exempted.
Motor License Fund Fuel Tax Subsidies	\$148.5	\$148.0			Special exemptions from taxes that fund the construction and maintenance of highways.
Political Subdivision Exemption	\$92.4	\$92.4	Oil	Specific	Intended an indirect means of assistance for local governments.
Emergency Vehicles	\$32.2	\$32.1	Oil	Specific	Intended as an indirect means of assistance for emergency services.
Nonprofit, Nonpublic Schools	\$0.3	\$0.3	Oil	Specific	Intended as an indirect means of assistance for schools.
Electric Cooperatives	\$0.3	\$0.2	Oil	Specific	Intended as an indirect means of assistance for electric cooperatives and their customers.
Distributor Discount	\$5.4	\$5.3	Oil	Specific	Fuel distributors are permitted a discount on gross tax due.
Buses	\$0.5	\$0.5	Oil	Specific	Bus companies are eligible for partial refund.
School Buses	\$14.7	\$14.6	Oil	Specific	School bus companies are eligible for partial refund.
Charitable and Religious Organizations	\$2.7	\$2.6	Oil	Specific	Intended as an indirect means of assistance for charitable and religious organizations.
Grand Totals	\$3,667.2	\$3,833.5			
Specific	3,208.6	\$3,172.6			Subsidy is specific to the fossil fuel industry
Broad	\$458.6	\$660.9			Subsidy targets a broader set of industries and passively includes fossil fuels

APPENDIX 2

Expanded Summary: Direct Spending

Program	Estimated Fossil Fuel Subsidy FY 2019 (in millions)	Subsidized Fuel Type	Subsidy Scope	Summary
Department of Environmental Protection				
Coal and Clay Mine Subsidence Insurance	\$51.0			
Coal and Clay Mine Subsidence Insurance	\$26.7	Coal	Specific	Subsidy is total cost paid by homeowners for insurance coverage and damage from mine collapse.
Operation Scarlift	\$0.0	Coal	Specific	Abandoned mine reclamation program that cost \$200 million public debt, now paid in full.
Transition to the Conventional Bonding System	\$0.0	Coal	Specific	\$13 million in subsidies over lifetime to help coal companies transition to the Conventional Bonding System. Highlights the need for the precautionary principle.
Anthracite Emergency Bond Fund	\$0.0	Coal	Specific	This program makes insolvent or otherwise financially insecure mining operators eligible for reclamation bonding and has also been financed by \$150,000 in taxpayer funds.
Growing Greener Grants	\$20.0	Mixed Shale gas/ Coal	Specific	DEP Grants for watershed restoration and protection, abandoned mine reclamation, and abandoned oil and gas well plugging. Act 20 of 2019 decreased the contribution from the Marcellus Legacy Fund, offsetting this revenue with an annually authorized transfer from personal income tax revenues.
Natural Gas Vehicle Development Program	\$0.0	Shale gas/ Petrochemicals	Specific	\$20 million of grants were awarded from 2013-2016
Alternative Fuels Incentive Act	\$4.3	Shale gas/ Petrochemicals	Broad	Of the \$5-6 million annually appropriated from the utility gross receipts tax revenue to promote alternative fuels, about \$4.3 million funded fossil fuel-related vehicles and infrastructure projects.
Public Utilities Commission				
Tier II of the Alternative Energy Portfolio Standard	\$2.6	Mixed Shale gas/ Coal	Broad	Requires electric distribution companies and generation suppliers to supply a percentage of electricity sold by renewable (Tier I) and alternative (Tier II) resources. While Tier I mirrors renewable portfolio standards in many other states, Tier II mandates that 10 percent of electricity sold by 2021 come from sources including fossil fuels.
Department of Community and Economic Development				
Marketing	\$0.2	Shale gas/ Petrochemicals	Broad	Spending on promotional materials to attract businesses. We estimate 10% as a fossil fuel subsidy.
Building Pennsylvania	Unknown	Shale gas/ Petrochemicals	Broad	Loan program that provides financing for high-impact real estate projects.
Business in Our Sites	Unknown	Shale gas/ Petrochemicals	Broad	Grant and loan program to prepare previously utilized or undeveloped sites for future use.
Industrial Sites Reuse	Unknown	Shale gas/ Petrochemicals	Broad	Low-interest loans and grants for environmental assessments and remediation that brings blighted land into productive reuse.
Infrastructure and Facilities Improvement	\$1.6	Shale gas/ Petrochemicals	Broad	Debt service for debt incurred to pay the costs of specific infrastructure and facilities improvement projects that enhance economic development.
WEDnetPA	Unknown	Shale gas/ Petrochemicals	Broad	Job training funds through a network of educational institutions
EDA Power Grant	\$0.0	Shale gas/ Petrochemicals	Broad	Support for coal mining communities affected by job losses. Sometimes subsidizes the shale gas and petrochemical industries. Funding from federal source.

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APPENDIX 2

Expanded Summary: Direct Spending *(continued)*

Program	Estimated Fossil Fuel Subsidy FY 2019 (in millions)	Subsidized Fuel Type	Subsidy Scope	Summary
Manufacturing PA	\$4.8	Shale gas/ Petrochemicals	Broad	Multi-pronged program to support the manufacturing community. Includes workforce development grant, seven technical assistance centers, and grant funds to support science and engineering at Carnegie Mellon University.
PA First	\$1.5	Shale gas/ Petrochemicals	Broad	Grants, loans, and loan guarantees to eligible businesses to facilitate increased investment and job creation.
PA Industrial Development Authority	\$0.2	Shale gas/ Petrochemicals	Broad	Low interest loans to companies expanding industrial capacity through land and building acquisition, construction and renovation, and industrial park development.
Alternative Clean Energy	\$2.9	Shale gas/ Petrochemicals	Broad	Grants, loans, and loan guarantees for the utilization, development, and construction of alternative and clean energy projects including waste coal, ethanol, compressed natural gas, and liquified natural gas, among others.
Ben Franklin Technology Development Authority	\$1.5	Shale gas/ Petrochemicals	Broad	Multi-pronged program. Supports technologies for companies, entrepreneurs, and innovators to proactively respond to changing markets in key industries.
Global Access Program	\$0.6	Shale gas/ Petrochemicals	Broad	Grants to small and mid-sized companies for export promotion activities.
Pipeline Investment Program	\$12.1	Shale gas/ Petrochemicals	Specific	Grant funding to construct the last few miles of shale gas distribution lines to business parks and existing industrial and manufacturing enterprises.
Department of Transportation	\$39.9			
Rail Freight Assistance Grant Programs	\$22.4	Shale gas/ Petrochemicals	Specific	Intended to stimulate the state's rail freight network, in part to serve the energy, plastics, and chemical sectors.
P3 CNG Fueling Stations	\$17.5	Shale gas/ Petrochemicals	Specific	Partnership with Trillium CNG to build and operate 29 compressed natural gas fueling stations.
Department of General Services	\$0.0			
Coal Use in Government Buildings	Unknown	Coal	Specific	With few exceptions, heating systems in state-owned facilities must be fueled by PA coal.
Grand Totals	\$118.9			
Specific	\$98.7			Subsidy is specific to the fossil fuel industry
Broad	\$20.2			Subsidy targets a broader set of industries and passively includes fossil fuels

APPENDIX 3

Expanded Summary: Negative Externalities

Negative Externalities: Unconventional Gas	Estimated Cost FY 2019 (in millions)	Summary
Hydraulic Fracturing	\$146.3	
Degradation of the Natural Environment	\$7.3	Intensive use and degradation of land and water
Water Consumption	Unknown	Permanent loss of natural resource averaging about 12 million gallons per fracked well
Infrastructure Damage	\$4.2	Damage to road and bridges, as well as increased air pollution, car accidents, dust, and noise
Creation of Boomtowns	Unknown	Negative community impacts including temporary influx of transient works, increases in crime, and increases in housing instability, among others
Groundwater Degradation	\$22.0	Damage to groundwater results in water availability issues and treatment costs, adverse health impacts, and reduced property value. Estimate includes avoidance behaviors only.
Air Pollution	Unknown	Air pollution emissions from compressor stations, well pads, and pigging stations
Pipeline Leaks & Ruptures	Unknown	Incidents occur on average every 19 days in Pennsylvania, posing risks of fatality, injury, property damage, and ecosystem impacts.
Improper Disposal of Fracking Waste	Unknown	Improper treatment of radioactive and hazardous waste, exemption from full disclosure of chemicals, and leaks and spills
Insufficient Bonding Requirements	Unknown	Transfer of remediation liabilities and elevated risk of bond forfeiture
Impacts on Health	\$112.8	Total health impacts associated with hydraulic fracturing (including from groundwater contamination, air pollution, and improper disposal listed above) relating to low birth weights, asthma & respiratory afflictions, sleep disruption, and depression
Processing and Downstream Use	\$0.0	
Impacts of Petrochemical Manufacturing	Unknown	Air pollution, health, and safety risks which disproportionately burden people of color and people living in poverty, as well as other externalities that are felt within and beyond Pennsylvania, including greenhouse gas emissions, plastic collection and sorting costs, and ocean cleanup.
Climate Impacts	\$10,938.0	
Greenhouse Gas Emissions	\$10,938.0	Disrupts climate stability
Grand Total	\$11,084.5	

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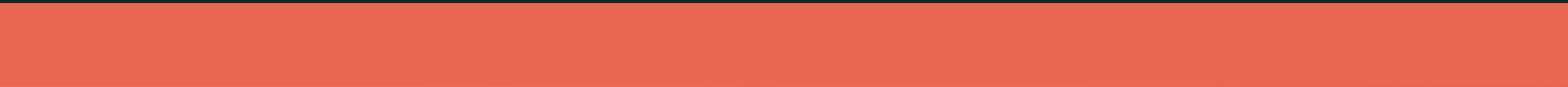
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BURIED OUT OF SIGHT

Uncovering Pennsylvania's Hidden Fossil Fuel Subsidies

THE HIGHLIGHTS



\$3.8 billion in fossil fuel subsidies in FY 2019



\$11.1 billion in external costs from unconventional gas development

UNDERSTANDING SUBSIDIES

- What? A privileged type of financial aid - it lessens a burden that was previously levied against the receiver or promotes a particular action by providing financial support
- How? Usually in the form of a tax reduction or a cash payment.
- Why? Economists in favor of subsidies often argue that subsidies are justifiable to provide the socially optimal level of goods and services which will lead to economic efficiency.

WHY TRACK FOSSIL FUEL SUBSIDIES?

Had nations reduced subsidies in a way to create efficient fossil fuel pricing in 2015, the International Monetary Fund believes that it would have lowered global carbon emissions by 28 percent and fossil fuel air pollution deaths by 46 percent, and increased government revenue by 3.8 percent of GDP.

- Tie up limited taxpayer dollars which could otherwise be used for education, infrastructure improvements, and environmental remediation
- The new Administration recently joined several international institutions (the G20, the International Energy Agency, OECD, EU, IMF) to call for the phase-out of fossil fuel subsidies

TYPES OF SUBSIDIES

Government revenue foregone

- Tax expenditure
- Under-pricing of government-owned energy resources, other natural resources, land, infrastructure, or other goods and services

Direct transfer of government funds

- Agency appropriations: Targeted spending on the sector through government budgets and budgets of individual government agencies
- Subsidies to intermediate inputs
- Wage subsidies to assist individuals in preparing for and maintaining employment (e.g. training)
- Government loans provided below-market rates, with low collateral requirements, lengthy repayment periods, or deferred repayments
- Government spending on research and development
- Government use of tax-free bonds to fund private investments

Induced transfers (price support)

- Consumption mandates
- Regulated prices set at below-market rates for consumers or above-market rates from producers
- Relief from costs enterprises normally bear in the normal course of business (labor, environmental, health, safety)
- Exemption from government procedures normally followed by enterprises

Transfer of Risk

- Credit support: Guarantees of loans, security, or credit
- Debt restructuring or cancellations
- Insurance and indemnification: market or below-market risk management or risk shifting services
- Assumption of occupational health and accident liabilities
- Assumption of liabilities for closure and post-closure risks, waste management and environmental damages

FOREGONE REVENUES

Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Government underpricing	Underpricing of government-owned resources, goods, and services.	\$530.4
Tax Credits	Provides a dollar-to-dollar reduction in tax payments for credit users.	\$14.3
Gross Receipts Tax Subsidies	Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.	\$322.9
Public Utility Realty Tax Subsidies	Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.	\$2.9
Sales and Use Tax Subsidies	Special exemptions from sales tax. Decreases revenues to the PA General Fund.	\$1,554.7
Personal Income Tax Subsidies	Special exemptions from income tax. Decreases revenues to the PA General Fund.	\$0.1
Realty Transfer Tax Subsidies	Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.	\$30.0
Local Property Tax Subsidies	Special exemption from property taxes collected by and for local governments	\$1,063.4
Motor License Fund Fuel Tax Subsidies	Special exemptions from multiple use taxes. Decreases revenue to the Motor License Fund for the construction and maintenance of highways.	\$148.5
Total		\$3,667.2

	Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Severance Tax	Government underpricing	Underpricing of government-owned resources, goods, and services.	\$530.4
PA Resource Manufacturing Tax Credit: \$65 million	Tax Credits	Provides a dollar-to-dollar reduction in tax payments for credit users.	\$14.3
Local Resource Manufacturing Tax Credit: \$26.7 million	Gross Receipts Tax Subsidies	Special exemptions from corporate sales tax. Decreases revenues to the PA General Fund.	\$322.9
Gasoline and Motor Fuels Sales Tax Exemption: \$1 billion	Public Utility Realty Tax Subsidies	Special exemptions from property tax of public utilities. Decreases revenues distributed to local governments.	\$2.9
	Sales and Use Tax Subsidies	Special exemptions from sales tax. Decreases revenues to the PA General Fund.	\$1,554.7
	Personal Income Tax Subsidies	Special exemptions from income tax. Decreases revenues to the PA General Fund.	\$0.1
	Realty Transfer Tax Subsidies	Special exemptions from a tax on real-estate transactions. Decreases revenues to the PA General Fund.	\$30.0
Oil and Gas Property Tax Exemption	Local Property Tax Subsidies	Special exemption from property taxes collected by and for local governments	\$1,063.4
	Motor License Fund Fuel Tax Subsidies	Special exemptions from multiple use taxes. Decreases revenue to the Motor License Fund for the construction and maintenance of highways.	\$148.5
	Total		\$3,667.2

DIRECT SPENDING

Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Department of Environmental Protection	Addresses legacy impacts from fossil fuel extraction, sometimes using taxpayer money to supplement fees from the fossil fuel industry; also benefits fossil fuel companies with spending related to climate change mitigation.	\$51.0
Public Utilities Commission	Oversees PA's Alternative Energy Portfolio Standard to reduce greenhouse gas emissions, yet includes some fossil fuels in its electricity sourcing requirements	\$2.6
Department of Community and Economic Development	Marketing to attract fossil fuel companies and supports their activities with grants, loans, and loan guarantees for site acquisition, preparation, and remediation, job creation and workforce development, and business development	\$25.4
Department of Transportation	Responsible for programs and policies impacting transportation, PennDOT has a rail freight grant program and a CNG fueling station public-private partnership which directly support shale gas	\$39.9
Department of General Services	In its role to support the operations of all state agencies, DGS implements a 1990 act that requires use of PA coal in any heating systems or units installed in state buildings	Unknown
Total		\$118.9

	Category	Summary	Total Fossil Fuel Subsidy Estimate FY 2019 (in millions)
Environmental Remediation	Department of Environmental Protection	Addresses legacy impacts from fossil fuel extraction, sometimes using taxpayer money to supplement fees from the fossil fuel industry; also benefits fossil fuel companies with spending related to climate change mitigation.	\$51.0
Alternative Fuels Incentive Act: \$4.3 million	Public Utilities Commission	Oversees PA's Alternative Energy Portfolio Standard to reduce greenhouse gas emissions, yet includes some fossil fuels in its electricity sourcing requirements	\$2.6
Tier II of the Alternative Energy Portfolio Standard	Department of Community and Economic Development	Marketing to attract fossil fuel companies and supports their activities with grants, loans, and loan guarantees for site acquisition, preparation, and remediation, job creation and workforce development, and business development	\$25.4
Mostly Estimates due to lack of transparency	Department of Transportation	Responsible for programs and policies impacting transportation, PennDOT has a rail freight grant program and a CNG fueling station public-private partnership which directly support shale gas	\$39.9
Rail Freight Assistance Grant Programs	Department of General Services	In its role to support the operations of all state agencies, DGS implements a 1990 act that requires use of PA coal in any heating systems or units installed in state buildings	Unknown
CNG Fueling Stations Public-Private Partnership	Total		\$118.9

FOREGONE
REVENUES

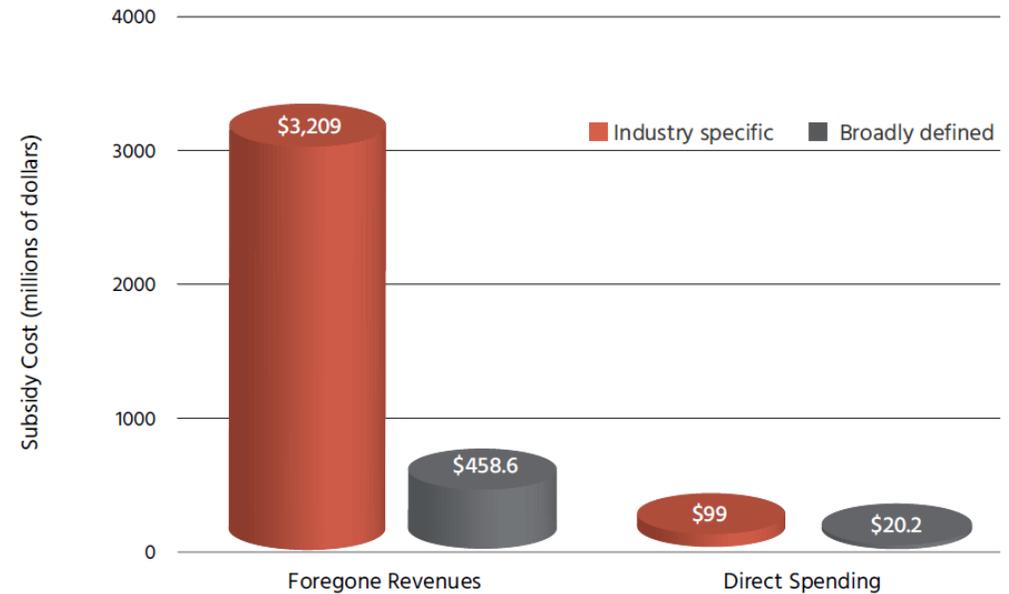
DIRECT
+ SPENDING

= \$3.8 BILLION

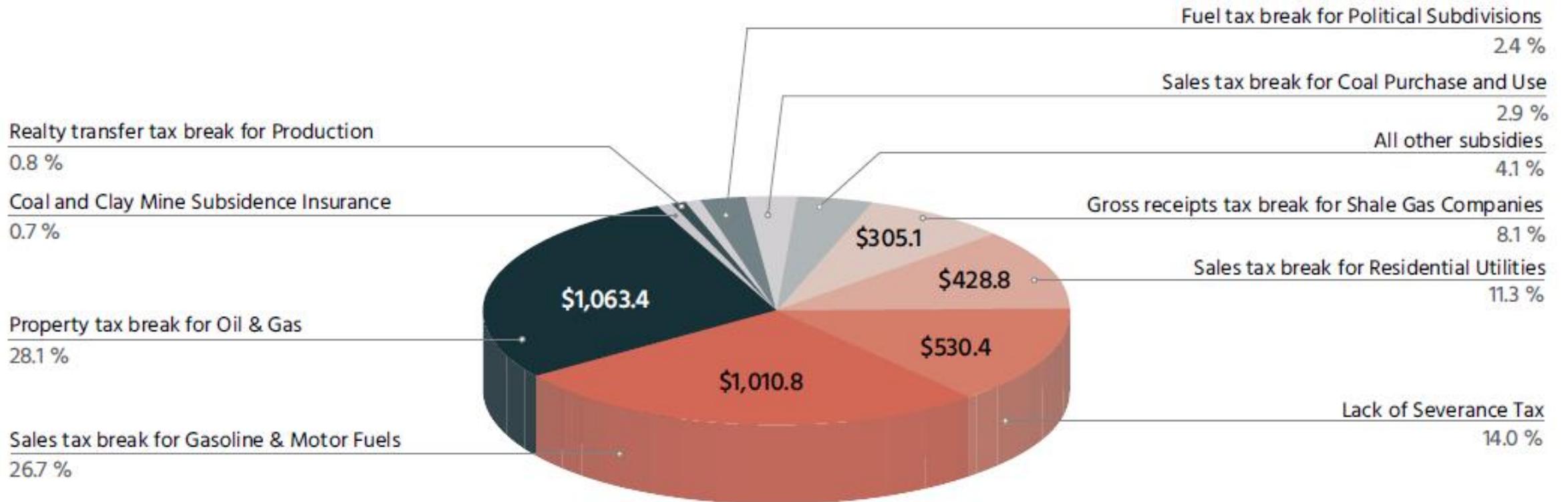
TOTAL
FY 2019
FOSSIL
FUEL
SUBSIDY

ANALYSIS

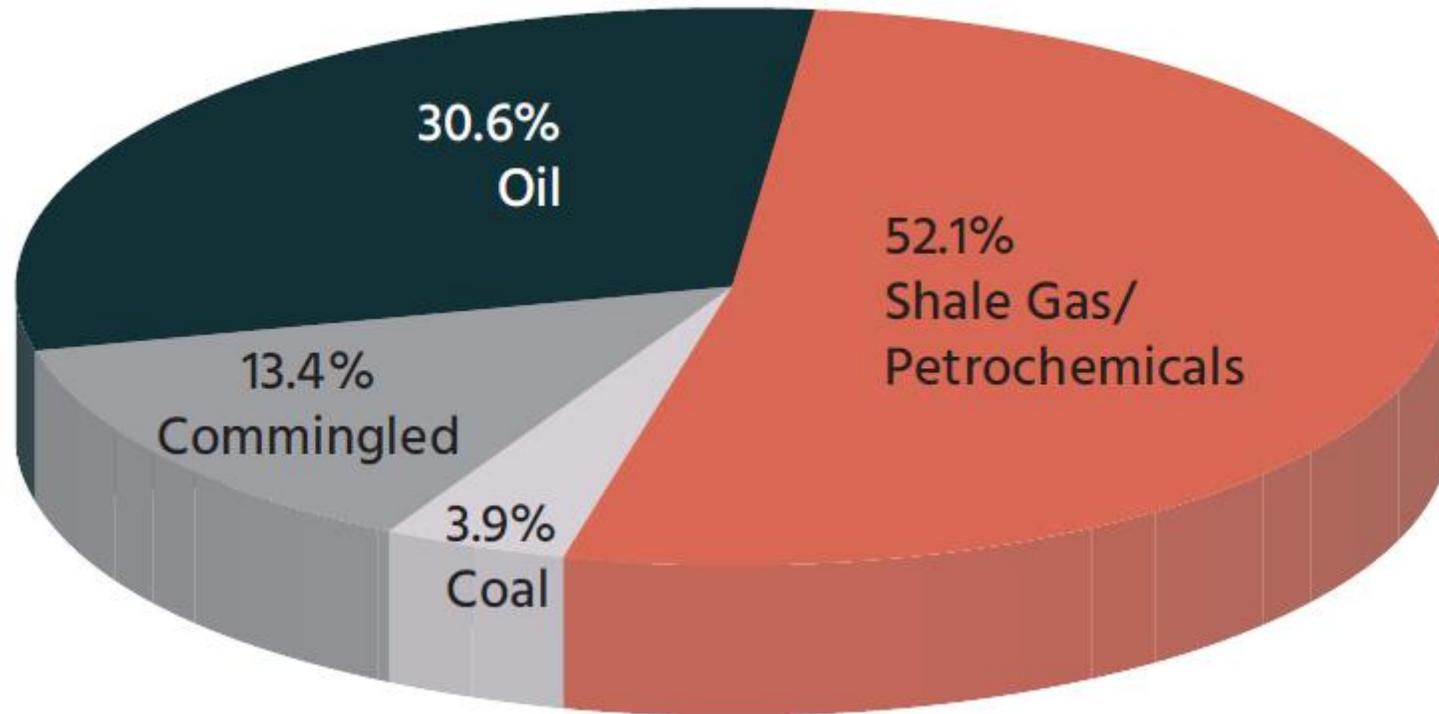
- Over 50 subsidies identified
- \$296 average per resident cost
- Nearly 97% industry specific
- 14% increase from 2015 analysis; increases budgeted to continue



ANALYSIS: THE TEN LARGEST SUBSIDIES COMPRISED 96% OF THE SUBSIDY TOTAL.



ANALYSIS: THE SHALE GAS & PETROCHEMICAL INDUSTRY BENEFITTED FROM \$2 BILLION WORTH OF SUBSIDIES IN FY 2019.



NEGATIVE EXTERNALITIES

- What? Negative externalities occur when the producer of a good or service creates costs that it does not bear the burden of paying.
- How? The most common example of a negative externality is pollution
- But is it a subsidy? Depends.

NEGATIVE EXTERNALITIES FROM SHALE GAS DEVELOPMENT

Negative Externalities: Unconventional Gas	Estimated Cost FY 2019 (in millions)	Summary
Hydraulic Fracturing	\$146.3	
Degradation of the Natural Environment	\$7.3	Intensive use and degradation of land and water
Water Consumption	Unknown	Permanent loss of natural resource averaging about 12 million gallons per fracked well
Infrastructure Damage	\$4.2	Damage to road and bridges, as well as increased air pollution, car accidents, dust, and noise
Creation of Boomtowns	Unknown	Negative community impacts including temporary influx of transient workers, increases in crime, and increases in housing instability, among others
Groundwater Degradation	\$22.0	Damage to groundwater results in water availability issues and treatment costs, adverse health impacts, and reduced property value. Estimate includes avoidance behaviors only.
Air Pollution	Unknown	Air pollution emissions from compressor stations, well pads, and pigging stations
Pipeline Leaks & Ruptures	Unknown	Incidents occur on average every 19 days in Pennsylvania, posing risks of fatality, injury, property damage, and ecosystem impacts.
Improper Disposal of Fracking Waste	Unknown	Improper treatment of radioactive and hazardous waste, exemption from full disclosure of chemicals, and leaks and spills
Insufficient Bonding Requirements	Unknown	Transfer of remediation liabilities and elevated risk of bond forfeiture
Impacts on Health	\$112.8	Total health impacts associated with hydraulic fracturing (including from groundwater contamination, air pollution, and improper disposal listed above) relating to low birth weights, asthma & respiratory afflictions, sleep disruption, and depression
Processing and Downstream Use	\$0.0	
Impacts of Petrochemical Manufacturing	Unknown	Air pollution, health, and safety risks which disproportionately burden people of color and people living in poverty, as well as other externalities that are felt within and beyond Pennsylvania, including greenhouse gas emissions, plastic collection and sorting costs, and ocean cleanup.
Climate Impacts	\$10,938.0	
Greenhouse Gas Emissions	\$10,938.0	Disrupts climate stability
Grand Total	\$11,084.5	

RECOMMENDATION #1: END ECONOMIC RELIANCE ON FOSSIL FUELS

- Discontinue petrochemical tax credits: Based off recent job estimates, the PRM Tax Credit will cost taxpayers approximately \$57,000 per job per year while the Local Manufacturing Tax Credit will cost \$27,000.
- Transform DCED's approach to community and economic development
 - Institute new climate conscious leadership
 - Break down silos and establish cross-departmental strategic alignment with agencies including DEP & DOH
 - Immediately phase out programs and activities specific to the fossil fuel industry
 - Establish funding directives to limit and eventually eliminate grants, loans, and loan guarantees supporting PA's fossil fuel industry
 - Create a DCED Climate Plan focused on divestment and transition

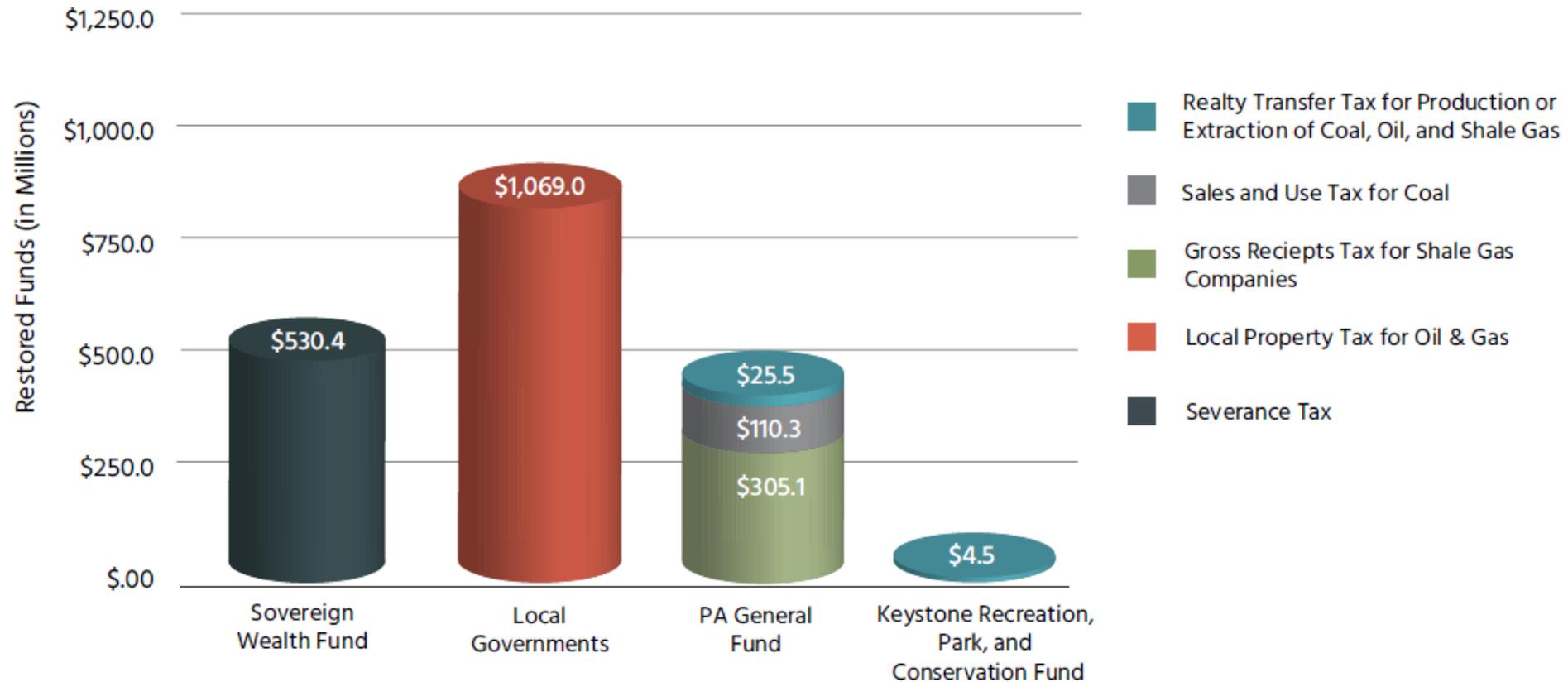
RECOMMENDATION #2: SHIFT THE PUBLIC HEALTH BURDEN OF SHALE GAS DEVELOPMENT TO THE INDUSTRY

- Expand the buffer between residents and hydraulic fracturing.
- Reduce environmental risk.
 - Enact common-sense protections from the 2020 Attorney General's Report.
 - Close the hazardous waste loophole.
 - Develop a sustainable mechanism for capping wells and increase the cost and duration of bonding requirements.
 - Protect overburdened communities
- Pass common-sense protections for surface owners.
- Uphold existing protections.

RECOMMENDATION #3: REDUCE SUBSIDIES FOR GREENHOUSE GAS EMISSIONS

- Remove fossil fuels from among the desired outcomes of all clean or alternative energy programs.
 - Eliminate the Natural Gas Vehicle Development Program.
 - Disqualify fossil fuel and fossil fuel-related infrastructure from receiving assistance under the Alternative Fuels Incentive Act and repurpose funds to expand the EV rebate program, targeting car-dependent rural areas and low- and moderate-income Pennsylvanians with older, more polluting vehicles.
- Eliminate Tier II of the Alternative Energy Portfolio Standard (AEPS) and strengthen renewable energy goals.
- Join the Regional Greenhouse Gas Initiative (RGGI).

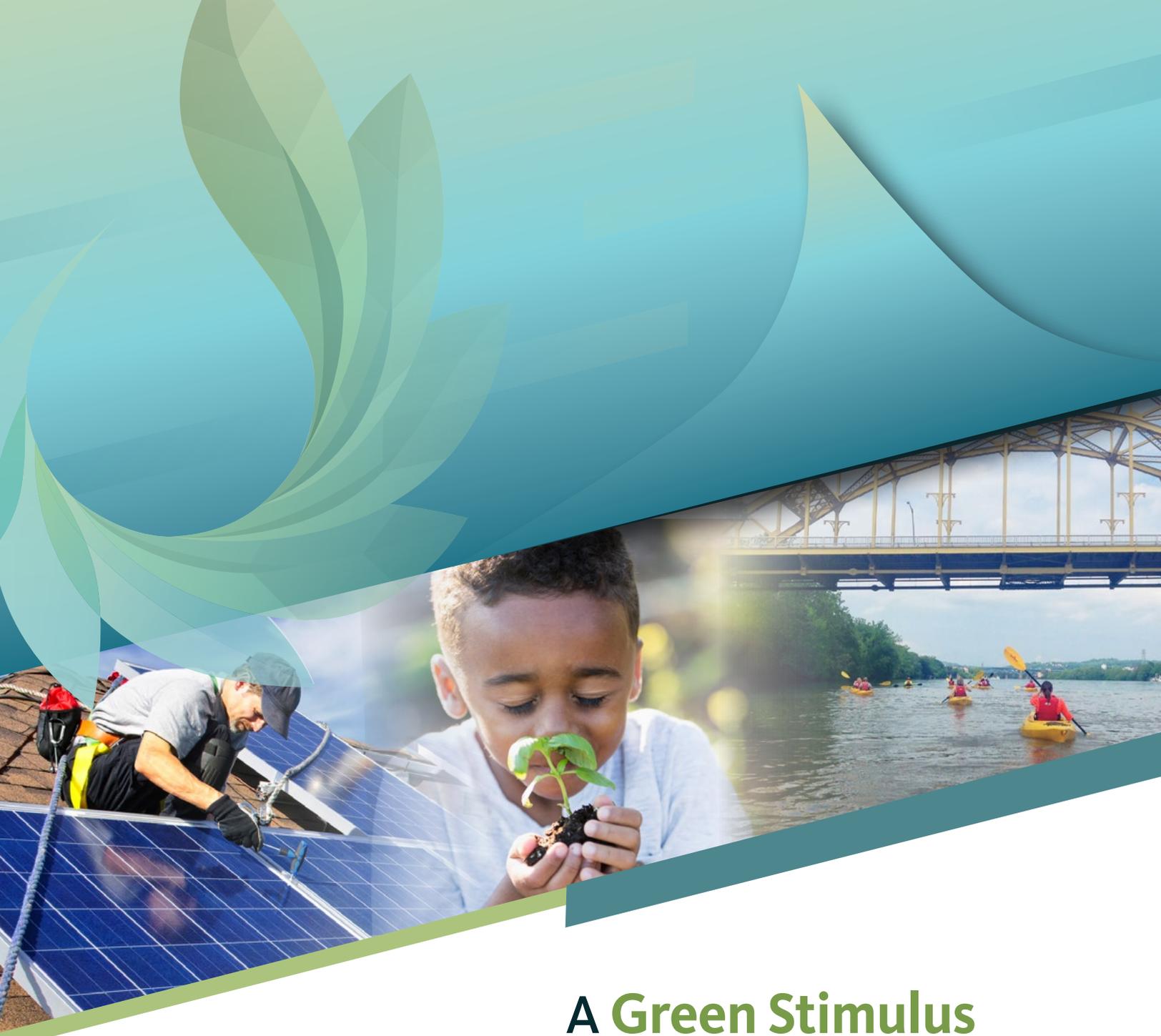
RECOMMENDATION #4: RESTORE \$2.0 BILLION IN FOREGONE REVENUES



RECOMMENDATION #5: TRACK AND REDUCE FOSSIL FUEL SUBSIDIES

- **Industry specific:**
 - gross receipts tax subsidy for shale gas distribution companies
 - sales and use tax subsidy for tangible personal property or services in mining operations
 - realty transfer tax subsidy for production or extraction of coal, oil, shale gas, or minerals
 - local property tax exemption for oil and gas
- **Many broadly defined subsidies did not disclose the necessary details to accurately ascertain fossil fuel subsidy values**
- **Direct Spending: Sources of funding for individual programs was often obscured**
- **Recommendation:**
 - Annual reports on the purpose, progress, cost, and success of DCED's tax credit, grant, and loan programs.
 - Governor's Budget Office should track fossil fuel subsidies and set targets for their removal.

Questions?



A **Green Stimulus** and **Recovery Platform** for Pennsylvania

Putting Pennsylvania Back to Work
and Investing in a Sustainable Economy

July 2020



PennFuture

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Executive Summary



The COVID-19 pandemic has deeply impacted Pennsylvania’s public health, social fabric, and economy. While the initial stay-at-home measures implemented by state leaders to control the spread of the virus have loosened, public health concerns continue. The resulting strain on the state economy is without precedent, including historic unemployment rates, millions filing unemployment claims, and businesses shuttering for months or permanently. The pandemic and economic downturn are disproportionately impacting communities of color and regions already beset by pollution. In response, momentum is building to transform our nation’s economy into one that is sustainable, resilient, and equitable.

This green stimulus and recovery platform lays out an agenda to take advantage of Pennsylvania’s homegrown sustainable industries—nature-based, outdoor tourism, agriculture, and renewable energy businesses—to put people back to work as well as rebuild a more equitable economy through the lens of sustainability and clean energy. As Table 1 summarizes, **the stimulus proposals call for \$2.83 billion in annual investments for the duration of the pandemic and other policy reforms, which we estimate will preserve or create over 389,000 jobs. Additional economic benefits would come from the recommendations on growing and transitioning to a clean energy economy.**

The policy recommendations made in this platform fall under five categories and are summarized below:

Avoid State Budget Cuts that Will Harm Economic Recovery

In times of recession, state policymakers often rely on agency cuts and layoffs to balance the budget against declining revenue, often targeting environmental, conservation, agriculture, and wildlife programs. Turning the budget knife on these programs again will only prolong our current economic decline. State policymakers should reject broad-based austerity measures and instead advance policies that build upon these important agencies to jumpstart the economy.

Preserve Nature-Based Small Businesses from Collapse

Safely Reopening and Supporting Nature-Based Small Businesses. Nature-based small businesses and outdoor recreation are crucial to the Commonwealth's economic recovery, particularly to more rural areas of the state. We recommend state policymakers do the following:

- Create a one-stop shop of recovery guidance for nature-based businesses.
- Develop a *Reopening Pennsylvania Nature Tourism* report on safely reopening during the pandemic.
- Launch an *Explore PA's Natural Beauty Campaign*, targeting in-state residents on how to safely take advantage of Pennsylvania's outdoor amenities during the pandemic.
- Pass legislation allowing small business tax deductions for safety measures and expenses.
- Increase funding for DCNR's *Community Conservation Partnership Program Grants* and temporarily eliminate the matching requirement.
- Provide operating grants of at least \$25 million to state *Community Development Financial Institutions* and other regional economic development entities to support nature-based small businesses in regions impacted the most by the pandemic, including low-income black and brown communities and environmental justice areas.
- Re-capitalize the *COVID-19 Working Capital Access Program* by at least \$100 million to support nature-based businesses in regions that may not be able to reopen during the summer and fall tourism seasons.

Support Small Farmers and Food Producers. Pennsylvania's farmers are in crisis. As a key player in the state economy, but also important stewards of our natural spaces looked at to reduce pollution, we recommend policymakers do the following to support them:

- Develop resources to connect job seekers to opportunities on farms during harvesting.
- Expand the *COVID-19 Working Capital Access Program* by \$250 million and increase eligibility to keep small family farms from cutting payroll to avoid bankruptcy during the pandemic.
- Re-capitalize the *Resource Enhancement and Protection* tax credit by \$25 million and allow for more flexible credit trading.
- Expand DCNR's *Riparian Forest Buffer* program to \$1 million.
- Increase PDA's *Farmland Preservation* program to \$76 million to preserve more farmland during the pandemic and offset reductions in county investments.
- Establish an *Agricultural Cost-Share Program* and initially fund it at \$25 million per year to invest in farm pollution reduction projects that also improve land productivity.

Create a Green Jobs Program to Put Pennsylvania Back to Work

Create a PA Conservation and Economic Recovery Corps (CERC). Pennsylvania should implement a modern-day Conservation Corps (CERC) to put people back to work with family-sustaining wages that rebuild our natural infrastructure:

- Set a goal of hiring at least 15,000 unemployed Pennsylvanians in the first 12 months for at least 6-month terms, which could be extended based on their needs and project needs.
- In addition to unemployed skilled workers, CERC should also provide employment opportunities for students, graduates, youth, and black and brown communities which are being disproportionately impacted by the pandemic.
- Projects would focus on state park and forest maintenance, habitat management, green storm-water infrastructure construction, stream buffer implementation, Main Street beautification, agriculture projects, tree planting, and other natural infrastructure needs.

“PENNSYLVANIA
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- CERC would provide family-sustaining wages of at least \$24/hour, plus health benefits, paid sick leave, and paid time off.
- Counties should submit lists of CERC-based job opportunities, organized by DCNR's nature-based regions, heritage areas, urban communities, and environmental justice areas so that projects are equitably spread across the Commonwealth.

Address Legacy Drilling and Mining Pollution. Abandoned mines and orphaned oil and gas wells have created legacy pollution issues scarring Pennsylvania's landscapes, polluting its waters, diminishing outdoor activity experiences and holding back economic development. To create jobs and new development opportunities, policymakers should:

- Invest \$453 million over 4 years in DEP's Abandoned & Orphan Well Program to clear a backlog of 9,000 abandoned wells that are "shovel-ready."
- Invest \$220 million over 4 years in DEP for mine reclamation projects, doubling the number of projects sourced through existing funds.
- By pressuring Pennsylvania's elected federal policymakers, support and pass the RECLAIM Act, which would provide at least \$300 million in mine reclamation funding to the state.

Modernize Our Homes and Businesses through Energy Efficiency Projects. Energy efficiency is one of the largest clean energy industries in Pennsylvania and is well situated to implement projects that save homeowners, renters, and businesses money as well as reduce pollution:

- Increase borrowing authority of the *Redevelopment Assistance Capital Program* by \$250 million to issue grants for energy efficiency retrofits in schools.
- Re-capitalize the *Pennsylvania Energy Development Authority* by \$100 million to provide financial vehicles for large efficiency projects.
- Work with the PUC to convene stakeholders to share best energy practices, develop new tools, and build consensus on advance payment provisions.
- Increase funding for DEP's *Small Business Advantage* program to \$10 million and increase project caps for efficiency projects at small businesses.
- Expand the DEP *Small Business Pollution Prevention Assistance Account* to \$20 million and expand loan eligibility to multifamily buildings.
- Expand DCED's *Weatherization Assistance Program* by \$20 million to support grants to low-income housing retrofits.

Support Shovel-Ready Clean Water Infrastructure Projects. Pennsylvania has significant clean water infrastructure needs, many of which are shovel-ready, providing good-paying jobs, supporting utilities financially impacted by the pandemic, and providing clean water:

- Appropriate \$360 million over 4 years to PENNVEST for drinking water and wastewater infrastructure projects, including set-asides for designing and implementing green infrastructure projects.
- Amend Act 30 of 2018 to include green stormwater infrastructure in the definition of "water conservation project," so that clean water projects are eligible for Commercial PACE programs.
- Create a *Green Stormwater Infrastructure Grant* program at DEP, initially funded at \$25 million, to support projects in the design phase, including support for municipalities designing local projects.



	Total Investment	Jobs Preserved or Created
Preserve Nature-Based Small Businesses		
<i>Support Nature-Based Tourism Businesses</i>	\$130 million	250,000
<i>Support Small Farmers and Food Producers</i>	\$340 million	102,000
Green Jobs Program		
<i>Conservation and Economic Recovery Corps</i>	\$905 million	15,000 (Minimum)
<i>Legacy Drilling and Mining Pollution</i>	\$673 million	8,480
<i>Shovel-Ready Energy Efficiency Projects</i>	\$397 million	7,940
<i>Shovel-Ready Clean Water Infrastructure</i>	\$385 million	5,775
TOTAL, Jobs and Stimulus Proposals	\$2.83 billion	389,195

Table 1. Summary of investment and job preservation and creation estimates of the green stimulus portion of the recovery platform.

Double Down on Pennsylvania’s Resilient Clean Energy Economy

The following policy proposals are recommended as part of a broader economic recovery package to strengthen and expand Pennsylvania’s rapidly growing clean energy industries.

Enable Community Solar. Pass legislation that allows for community solar, increasing by 50 to 75 percent the number of PA residents with access to solar power if they choose to do so. This would create good paying skilled labor jobs as well as reduce pollution. Current bipartisan bills exist to do so, including HB 531 and SB 705.

Incentivize Grid-Scale Solar. Amend the state Alternative Energy Portfolio Standards Act to ensure that a certain percentage of energy credits are obtained through competitively-bid long-term contracts as well as increase the share of electricity the state must source from renewable energy. Current bills exist to do so, including SB 600.



Expand Energy Efficiency Opportunities. Pennsylvania’s energy efficiency laws have saved ratepayers significant money while reducing energy consumption and pollution. With a few tweaks, these laws could open up additional economic development and job creation opportunities, including:

- Remove the investments caps in Act 129 to allow for more energy efficiency projects at no net cost to consumers.
- Enact legislation to require the PUC to inquire if investment in available energy efficiency measures could achieve the same goals in proposed electric utility rate increases.
- Amend Act 30 of 2018 to include multi-family residential units as eligible to participate in commercial PACE programs so that landlords can retrofit apartment buildings, creating jobs as well as improving the quality of life for renters.



Invest in Clean Transportation. The market for electric vehicles is growing and is expected to grow rapidly by 2030. Targeted investments in infrastructure would allow PA to take part in this growth, including:

- Prepare a transportation electrification opportunity assessment and set a statewide goal for vehicle electrification of at least 50 percent above business-as-usual by 2030. Existing bipartisan legislation exists to do so, including SB 596.
- Implement a cap-and-invest program to fund clean vehicles and infrastructure investments. One such initiative is the Transportation Climate Initiative Regional Policy Development Process.

Convene a Green Recovery Summit for Municipal Officials

Governor Tom Wolf should convene a statewide *Green Recovery Summit* of local and county officials to develop and adopt a sustainable and equitable economic recovery framework. The convening would develop a priority list of clean infrastructure projects so that state agencies can take quick action as well as provide a consensus framework document that will guide future stimulus and recovery investments at the local level.

Next Steps and Paying for State Stimulus and Recovery Policies

It is widely expected that the federal government will continue to leverage its historically low interest rates and borrow funds to support state and municipal recovery efforts. Pennsylvania’s policy leaders, particularly Governor Wolf, should not be passive in these efforts and should work with state congressional leaders to shape future federal stimulus plans. Federal stimulus investments will provide funds for the types of programs recommended in this agenda as well as fill other state budget holes, freeing up flexibility to invest further in stimulus and recovery efforts. Certainly, federal stimulus dollars will not provide full funding for recovery efforts and state policymakers will have to develop new revenue options. This agenda provides a list of potential revenue options as part of a broader recovery reform platform.

Introduction



“...THIS REPORT LAYS OUT A POLICY ROAD-MAP... TO PUT PEOPLE BACK TO WORK AND BUILD A MORE RESILIENT AND SUSTAINABLE ECONOMY .”

The social, economic, and environmental impacts of the COVID-19 health crisis are profound and are reshaping how we work, recreate, and live our daily lives. As of the drafting of this report, there have been over 90,000 cases of the disease in the Commonwealth and over 6,750 deaths.¹ Over 2 million workers have filed for unemployment insurance since the beginning of the pandemic, creating the largest unemployment rate—16.1 percent—in state history in April (Southwick, 2020). The state eased lockdown restrictions in May, resulting in a modest unemployment improvement of 13.1 percent, but millions remain out of work (Southwick, 2020). Some of the hardest hit areas in the state are black and brown communities where essential and low-wage workers reside, and preliminary reports show these are also areas with higher air pollution that exacerbate the impact of the disease (Wu et al., 2020). Many of Pennsylvania’s 67 counties are reopening their economies, albeit with significant limitations.² The deep and rapid decline in Pennsylvania’s economy is nearly double that of the Great Recession, with state gross domestic product (GDP) declining by at least 6.2 percent in 2020 (Independent Fiscal Office, 2020).

With these historic circumstances in mind, this report lays out a policy roadmap that leverages Pennsylvania’s growing nature-based, clean energy, and sustainable industries to put people back to work and build a more resilient and sustainable economy. The policy proposals described herein have four overarching goals:

1. **Safely and equitably restarting the state economy in a way that limits the pandemic, reduces pollution, and protects human health.**
2. **Avoiding state budget cuts that will negatively harm economic recovery and nature-based businesses.**
3. **Targeting short-term economic stimulus investments that put Pennsylvanians back to work and provide family sustaining wages.³**
4. **Advancing long-term economic recovery investments to support environmentally sustainable infrastructure and industries that underpin resilient and equitable communities.**

In total, this policy platform is estimated to require \$2.83 billion in annual investments for the duration of the crisis and recovery, which would preserve or create as many as 389,000 jobs in the Commonwealth, including nearly 37,000 immediate, shovel-ready jobs, while also reducing pollution, promoting our natural resources, and advancing public health. To put this in context, it would fill 45 percent of the 849,000 jobs lost during the pandemic, as of May 2020 (U.S. Bureau of Labor Statistics, 2020).⁴

Stimulus and Recovery Investments are Necessary to Rebuild the State Economy

The federal government has passed over \$3 trillion in stimulus funds through the CARES Act and additional supplementals to cushion the immediate health and economic pain caused by shelter-in-place orders. Nonetheless, it will require years of federal, state and local investments to recover from the COVID-19 crisis and make our society and economy emerge stronger and more resilient.

These much-needed investments offer a historic opportunity for Pennsylvania to reshape its economy and transition toward a financially stronger, environmentally sustainable, and more equitable Pennsylvania. Pre-pandemic, Pennsylvania's economy showed signs of weakness (Gelinas, 2020). While statewide job growth remained steady through February 2020 and the unemployment rate was low, the state tracked worse than the national average. Even at this high level of employment, Pennsylvania had one of the worst racial inequity rankings for its economy (McCann, 2020). Employment was beginning to shrink as the United States' trade war with China continued to impact steel and agriculture producers.⁵ Many communities, particularly in western and northeastern counties, remained left behind and experienced continued economic decline since the Great Recession (Alter et al., 2019). The oil and fracked gas industry was also reeling, portending to a steep decline and bankruptcies.⁶ And according to a recent assessment by the *Brookings Metropolitan Policy Program*, Pennsylvania's ability to innovate and advance new industries and entrepreneurship had "gone flat" and faced significant challenges (Maxim and Muro, 2019).

The COVID-19 crisis is exacerbating and deepening these economic issues so rapidly that it requires swift and significant action by state leaders. It is largely expected that the federal government will implement additional rounds of economic stimulus and recovery packages to stem the impacts from the COVID-19 pandemic, as well as address problems caused by the complicated execution of initial subsidies to businesses and residents (Leonhardt, 2020). Pennsylvania will have to do the same to pass balanced state operating budgets and spend federal investment dollars, in addition to passing state-specific stimulus and recovery measures.

Stimulus and Recovery Investments Should Prioritize Green Projects and Industries

There is a growing consensus that prioritizing recovery investments in sustainability, clean energy, and nature-based industries offers a powerful mix of benefits: immediate job creation opportunities, retention of good-paying jobs, long-term prosperity, and lower pollution. Numerous statements, reports, and proposals have been released during the pandemic by bipartisan political, business, academic, and financial leaders across the country making the same fundamental point: governments should stimulate economic growth that will create jobs as well as provide significant co-benefits, like reducing air pollution, addressing climate change, and providing clean water.

Over 150 multinational companies, many with headquarters, facilities, and workers in Pennsylvania, issued a statement calling for governments around the world to "prioritize a faster and fairer transition from a gray to a green economy by aligning policies and recovery plans with the latest climate science" (Science Based Targets Initiative, 2020). CEO's and representatives from 330

“THE COVID-19 CRISIS IS EXACERBATING AND DEEPENING THESE ECONOMIC ISSUES SO RAPIDLY THAT IT REQUIRES SWIFT AND SIGNIFICANT ACTION BY STATE LEADERS.”



U.S. Fortune 500 firms, trade associations, and small-and medium-sized businesses are also calling on Congress to “back a better economy by infusing resilient, long-term climate solutions into future economic recovery plans” (Ceres, 2020). A group of economists and leading academics and policymakers proposed an ambitious green stimulus bill to promote economic recovery and reduce pollution (Bozuwa et al., 2020). A coalition of financial investors representing trillions of dollars in investments have called for a “green recovery from the COVID-19 pandemic” (Holder, 2020).

This momentum for a green recovery is based on the growth of these industries during the last decade. Low-carbon economic growth has outpaced growth under business-as-usual policies, such as subsidizing fossil fuels (Mountford, 2020). Clean energy industries represent 3.3 million American workers, outnumbering fossil fuel jobs by 3 to 1 (Ricketts et al., 2020). Increasingly, sustainable and nature-based industries are future-proof, rapidly growing segments of the economy. For example, the Dow Jones Sustainability Index (DJSI) has outperformed the S&P Global BMI by 4.48 percent as of June 2020, meaning companies that have stronger environmental and social performance are not only producing better results, but are weathering the pandemic more so than their polluting competitors (S&P Global Market Intelligence, 2020).

A green recovery would also provide a diverse mix of skilled jobs. According to analysis by the Pew Research Center, green industries require jobs that are characterized by analytical skills (e.g. programming, science, and mathematics), but also jobs that are characterized by labor-intensive skills (e.g. installation, maintenance, and equipment operation) (Kochhar, 2020). Green industries like solar installations and energy efficiency retrofits are emphasizing employment from traditional, existing skill categories like engineering, electricians, and laborers.

The same holds true for Pennsylvania. Nature-based, outdoor recreation industries represent over 250,000 jobs while generating over \$29 billion in economic activity to the state each year (Outdoor Industry Association, 2017). The agriculture sector produces 280,000 jobs and generates \$135 billion annually (TeamPA, 2018). And the clean energy sector is creating over 90,000 jobs, growing five times faster than the overall employment growth in the state (E2, 2019). Pennsylvania is well positioned to leverage its growing green economy to ensure that the recession is short-lived and people are put back to work as quickly as possible.

Avoid State Budget Cuts That Will Negatively Harm Economic Recovery



The COVID-19 crisis is going to put a significant strain on Pennsylvania's state government, increasing calls for budget cuts, special fund transfers, and state worker layoffs. Policymakers should reject pressure to cut their way out of the recession and instead learn from the Great Recession recovery: deep spending and public sector job cuts will put a drag on economic growth, further entrench racial inequality, and create a ripple effect through the economy, including environmental protection (Fischler, 2020).

The Independent Fiscal Office estimates the Commonwealth will lose \$3.9 billion in revenue because of pandemic-related lockdown measures (IFO, 2020). A gradual reopening of the state economy will further depress revenue as will business restrictions and consumer uncertainty before a vaccine is developed. If additional spikes in infections leads to further lockdowns, the economic consequences will be even more severe. Making up for this lost revenue means relying on a limited number of options resulting from Pennsylvania's constitutional requirement to balance the operating budget every fiscal year: (1) Raise taxes and fees; (2) Cut spending and investments; (3) Float bonds; (4) Spend down reserve funds; and/or (5) Leverage federal stimulus spending to balance the budget.

Pennsylvania received \$3.9 billion in discretionary federal stimulus dollars through the CARES Act. This money cannot be used to fill holes in the state budget, and can only be spent on coronavirus-related expenditures. The state legislature has developed a plan to spend \$2.6 billion for nursing homes, county block grants, intellectual disability care, small business grants, research and development of a coronavirus vaccine, relief for farmers, higher education, and housing security. The remaining \$1.3 billion has not yet been allocated as of the writing of this report (Caruso & Shanahan, 2020).

So far, the Pennsylvania legislature is opting to make budget decisions later in the year. In late May, the state passed a short-term, five month stop-gap budget that provides level funding (compared to FY19-20) for all state agencies and programs from July 1, 2020 through November 30, 2020. Legislators will then convene a special sine die session after the General Elections in November to debate a budget that accommodates the remaining seven months of the fiscal year.

“ANY GREEN PLATFORM FOR PENNSYLVANIA SHOULD BE BUILT FROM THE BASIC PREMISE THAT ITS CORE ENVIRONMENTAL AND CONSERVATION AGENCIES AND PROGRAMS SHOULD REMAIN WHOLE AND, MORE IMPORTANTLY, BE BUILT UPON.”

For these future budgets, the recovery from the Great Recession provides a useful lesson on how to quicken the pace of economic recovery. Relying almost solely on slashing public sector jobs and investments prolongs the economic pain and makes a full recovery more difficult (White, 2019). These cuts have disproportionately affected women of color specifically and black and brown communities broadly as the dramatic cuts to public spending and the privatization of public services simultaneously subject them by further destabilizing their already precarious economic position (Emejulu & Bassel, 2018). Public sector spending still had not bounced back to pre-2008 levels before the pandemic struck.⁷ Environmental agencies, including the Department of Environmental Protection (DEP) and the Department of Conservation and Natural Resources (DCNR), have taken the brunt of that workforce decline. The DEP’s workforce declined by 25 percent and its budget has been cut by 40 percent (Phillips, 2020). The DCNR has been tasked with managing more parks and more visitors, but doing so with staffing cuts and a \$1 billion backlog for maintenance and infrastructure (Pennsylvania Parks & Forests Foundation, 2018). Similar budget cuts have impacted Pennsylvania’s wildlife and river basin commissions, as well. These deep cuts have come at a time when the challenges facing those agencies—such as the massive buildout in natural gas infrastructure, drinking water issues, and industrial and agricultural pollution—have greatly increased.

Turning the budget knife on those same agencies again will only prolong our current racial inequality and economic malaise. To this end, the state legislature is not off to a good start. It has debated bills during the pandemic that would freeze investments made from environmental and conservation special funds—separate state accounts created by the legislature to receive earmarked revenue for annual investments in conservation projects (Thrush, 2020). For example, the Environmental Stewardship Fund invests revenue raised from dumping trash in landfills and other state bonds to preserve farmland, clean up acid mine drainage, and build watershed protection projects. Not only do these projects create good-paying jobs, they also reclaim land for economic development and greenspaces for communities—the type of win-win projects the Commonwealth needs right now.

In fact, this green stimulus and recovery platform is a rejection of broad-based austerity measures that are often looked to by policymakers during economic downturns. A more strategic approach is needed, which is why this platform proposes new investments in environmental agencies, programs, and policies to spark economic development. Many economists similarly reject broad-based austerity and point to past use of these policies as detrimental to economic growth and social well-being.⁸ In fact, austerity measures during the Great Recession have been linked to significant public health impacts and the inability to enforce environmental protection laws (Collett-White, 2019).⁹

Any green platform for Pennsylvania should be built from the basic premise that its core environmental and conservation agencies and programs should remain whole and, more importantly, be built upon. The proposals in this document assume that the relevant environmental, conservation, agriculture, and wildlife agencies are not cut, and the investments recommended herein would add agency capacity and programmatic dollars. To do otherwise is no less than cutting off our nose to spite the face—Pennsylvania would do well to strategically invest in its green economy to quickly emerge from the current recession.

Preserve Pennsylvania’s Nature-Based Small Businesses from Collapse



Small businesses are crucial to Pennsylvania’s economy and are being disproportionately impacted by COVID-19. They will need significant assistance to ensure that they do not close or file for bankruptcy. Pennsylvania’s nature-based small businesses, such as outdoor recreation and agriculture, are being particularly threatened with financial hardship. State policymakers should prioritize efforts to ensure that these industries are financially protected so they can continue to support hundreds of thousands of jobs through the important summer and fall seasons.

Safely Reopen and Support Pennsylvania’s Nature-Based Small Businesses

Jobs Created or Protected: At least 250,000

Total Cost: \$127 million to \$132 million ¹⁰

Framing Statement

Nature-based businesses are of particular importance to the state economy due to the tourism and recreation generated by the state’s abundant natural resources and natural beauty. The Outdoor Industry Association (2017) estimates that Pennsylvania’s outdoor recreation industry generates \$29.1 billion in economic activity to the state each year and creates 250,000 jobs. State parks alone generate over \$1.1 billion in economic benefit (Mowen et. al., 2010). Safely restarting this industry is crucial to reopening Pennsylvania’s economy as well as providing a much-needed respite for residents in need of outdoor recreation during these unsettled times.

The small businesses—hotels, diners, recreation guides, river guides, tackle shops, campgrounds, bike shops, and hunting shops—that are the backbone of this industry need support to make it through this crisis. The stay-at-home shutdown orders hit during the start of the spring tourism

season and could greatly impact the summer and fall seasons as well, threatening severe job losses and bankruptcies throughout the Commonwealth's scenic and natural areas. Rural counties would be particularly hard hit as they rely on tourism and outdoor recreation for their local economies (Briggs & Benschoff, 2020).

Recommended Policy Interventions

- In collaboration with Pennsylvania's network of *Small Business Development Centers*, create a one-stop shop online information sharing mechanism at the Department of Community and Economic Development (DCED) for nature-based businesses to quickly provide guidance, financial information, and online business recovery training.
- Develop a "Reopening Pennsylvania Nature Tourism" report in consultation with public health officials, DCED, and nature-based small business leaders that provides a plan on how to reopen tourism businesses, even on a limited basis.
- Launch an "Explore PA's Natural Beauty Campaign" for in-state residents that highlights open businesses and provides ideas about how to enjoy the outdoors and support the economy in a safe and healthy way during the summer and fall seasons.
- Pass legislation that allows small businesses to claim deep cleaning contracts, cleaning supplies, personal protection equipment, and other safety measures as allowable business expenses to reduce their state taxes.
- Increase funding for DCNR's *Community Conservation Partnership Program Grants* program from \$60 million to \$62 million to support capacity building, training, and project funding to nature-based nonprofits that support areas of outdoor recreational importance.
- Temporarily eliminate the matching requirement for DCNR for two years to allow easier access to funds that will support nature-based businesses, including those that will benefit businesses indirectly through contract work with communities.
- Provide operating grants and program-related investments of at least \$25 million to state Community Development Financial Institutions (CDFI), credit unions, and regional economic development entities to support nature-based small businesses in low income, black and brown communities, and environmental justice areas.¹¹ The Administration should work with state philanthropic foundations to match or augment these state investments so CDFIs are in a healthy financial situation and can quickly scale up operations and provide loans to businesses that haven't been able to access federal assistance.
- Re-capitalize the *COVID-19 Working Capital Access Program* through DCED and the *Pennsylvania Industrial Development Authority* (PIDA) to \$100 million and expand eligibility for projected staffing and operating costs to support nature-based businesses in regions of the state that won't be able to open during the summer and fall tourism seasons.¹²



“RURAL COUNTIES WOULD BE PARTICULARLY HARD HIT AS THEY RELY ON TOURISM AND OUTDOOR RECREATION FOR THEIR LOCAL ECONOMIES.”



Support Pennsylvania's Small Farmers and Food Producers

Jobs Protected or Created: 45,000 to 102,000¹³

Total Cost: \$325 million to \$340 million

Framing Statement

Pennsylvania's agriculture industry contributes \$135.7 billion, or approximately 18 percent, of the state's gross product and supports 280,500 direct jobs (TeamPA, 2018).¹⁴ This includes products like livestock, fruits and vegetables, dairy, forestry, landscaping and nurseries, beer, wine, hemp, and food processing. According to the most recent agricultural census in Pennsylvania, there are 59,309 farms in the state, 48,039 of which are 179 acres or less (Mondal & Solano, 2017).

Not only are these small farms an important food source and economic engine, they are also a key source of conservation. Whether it is preserving farmland for future generations, protecting streams from pollution, or enacting best practices to encourage soil health, farmers often are traditional stewards of our natural spaces throughout the Commonwealth.

They are also often looked at to reduce pollution, particularly the nutrients and sediment entering Pennsylvania waterways. For instance, runoff from agricultural lands in the Susquehanna and Potomac River Basins are the most significant source of pollution entering the streams and rivers that ultimately feed the Chesapeake Bay, in part causing severe impacts to sensitive species and habitats (PA Department of Environmental Protection, August 2019). The U.S. Environmental Protection Agency (EPA) has mandated that Pennsylvania cut this pollution load by 2025, meaning the state and farmers must collaboratively invest in reducing pollution while utilizing best farmland practices such as riparian forest buffers along streams, manure storage facilities, and healthy soil best practices. Implementing these practices not only reduces pollution, but they improve farm productivity and create jobs. For example, just one state-of-the-art dairy barn with manure management pits required 25 professionals to install from design through completion (Chesapeake Bay Foundation, 2011).

Prior to COVID-19, 75,000 jobs were estimated to be available in this sector over the next decade due to an aging workforce, immigration policies that have reduced the seasonal workforce, and a dairy industry in financial crisis (TeamPA, 2018). Many Pennsylvania farmers were also enduring

falling demand and prices because of the United States' trade wars with China and European countries. But the pandemic is creating a new gut punch to the industry because it is reducing or eliminating demand from schools, restaurants, office cafeterias, and meat purveyors, creating a financial environment that will lead to many family-run small farms going out of business (Marroni, 2020). Emergency financial loan programs offered by the federal government are often out of reach for small farmers because they don't have access to the same legal and accounting staff—or any administrative staff—that larger corporate farms benefit from (Finnerty, 2020). To put it simply, small Pennsylvania farmers are in crisis and the pandemic is pushing many to the breaking point, putting into question the farmers' livelihoods, preservation of Pennsylvania's lands, and our ability to limit water pollution.

Recommended Policy Interventions

- Leverage the proposed *Pennsylvania Conservation and Economic Recovery Corps* (CERC) described below to provide farmers access to workers to implement conservation best management practices, watershed protection projects, and new farm practices.¹⁵
- In addition to the employment opportunities through CERC, the Department of Agriculture should be directed to develop guidelines and online resources, in collaboration with agriculture trade associations, so that unemployed job seekers have user-friendly access to opportunities on farms throughout the Commonwealth.
- Expand DCED's *COVID-19 Working Capital Access Program* (CWCA) to include an additional \$250 million program solely aimed at keeping small family farms from cutting payroll and/or going bankrupt during the pandemic. The loan eligibility cap of \$100,000 should be increased to up to \$250,000 to provide significant cash support to farms through the summer crop and fall harvest seasons. Loan eligibility and interest rates should be low as many small farms don't have access to other sources of credit and are already cash-strapped.
- Re-capitalize the Resource Enhancement and Protection (REAP) tax credit from \$13 million in FY 2019-20 to \$25 million for FY 2020-21. The credit cap of \$250,000 per agriculture operation should remain, but farms should be allowed to trade the credits after 6 months, rather than 12 months. REAP tax credits will cover 50 percent to 75 percent of conservation project costs, including no-till planting, riparian stream buffers, cover crops, and conservation plans. The tax credit was expanded through the *PA Farm Bill* to \$13 million and was quickly allocated on a first-come, first-serve basis.
- Expand DCNR's *Riparian Forest Buffer* program from \$500,000 to \$1 million to directly support buffer projects on agricultural land. Grants should be allowed to cover greater than 50 percent of project costs.
- Double state funds for the Department of Agriculture *Farmland Preservation* program from \$38 million in 2019 to \$76 million.¹⁶ This is important for two reasons: (1) it provides farmers an additional preservation option during the pandemic that protects the land while still providing a financial benefit; and (2) it offsets any reduction in county investment in farmland preservation due to budget cuts resulting from the recession. County investments accounted for 32.5 percent of farmland preservation funding in 2019.¹⁷
- Establish an *Agricultural Cost-Share Program* to provide direct support to farmers for installing conservation practices that can improve farm productivity and improve our rivers and streams. Initially fund the program at \$25 million per year. Such programs exist in neighboring states such as Maryland and Virginia. A state cost-share program would leverage state and federal dollars and reduce the cost to farmers for stewarding the land.

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Creating a Green Jobs Program to Put Pennsylvania Back to Work



Pennsylvania needs to get back to work and there is no easier way to do that than to invest in green jobs programs. The following recovery investments would take advantage of shovel-ready projects to modernize our green spaces, energy system, and water infrastructure. Each would also provide job opportunities in each of the Commonwealth's counties and to workers of various skill sets that reflect the diversity of unemployed, including high school graduates, college graduates, laborers and tradespeople, engineers, planners, and other technical experts.

Create a Pennsylvania Conservation and Economic Recovery Corps

Jobs Created or Protected: *At least 15,000 in Year 1, depending on the salaries per worker and their length of employment.*

Total Cost: *Up to \$905,625,000*¹⁸

Framing Statement

During the height of the Great Depression, the United States implemented a bold idea—provide the unemployed with job opportunities by building and maintaining environmental infrastructure like state park buildings, trails, tree plantings, forest roads, and flood barriers. For nine years, the Civilian Conservation Corps employed 3 million people, provided shelter and food, and required Corps members to send a portion of their earnings back home to their families, providing much-needed support to hard hit rural communities across America.

The program was so popular that even after its elimination because of World War II, states implemented scaled-down versions of the Corps to support youth job creation, conservation projects, and disaster response.¹⁹ DCNR deploys an *Outdoor Corps* for 18-25 year-olds to conduct 10-month, paid employment to work on projects on state park and forest land.²⁰ In 2015, Representative Marcy Kaptur (D-OH) introduced the *21st Century Civilian Conservation Corps Act* to reestablish a national Corps to provide employment completing conservation and restoration projects.

“WHILE THE IMMEDIATE CHALLENGE IS ADDRESSING THE STATE’S HISTORIC UNEMPLOYMENT, THE LONG-TERM NATURAL INFRASTRUCTURE NEEDS OF PENNSYLVANIA ARE ALSO IMMENSE...”

While the United States is a much different place than in 1933, an equally bold idea is needed to provide Pennsylvania’s unemployed with job opportunities during the COVID-fueled recession. That idea is to create a modern-day *Pennsylvania Conservation and Economic Recovery Corps* (CERC) to provide guaranteed work and family-sustaining wages for conservation projects around the Commonwealth. This would not be an expansion of the DCNR Outdoor Corps, but rather a jobs program to leverage the skills of the unemployed to help rebuild and maintain Pennsylvania’s natural infrastructure.

While the immediate challenge is addressing the state’s historic unemployment, the long-term natural infrastructure needs of Pennsylvania are also immense and provide a win-win opportunity. The Pennsylvania Parks & Forests Foundation calculated that the state park and forest infrastructure and maintenance needs totaled \$1 billion (PPFF, 2018). Pennsylvania’s *Phase 3 Watershed Implementation Plan* for the Chesapeake Bay Watershed estimates that the cost of pollution reduction projects in the Susquehanna River and Potomac watersheds, such as for forest buffers, soil health, and agricultural projects, is \$521 million per year, of which a deficit of \$324 million per year remains (PADEP, August 2019, p. 11). Governor Wolf’s *Restore Pennsylvania* plan identified billions of dollars-worth of projects to build green stormwater infrastructure, flood control, brownfield cleanup, and other conservation projects (Wolf, 2019).

Put simply, there are billions of dollars-worth of natural infrastructure projects backlogged throughout the Commonwealth. CERC could help put a major dent in this backlog, leveraging existing program funding at state agencies, federal project and stimulus funds, as well as new state investments to put people back to work rebuilding Pennsylvania.

CERC should also support employment for high school students, recent college graduates, unskilled workers, workers in communities of color, and workers interested in the opportunity to learn new skills that will be transferable to future jobs. There is currently no clear trajectory in these populations and communities to develop skills and enter or re-enter the workforce. This plan would provide such a trajectory and likely cause the current lack of skilled workers that many Pennsylvania employers report to shrink (Hoffman, 2018; PA State System of Higher Education, 2016). For example, millennials who entered the workforce during the Great Recession have had, on average, lower wages (adjusted for inflation) and less accumulated net wealth than other generations (Kurz et al., 2018). CERC could help prevent this from happening to the current generation entering the workforce during the economic fallout from COVID-19 as well as help address the significant racial inequality in the state economy.

Recommended Policy Intervention

- Create the CERC as a new, independent commission that is jointly chaired by leadership from relevant environmental, conservation, agriculture, and economic agencies to quickly develop hiring guidelines, prioritize projects, leverage existing state project management expertise to ensure projects are efficiently managed, and ensure the program engages on projects throughout the Commonwealth.²¹
- Set a goal of hiring 15,000 unemployed Pennsylvanians in the first 12 months.²² Workers would be hired on 6-month terms, which would be extended based on the needs of the workers and projects.²³ This would allow workers flexibility to find permanent full-time work elsewhere, while also providing a steady workforce for project development.



- Significantly expand maintenance, construction and installation of conservation and pollution reduction projects, including the following:
 - State park and forest maintenance
 - Habitat and wildlife management
 - Green stormwater infrastructure
 - Stream buffers
 - Invasive species removal
 - Main Street beautification projects
 - Implement agriculture best-management projects
 - Tree plantings and other conservation activities
 - Upgrade agency IT infrastructure
- Supplementary to the support described for small farmers above, a portion of CERC hires should be used to assist small Pennsylvania farmers if shortages in skilled labor occur. These hires should also be used to help farmers with technical assistance or with administrative burdens that often prevent them from completing best management plans or accessing available loans, grants, or tax credits.
- CERC should also target employment opportunities for recent graduates, workers without a degree, high school students, and workers in communities of color that have been disproportionately impacted by the pandemic.
- Wages should be able to support a family, so either prevailing wages for the area or at least \$24/hour, which would provide the equivalent of a \$50,000/year salary.
- Workers should also be provided health insurance, paid sick leave, and paid time off. Additional benefits, such as accreditation, community college credits, or other technical training could also be offered alongside the program so that long-term skills are provided. For example, flexibility could be provided that allows CERC hires to be provided access to discounted or free education at a regional state school or community college rather than getting paid a full salary.
- Require all Pennsylvania counties to submit lists of CERC-based job opportunities, such as organizing projects by DCNR's nature-based regions plus heritage areas, urban communities, and environmental justice areas, so that potential workers have access to projects close to their homes and the program is well integrated with county officials.

Create Jobs by Addressing Legacy Drilling and Mining Pollution

Jobs Protected or Created: 8,480 Total (5,400 for abandoned wells ²⁴ & 3,080 for mine reclamation ²⁵)

Total Cost: \$673.2 million over 4 years (\$453.2 million for abandoned wells and \$220 million for mine reclamation)

Framing Statement:

Pennsylvania's oil drilling and coal mining industries have left Pennsylvania with significant legacy pollution issues that endanger lives, pollute water and air, and hold back economic development in the surrounding areas. Over 200,000 acres of Abandoned Mine Lands exist statewide, representing historic mining sites active prior to 1977 that were inadequately reclaimed or protected and are hazardous because of landslides, fires, air pollution, and water pollution caused by acid mine drainage.²⁶ Another 200,000 to 750,000 unplugged legacy oil and gas wells pockmark the state,

representing abandoned operations that were not properly encased and filled, potentially leaching methane, volatile organic compounds, and other pollution into the air and ground water. Any new economic development of these sites will cost private developers potentially millions of dollars in cleanup, making land reuse costly and, often, untenable.

Prior to the COVID-19 pandemic, the existing oil and gas well plugging workforce operated primarily as small businesses and directly employed 300 people. This small industry—backed by very limited state investment and further hampered by bankrupt or unknown well owners—is not operating at nearly the scale necessary (Weber, 2019). Econsult Solutions (2017, pg. 35) estimates that it will cost \$8.4 billion to properly address legacy oil and gas wells. For its part, the PADEP only has 9,000 priority, unplugged wells in its database, though statewide assessments have pinned the number at between 300,000 to 760,000 (PADEP, Sept. 2018). While a fully staffed well plugging mapping effort is still needed in Pennsylvania to properly locate and assess all abandoned wells, addressing the priority list is still a significant effort. Plugging the wells on the priority list would be a win-win: improving environment outcomes as well as supporting a diverse mix of construction and labor jobs, many of which could come from workers in the struggling fracked gas industry and construction workers who struggled during the stay-at-home lockdowns.

Abandoned mine reclamation is an equally significant job and economic opportunity. According to the U.S. Department of Interior Office of Surface Mining Reclamation and Enforcement, Pennsylvania's high priority mine reclamation projects are unfunded by \$3.9 billion (U.S. Department of Interior, 2020). The DEP believes the cost is closer to \$5 billion (Frazier, 2020).

Funding to address these projects is limited by federal policy. The Surface Mining Control and Reclamation Act of 1977 provided for the restoration of historic mine lands inadequately addressed before 1977. Existing mining operations were assessed a fee per ton of coal, which is placed in the national Abandoned Mine Reclamation (AML) Fund and provides annual funding to Pennsylvania and other historic coal states for reclamation projects. Annual allocations to the states continue, albeit lower today because Congress lowered the fee on coal mining.²⁷ There is a bipartisan movement in the U.S. Congress to pass the *Revitalizing the Economy of Coal Communities by Leveraging Local Activities and Investing More Act* (RECLAIM Act), which would front load \$1 billion from the AML Fund into larger allocations to coal



“PLUGGING OIL AND GAS WELLS...WOULD BE A WIN-WIN: IMPROVING ENVIRONMENTAL OUTCOMES AS WELL AS SUPPORTING A DIVERSE MIX OF CONSTRUCTION AND LABOR JOBS...”



states over 5 years. Based on the legislation’s allocation formula, Pennsylvania would gain roughly \$300 million for mine reclamation that must be tied to economic development projects.

Nonetheless, Pennsylvania should go beyond what the federal government and the RECLAIM Act would invest to boost mine reclamation and more quickly generate new economic opportunities for the Commonwealth. Reclamation projects around the state have shown the pollution and economic benefits of investing in these projects as quickly as possible. For example, in the Wyoming Valley, the Earth Conservancy has reclaimed nearly 2,000 acres of mine-scarred lands that are now available for commerce, attracting businesses such as Wegmans, Adidas, Spreetrail, and TruValue.²⁸ These projects also create ongoing operation and maintenance jobs when passive treatment systems are used (Hughes, 2019). Historically, Pennsylvania has invested in mine reclamation through *Growing Greener* funding and has proposed additional funding for projects through efforts like *RestorePA*.²⁹

Creating jobs through addressing the backlog of legacy coal mining impacts and capping unplugged legacy oil and gas wells will spur economic development opportunities in communities hard hit by the pandemic as well as the recession.

Recommended Policy Interventions

- Invest \$450 million over 4 years in the DEP’s *Abandoned & Orphan Well Program* to clear out the 9,000 well backlog. Doing so will also require an additional \$3.2 million investment in the DEP program to hire eight full-time positions to administer and manage the program.³⁰ In addition to new state funds, the legislature could shift funds from Act 13 that are transferred to the Commonwealth Financing Authority back to DEP to partially support this effort.
- Appropriate \$220 million over 4 years to the DEP to increase the number of mine reclamation projects and accelerate addressing the backlog of legacy coal mining impacts. This equates to providing a state match on federal investments in mine reclamation through the AML Fund, or \$55 million per year. This would double the number of projects and allow existing projects to be completed quicker rather than be segmented over multiple funding cycles.³¹
- By pressuring Pennsylvania’s elected federal policymakers, support and pass the RECLAIM Act, which would provide at least \$300 million in mine reclamation funding to the state.



Deploy Shovel-Ready Energy Efficiency Projects to Modernize Our Homes and Businesses

Jobs Protected or Created: 7,940 ³²

Total Cost: \$397 million total

Framing Statement

The energy efficiency sector is the single largest employer in the clean energy sector with 69,000 jobs, representing everything from insulation manufacturing and installers to efficiency engineers and high-efficiency windows production (E2, 2019). The energy efficiency sector is also the clean energy industry hardest hit by the COVID-19 crisis. The losses in the energy efficiency sector account for about two-thirds of all clean energy unemployment filings as electricians, plumbers, construction workers, energy auditors and others were unable to enter homes, offices and other buildings because of coronavirus quarantines (Renewable Energy World, 2020). As a large, growing, and sustainable industry, policymakers should focus investments on supporting these workers and projects.

Protecting existing and creating new jobs in energy efficiency will have three major impacts. First, it will help restore and grow our regional job market for skilled labor. Second, it will lower the cost of utilities for homeowners and businesses at a time when everyone is trying to make ends meet. Third, it will improve the overall quality of life for Pennsylvanians while they're stuck at home. The new normal is that staying at home also means staying safe from infection, but many people do not have access to safe, healthy, and affordable housing. As we move into the warm summer months, high cooling bills and energy inefficient homes will stress our already energy burdened region (Drehobl & Ross, 2016).³³

Recommended Policy Interventions

- Increase the borrowing authority of the *Redevelopment Assistance Capital Program (RACP)* by \$250 million to issue grants for energy efficiency retrofits in schools around the Commonwealth. In 2020, Governor Wolf proposed a \$1 billion increase in RACP for lead and asbestos removal in schools, an important and priority investment. This additional increase would complement these potential toxic removal projects and allow for a more robust retrofit of school buildings at a time when they are closed and school years may be shortened.
- Re-capitalize the *Pennsylvania Energy Development Authority (PEDA)* by \$100 million to provide low-interest loans, grants, and loan guarantees for large energy efficiency projects around the Commonwealth.³⁴
- Work with the Public Utility Commission to convene energy distribution and energy efficiency companies to share best practices, develop new virtual tools for efficiency providers and explore issuing advance payments on contracts.³⁵
- Invest in energy efficiency projects for small businesses by increasing funding for the DEP *Small Business Advantage* grants program from \$1 million to \$10 million. The grant cap should be increased from \$7,000 to \$10,000 and the matching cap increased from 50 percent to 75 percent. The program provides grants to small businesses of 100 employees or less to construct projects that save the business at least 25 percent on their energy bills annually.
- Expand the *Small Business Pollution Prevention Assistance Account* loan program at DEP from \$2 million to \$20 million to provide for large, low-interest loans up to \$100,000 for energy efficiency projects such as HVAC, lighting, energy efficient machinery upgrades. Program loans provide up to 75 percent of project costs and are eligible for businesses of 100 employees or less, but the program should be expanded for multi-family buildings, providing an additional tool for landlords to provide better quality of life for its lessors.
- Expand DCED's *Weatherization Assistance Program* by investing \$20 million to match the federal government's FY20-21 investment. The weatherization program through DCED is funded by the U.S. Department of Energy to provide grants, averaging \$7,000, to low-income residents for energy assessments and housing retrofits.





Modernize Clean Water Infrastructure

Jobs Protected or Created: 5,775³⁶

Total Cost: \$385 million³⁷

Framing Statement

The COVID-19 crisis has placed a burden on water and wastewater utilities because of an expected loss of revenue, threatening the Commonwealth's clean water, rivers, and streams. Pennsylvania's water utilities have continued to operate as an essential service during the crisis, enacting moratoriums on utility shut offs and restoring connections to ensure residents continue to have access to water during the stay-at-home shutdowns (PUC issues, 2020). Much needed water infrastructure projects have also been delayed (American Water Works Association, 2020). Wastewater treatment facilities have seen an increase of trash in their systems because residents are flushing their personal protective equipment down toilets or littering on streets that then washes into combined sewer systems (Tanenbaum, 2020).

These COVID-19 impacts are putting a significant strain on water utilities. The American Water Works Association (AWWA) estimates an aggregate financial impact on water and wastewater utilities exceeding \$27 billion or a 16.9 percent impact on water sector revenues nationwide (AWWA, 2020). Expected delays and reductions in capital expenditures will result in communities experiencing a reduction in economic activity by as much as \$32.7 billion (AWWA, 2020). This adds to a significant funding problem for Pennsylvania's water utilities. The DEP's *Pennsylvania Water and Wastewater Gap Study* indicated a \$18.6 billion "gap" in funding for drinking water and wastewater infrastructure from 2015 to 2025 (PADEP, 2015).³⁸

The financial strain is not fleeting and will impact water utilities for years. Utilities will likely defer rate increases—their main source of revenue—in the short term to help residents cope with the pandemic and recession, which will further exacerbate revenue shortages (AWWA, 2020); however, the economic impacts on water utilities may mean larger rate increases are necessary over time to meet the costs of providing service and make up for lost revenue. Even before the COVID-19 water crisis, nationwide water rates were unaffordable for nearly 13.1 million households (Mack & Wrase, 2017). In Philadelphia, prior to the implementation of its income-based tiered-assistance

program, nearly 40 percent of residents could not afford to pay their water bills (Nadolny, 2017). In other words, the pandemic is going to set back the ability of water utilities to modernize their infrastructure and put a future strain on residents' ability to afford clean water.

These impacts threaten the Commonwealth's ability to provide clean water. Whether it is from direct impacts like more garbage flowing into our rivers or fewer green infrastructure projects keeping sewage from entering our streams, a financially strained water utility system means more pollution in the future. Water utilities are anchor institutions in their communities, providing essential public health service and family-sustaining jobs. Water infrastructure projects provide an important opportunity to jumpstart the state economy, while safeguarding clean water by investing in shovel-ready water and wastewater infrastructure projects as well as maintenance and repairs of the existing system.

Recommended Policy Interventions

- Appropriate \$360 million over 4 years to the *Pennsylvania Infrastructure Investment Authority* (PENNVEST) for drinking water and wastewater infrastructure projects. Funds should be set aside to support the design of green infrastructure alternatives in project development, which would support higher numbers of jobs including architects, planners, and laborers. Funding should also initially prioritize completing existing projects to get the most immediate job creation benefit as well as investments that leverage federal cost-share to increase the number of funded opportunities.³⁹
- Prioritize modern, green infrastructure water infrastructure solutions in state water investments—e.g. vegetated buffers, gardens, rooftops, and green spaces that naturally capture water—rather than traditional gray infrastructure—e.g. large tunnels, storage basins, treatment facilities—because they're quicker to develop, create immediate jobs, and provide equitable environmental benefits to communities (Neukrug and Koehler, 2020).
- Amend Act 30 of 2018 to include green stormwater infrastructure in the definition of "Water Conservation Project." This change would significantly increase available private capital through municipal Commercial PACE programs for green stormwater retrofits and projects without costing the state any funds.
- Create a *Green Stormwater Infrastructure Grant* program at DEP and initially capitalize the program at \$25 million. Currently, there is no central funding mechanism for green stormwater projects at the state level, aside from PENNVEST, that are open to any type of water project.⁴⁰ This grant program would provide financial assistance to projects currently in the design phase so that they can be fully engineered. This would retain and create immediate jobs because much of this work can be done remotely by landscape architects, engineers, and planners. It could also be leveraged by municipal water utilities and municipal separate storm sewer system (MS4) permittees to support their green infrastructure projects through the design phase.



Advancing Economic Recovery by Doubling Down on Pennsylvania's Clean Energy Industries



The investments in nature-based industries and green job policies described in this platform are a down-payment on a more vibrant and sustainable economy. The policy recommendations would keep nature-based industries from collapsing as well as put many Pennsylvanians back to work at a time of great public health and economic uncertainty. Recovering from the pandemic should not stop with short-term stimulus efforts though. Policymakers should go further and shift the state economy away from the industries that have put the Commonwealth in the shaky economic position it is in by doubling down on Pennsylvania's growing clean energy economy.

For too long, Pennsylvania has relied on oil, steel and coal—and now fracked gas—to prop up its regional economies through natural resource extraction, putting the state at a competitive disadvantage during times of recession and national crisis. And it is now almost singularly focused on the petrochemical industry as another fossil fuel enterprise that would monopolize future economic activity, leaving small and mid-sized towns without long-term sustainable industries as well as a disastrous environmental legacy.

What all these industries have in common is the brutal economic and environmental conditions they leave behind. Small and mid-sized towns and cities throughout the Commonwealth have seen populations decline, youth flee their hometowns, and wealth leave to surrounding states with more stable and diverse opportunities. Boom-and-bust economic cycles have become the norm for blue collar and union workers. Towns are constantly on edge for the next big fossil fuel industry bankruptcy. Green spaces and landscapes are left scarred with culm piles, brownfields, and abandoned wells, affecting how municipalities can attract new businesses and tourism.

“EVEN BEFORE THE PANDEMIC, THE FOSSIL FUEL INDUSTRY WAS HEADING TOWARDS A FINANCIAL CLIFF AND THE COVID-19 PANDEMIC HAS ONLY MADE THE LIKELIHOOD INEVITABLE.”



Transitioning Pennsylvania away from its dedication to natural resource extraction won't happen overnight, but doing so isn't impossible either. Even before the pandemic, the fossil fuel industry was heading towards a financial cliff and the COVID-19 pandemic has only made the likelihood inevitable (Richards, 2019). A recent report by CarbonTracker Institute predicted that the COVID-19 pandemic could cause a \$25 trillion collapse in future fossil fuel profits (CarbonTracker Institute, 2020).

The fossil fuel industry has relied heavily on government interventions to stay afloat, but those come at a significant cost to taxpayers. Pennsylvania taxpayers provide more than \$3.2 billion in fossil fuel subsidies, which equals \$794 per Pennsylvania taxpayer (PennFuture, 2015, p. 5). Fossil fuel companies have already benefited from \$1.9 billion in CARES Act tax credits to keep them afloat during the pandemic (Dlouhy, 2020). The very business model of the fossil fuel industry, even though it is well over a century old, requires taxpayers to pick up its tab before, during, and after its operation. In other words, industry profits are privatized, but its costs are born on society writ large.

Supporting a vibrant, thriving clean energy industry in Pennsylvania is critical to the future success of Pennsylvania's economy and the well-being of its environment. Clean energy employs more than twice the number of workers as fossil fuel industries (E2, 2019). Diversifying and future-proofing the state's energy portfolio is one way to position the Commonwealth as an economic leader, providing new and environmentally-safe opportunities for its residents. Prior to the pandemic, one in three jobs in Pennsylvania were clean energy jobs (E2, 2019) and clean energy was adding jobs five times faster than the overall state employment growth rate. According to the U.S. Bureau of Labor Statistics Occupational Outlook, the fastest growing occupations between 2018 and 2028 will be solar photovoltaic installers and wind turbine service technicians. The median pay in 2018 for solar photovoltaic installers was \$42,680 per year and for wind service technicians it was \$54,370 per year. Overall, as of 2019, there were 90,000 jobs in clean energy industries (E2, 2019).

While Pennsylvania was an early leader in renewable development and we have significant potential for solar generation, surrounding states have seen far stronger solar growth in recent years. According to the Solar Energy Industries Association, Pennsylvania ranks 22nd in the nation in solar development with New Jersey, Maryland, New York, and even Massachusetts having more solar installed and more solar jobs than Pennsylvania. A joint project of the PADEP and the U.S. Department of Energy recently concluded a 30-month stakeholder-led project to investigate actions that

could increase the amount of in-state solar generation from our current target of 0.5 percent by mid-2021 to 10 percent by 2030. Reaching these goals could create more than 100,000 job-years of construction jobs and over 1,000 direct ongoing jobs (PADEP, April 2019).

The U.S. Department of Energy also reports over 71,000 energy efficiency jobs in 2019 with a year-over-year increase of 2,623 jobs (U.S. DOE, 2020). As the independent statewide evaluator reports, significant additional cost-effective energy efficiency reductions are available through the Act 129 program and there is considerable potential for increased energy efficiency jobs (PA Pennsylvania Public Utility Commission, 2020).

In addition to clean energy being a job creator, it is also a key tool for creating a cleaner environment. Projections indicate that to avert the worst impacts of climate change we must achieve net-zero carbon emissions by 2050. Achieving that target will likely require renewable generation being used for 70 to 85 percent of electricity by 2050, limiting emissions from industrial sources between 60 and 90 percent, and sharply limiting gas to around 8 percent of generation (Intergovernmental Panel on Climate Change, 2018). Despite the job growth, many market and legislative barriers still hamper Pennsylvanians from fully benefiting when compared to other states. Pennsylvania can continue this trajectory by adopting the following recommendations. They will not necessarily provide job opportunities immediately, but would instead support strong, forward-looking clean energy industries to continue growing in the state so that our recovery from the pandemic is swift.



Enable Community Solar

While the distributed (largely rooftop) solar market has been strong for the past few years, it is estimated that 50 to 75 percent of residents lack effective access to solar power. Those impacted includes those living in multifamily housing, renters, low-income families, houses located in shady areas, and other situations. One solution to immediately expand access to solar development is to enable community solar in Pennsylvania, allowing solar consumers to buy or lease a share of a centralized solar system and count the resulting generation much like if it came from their rooftop. Bipartisan bills in the House (HB531) and Senate (SB705) would accomplish this goal. As soon as this program is enacted, private solar developers would be able to invest in developing community solar systems in Pennsylvania.

Incentivize Grid-Scale Solar

In addition to small distributed solar systems that often range from 5 kilowatts (kW) to 3 megawatts (MW) in size, Pennsylvania also has significant potential to install larger grid-scale solar systems such as the 70MW system that BP Lightsource is building under contract with Penn State University, or the similarly-sized system that Community Energy is building to supply power to the city of Philadelphia. One issue holding back development is the inability to craft long-term contracts to sell the power generated, making it more difficult to secure private investment.

To incentivize development, a requirement could be added to the State's Alternative Energy Portfolio Standards Act to ensure a certain percentage of the energy and alternative energy credits be obtained through competitively-bid long-term contracts of between 12 and 20 years.⁴¹

For example, state legislators could pass SB600 to extend and expand the current Alternative Energy Portfolio Standards Act to require the state obtain 30 percent of its electricity from clean Tier 1 energy sources by 2030 with a significant carve-out for solar photovoltaic generation.⁴² The solar targets in that bill alone could create over 100,000 construction jobs and over 1,000 on-going jobs at a net increase in consumer energy spending of 1.2 to 1.4 percent over the next 15 years (PADEP, November 2018), while making the necessary changes to allow for long-term contracting.

Expand Energy Efficiency Opportunities for Businesses, Homeowners, and Renters

Currently, Pennsylvania is in Phase III of the Act 129 Energy Efficiency Program and is working on developing Phase IV. As part of the Phase IV development, the Independent Statewide Evaluator (SWE) analyzed the potential for additional energy efficiency improvements and found that “if Pennsylvania were to pursue all cost-effective achievable potential per the Achievable Potential scenario, the SWE team estimated it would provide \$5.80 billion in present value benefits to the economy, at a present-value cost of \$4.75 billion. In other words, on average at full scale, for every dollar invested in efficiency, Pennsylvania would accrue \$1.22 in economic benefits.” Crucially, this is based on a very limited cost-benefit analysis and does not consider public health and environmental benefits. Nonetheless, it shows the significant benefit increasing investments in energy efficiency can have. To take advantage of this economic opportunity and expand the efficiency industry, three policies are recommended:

“ON AVERAGE
AT FULL SCALE,
FOR EVERY
DOLLAR INVESTED
IN EFFICIENCY,
PENNSYLVANIA
WOULD ACCRUE
\$1.22 IN ECONOMIC
BENEFITS.”

- **Update Act 129:** Unfortunately, Act 129 was designed with investment caps built into the program, which means many energy efficiency measures that can be deployed at no net cost to the consumer will not be required under the program. If legislation were passed removing the investment caps, the Public Utility Commission (PUC) would have the ability to ensure the program can maximize cost-effective emissions reductions.
- **Consider Energy Efficiency in Utility Rate Cases:** Currently, when an electric utility files for a rate increase with the PUC, the Commission must ensure that the proposed rate is “just and reasonable” (66 Pa.C.S. § 1301) before approval. Legislation could specify that such a determination requires the Commission to inquire if investment in reasonably available and cost-effective energy efficiency measures could achieve the same goals as a proposed rate increase.
- **Expand Commercial Property Assessed Clean Energy (C-PACE):** Pennsylvania recently took a positive step to encourage private investment in energy efficiency by enabling C-PACE. This program lets most commercial entities in participating municipalities obtain loans for clean energy investments that are paid for through property assessments. By lowering the risk for lenders, this makes private capital available at competitive rates. However, this program excludes commercial entities operating multi-family residential units. Nationwide data indicates that approximately 20 percent of the \$1.5 billion of C-PACE financings have been for mixed use and multi-family projects (PACENation, 2019). In Philadelphia alone, over \$40 million of mixed-use or multifamily projects have been prevented from accessing competitive capital that facilitates cleaner, healthier buildings. Based on C-PACE deal data from across the country, every \$1 million of C-PACE financing deployed equates to a carbon impact of removing approximately 1,000 cars from the road (PACENation, 2019). Through 2019, \$1.54 billion of C-PACE financing had been deployed, which created 17,848 jobs (Environmental Protection Agency, 2020). The average C-PACE project creates approximately 7 jobs and every \$1 million of C-PACE investment and will generate approximately 12 job-years (PACENation, 2019). Legislators can expand private investment in energy efficiency by amending the state’s C-PACE law to include multi-family residential units. This would provide a much-needed tool for landlords to retrofit apartment buildings and other multi-family dwellings.⁴³

Build Clean Transportation Infrastructure

In many areas of the country, transportation emissions are the largest source of carbon pollution and create significant adverse health impacts—particularly in densely populated areas.

The market for electric vehicles is expected to experience significant growth as internal combustion vehicles are expected to decrease to 40 percent of the market share by 2030, and with appropriate investment, the Northeast and Mid-Atlantic could see a 60 to 80 percent reduction in carbon pollution by 2050. Reaching this level would require regional investments of \$12 to \$25 billion, but would return over \$150 billion in savings to consumers. When both economic and environmental benefits are considered, net benefits grow to over \$311 billion. Two policies are important to consider:

- **Invest in infrastructure to support vehicle electrification:** One avenue to expand electric vehicle infrastructure is to work with our existing electric distribution companies regulated by the Public Utility Commission by passing SB 596 (Mensch). This bill would require the preparation of a transportation electrification opportunity assessment, a statewide goal for vehicle electrification 50 percent above the business-as-usual case by 2030, and the development of a framework and plans to electrify transportation infrastructure.
- **Implement a cap-and-invest program funding clean vehicles and infrastructure**
Currently, a number of states in the Northeast are working together on the “Transportation Climate Initiative Regional Policy Development Process” and have released a framework for a draft of the proposal. Under this framework, fuel suppliers would be required to report emissions to participating states consistent with state monitoring and verification requirements. They would also be required to obtain allowances sufficient to cover those emissions, most of which would be obtained through an auction. Proceeds from the auction would be returned to the participating state and would be invested to achieve carbon emission reductions, reduced air pollution, affordable access to transportation, and other policy goals.



Convening a Green Recovery Summit for Municipal Officials

It is important that the state stimulus and recovery efforts recommended in this framework do not lose sight of the county commissioners, mayors, and municipal officials often tasked with carrying out infrastructure projects. Ensuring that Pennsylvania’s recovery is equitable across communities and the state is critical so that an uneven economic renewal does not settle in like it did after the Great Recession.

To this end, Governor Tom Wolf should convene a statewide *Green Recovery Summit* of local and county officials to develop and adopt an economic recovery framework. The convening would discuss a green economy, assess its existing reach across the Commonwealth, and develop prioritized clean and sustainable infrastructure projects for investment so that state agencies and local officials are collaboratively working together and advancing projects as quickly as possible. Furthermore, it could be an avenue for federal officials and congressional staff to learn about shovel-ready projects and local sustainability needs while developing federal legislation.

Ultimately, the goal of the Summit is to build consensus and get state policy leaders on the same page. Stimulus and recovery dollars should be invested quickly to put people back to work, but it should also be done smartly. This platform document could provide a useful framework for such a convening, particularly because of its focus on infrastructure projects.

Paying for a Green State Stimulus and Recovery Package



The COVID-19 pandemic has created both a public health and economic crisis for Pennsylvania. Bold policies and investments are needed to fully recover from these historic challenges in a way that does not make the Commonwealth more prone to environmental devastation and boom-and-bust economies that have held our state back for generations.

To do this, state policymakers must explore diverse revenue options. The total cost of investing in this short-term stimulus and green jobs platform—\$2.83 billion annually—is significant, but proportional to the circumstances the state finds itself in. Long-term economic recovery through doubling down on the clean energy economy would require additional policy changes. Ensuring that deep budget cuts will not hinder environmental protection and job recovery would require even more. In this time of crisis, we should not confine ourselves to how Pennsylvania has attempted—and often failed—to stimulate its economy in the past, lest we relegate ourselves to another slow, mediocre recovery. We can, and should, do better.

State Leaders Should Shape Federal Stimulus Investments

It is widely expected that the federal government will continue to leverage its ability to print and borrow money at historically low interest rates to provide stimulus investments for states and municipalities. Some—if not much—of those dollars may be used for many of the types of programs described in this platform. State policymakers will have some discretion on how those dollars will be used and can shape their stimulus investments accordingly.

More importantly, Pennsylvania’s leaders, particularly Governor Tom Wolf, should not play a passive role in federal stimulus policy. States play a significant role in the development of federal stimulus response through formal channels created by the federal government (e.g. a task force) or informal avenues (e.g. Congressional delegation). For example, Governors played a key role in shaping the American Recovery and Reinvestment Act (ARRA) during the Great Recession, leading to roughly \$275 billion of the \$831 billion in total stimulus investments going directly to state and municipal

governments (Pew Charitable Trusts, 2019). This collaboration between state and federal officials allows for federal stimulus dollars to be directed at targeted programs as well as help plug important budget holes caused by the recession. This frees up the state to make even more targeted recovery investments that are tailored to state needs.

Implement New State Revenue Options

Federal stimulus dollars will not provide full funding for stimulus and recovery efforts, so policy-makers will have to develop new revenue. Additional revenue options are available to match the bold initiatives proposed herein to either directly fund the programs or support the payback of a larger bond initiative. Below is a list of innovative options, in no particular order, we believe the state should explore and implement as we recover from this unprecedented crisis:

- ***Establish a Pennsylvania Green Bank***

A number of proposals have been made, including a green bank and Energy Investment Partnerships,⁴⁴ that have the same goal in mind: create a state entity that leverages federal, state, and private sector dollars to invest in clean energy and clean water infrastructure projects. The entity would be capitalized by the state and offer low interest or low-cost loans and other financing mechanisms to support the types of projects described in this platform.

- ***Close the “Delaware” Loophole***

Establish combined reporting that requires corporations to more accurately report revenues earned in the state, rather than shift its tax burden between Pennsylvania and Delaware, where many businesses incorporate, but do not operate.

- ***Increase the Tipping Fee on Landfills***

State lawmakers could amend Title 27 to increase the disposal fee for solid waste disposed of at municipal waste landfills. Not only should the fee be increased, but it should be expanded to also be levied on those who dump from waste treatment processes such as fracked gas well operations.

- ***Levy a State Fee on Single Use Plastic Bags***

Implement a fee on single-use plastic bags to not only disincentivize plastic consumption and reduce litter in our streets and waterways, but also raise revenue for additional environmental programs.

- ***Eliminate Sales Tax Exemption for Bottled Water***

Under Pennsylvania’s tax code, bottled water is exempt from sales tax unlike other bottled drinks. This exemption could be eliminated to raise revenue as well as disincentivize the significant use of plastic water bottles.

- ***Expand Pennsylvania’s P3 Program to Include All State Projects***

Public-private partnerships (P3) are an opportunity to bring in private dollars into clean water restoration work. There are several types of P3s, such as pay-for-performance, Environmental Impact Bonds, and credit trading programs. In establishing a P3 program, Pennsylvania could leverage state money with private dollars to increase the funding available for clean water BMPs.

- ***Fully Implement Pennsylvania’s Entrance into the Regional Greenhouse Gas Initiative***

Pennsylvania is promulgating new rules that would create a carbon emission reduction program that is aligned with the Regional Greenhouse Gas Initiative (RGGI). Through this program, polluting entities would purchase annual credits to emit carbon and those revenues would be reinvested in pollution reduction programs. Fully implementing the program would create a pool of funds that could be used to support some of the recovery efforts described in this platform.



- ***Implement the Fair Share Tax Plan***

The Fair Share Tax plan would divide Pennsylvania’s personal income tax into a separate tax on wages and interest as well as a tax on income from passive wealth (e.g. dividends, capital gains, etc.). The plan would cut the income tax on wages from 3.07 percent to 2.8 percent and sets a new rate of 6.5 percent on income from passive wealth. According to analysis by the Pennsylvania Budget and Policy Center, the proposal would generate at least \$2.2 billion in new annual revenue, while cutting or leveling taxes for most in the Commonwealth aside from out-of-state taxpayers and the richest fifth of taxpayers in the state (Pennsylvania Budget and Policy Center, 2019).

- ***Eliminate Long-Standing State Subsidies for Fossil Fuels***

In 2015 PennFuture published an analysis identifying \$3.2 billion worth of subsidies received by the fossil fuel industry in Pennsylvania each year (PennFuture, 2015). That amounted to \$724 per taxpayer in the prior year. This includes exempting oil and gas reserves from property tax assessments—itsself worth nearly \$1 billion, a handout to Shell for the development of their ethane cracker plant worth \$1.6 billion, and numerous other tax breaks.

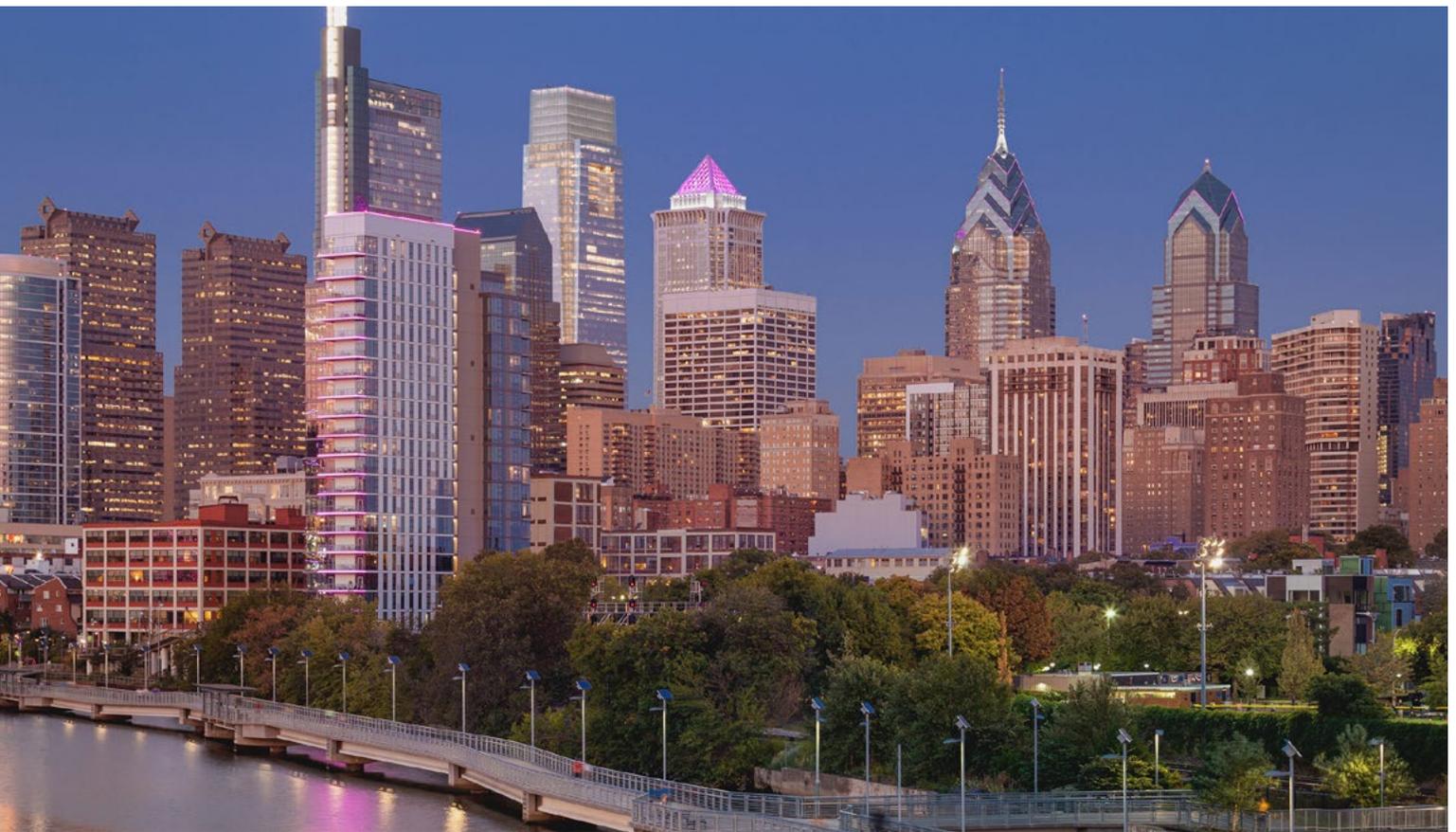
In the intervening years, we have seen a steady stream of proposals for many millions of dollars in new subsidies that will only take us further from reaching our climate goals. This includes HB1100 that, if passed, would result in hundreds of millions of dollars in additional subsidies for petrochemical plants, and SB 618 that would turn a \$10 million subsidy for waste coal plants into a \$45 million subsidy. Our recommendation remains that Pennsylvania should periodically review these fossil fuel subsidies, analyze the costs and benefits, and redirect these tax expenditures to cleaner alternatives.

- ***Levy a Severance Tax on Fracked Gas Drilling Production***

The Commonwealth remains the only fracked gas drilling state that doesn’t levy a severance tax. Instead, the industry and the legislature struck a deal during the early days of the industry to implement a so-called Impact Fee, which provides a flat fee per well that phases out over time. In comparison, a severance tax would generate revenue based on the amount of natural gas produced by the wells. In other words, Pennsylvania’s fracked gas industry is paying far less than in other states, particularly as the number of new wells drilled decreases over time. A severance tax could be enacted to support the green stimulus proposals in this framework, particularly as Pennsylvania transitions away from the fracked gas industry to more sustainable economic development opportunities.



Summary of Green Stimulus and Recovery Reforms and Investments



Pennsylvania is contending with historic public health and economic challenges that require a bold vision for economic stimulus and recovery to put the Commonwealth on a stronger footing in the wake of the pandemic than what existed before. This report lays out a policy roadmap that leverages Pennsylvania's growing nature-based, clean energy, and sustainable industries to create at least 389,000 jobs and build a more resilient and sustainable economy. The policy proposals described herein have four overarching goals:

1. Safely restarting the state economy in a way that limits the pandemic, reduces pollution, and protects human health.
2. Avoiding state budget cuts that will negatively harm economic recovery and nature-based businesses.
3. Targeting short-term economic stimulus investments that put Pennsylvanians back to work and provide family sustaining wages.⁴⁵
4. Advancing long-term economic recovery investments to support environmentally sustainable infrastructure and industries that underpin resilient and equitable communities.

Using these basic principles, the following policy recommendations are made to put people back to work, reduce pollution, and rebuild toward a more sustainable economy.

Investments and Policy Reforms Requiring Executive or Agency Action

Convene a Green Recovery Summit for Municipal Officials (see page 29)

Governor Tom Wolf should convene a statewide *Green Recovery Summit* of local and county officials to develop and adopt a sustainable economic recovery framework. The convening would develop a priority list of clean infrastructure projects so that state agencies can take quick action as well as provide a consensus framework document for future stimulus and recovery investments at the local level.

Safely Reopen and Support Nature-Based Small Businesses (see page 12)

- Create a one-stop shop of business recovery guidance for nature-based businesses.
- Develop a *Reopening Pennsylvania Nature Tourism* report on safely reopening during the pandemic.
- Launch an *Explore PA's Natural Beauty Campaign*, targeting in-state residents on how to safely take advantage of outdoor tourism during the pandemic.

Support Small Farmers and Food Producers (see page 14)

- Develop resources to connect job seekers to opportunities on farms during harvesting.

Address Legacy Drilling and Mining Pollution (see page 19)

- Pressure Pennsylvania's federal policymakers to support and pass the RECLAIM Act, which would provide at least \$300 million in mine reclamation funding to the state.

Modernize Our Homes and Businesses through Energy Efficiency Projects (see page 21)

- Work with the PUC to convene stakeholders to share best energy practices, develop new tools, and build consensus on advance payment provisions.

Invest in Clean Transportation (see page 29)

- Implement a cap-and-invest program to fund clean vehicles and infrastructure investments. One such initiative is the Transportation Climate Initiative Regional Policy Development Process.

Investments and Policy Reforms Requiring Legislative Action

Avoid State Budget Cuts that Will Harm Economic Recovery (see page 10)

- Reject broad-based austerity measures to balance the state operational budget, particularly by rejecting cuts to environmental, conservation, wildlife, and agriculture programs, and instead advancing policies that build-on these important agencies to jumpstart the economy.

Safely Reopen and Support Nature-Based Small Businesses (see page 12)

- Pass legislation allowing small business tax deductions for implementing safety measures and expenses.
- Increase funding for DCNR's *Community Conservation Partnership Program Grants* and temporarily eliminate the matching requirement.
- Provide operating grants of at least \$25 million to state *Community Development Financial Institutions* and other regional economic development entities to support nature-based small businesses, including in low-income black and brown communities and environmental justice areas.
- Re-capitalize the *COVID-19 Working Capital Access Program* by at least \$100 million to support nature-based businesses in regions that may not be able to reopen during the summer and fall tourism seasons.



Support Small Farmers and Food Producers (see page 14)

- Expand the *COVID-19 Working Capital Access Program* by \$250 million and increase eligibility to keep small family farms from cutting payroll or averting bankruptcy during the pandemic.
- Re-capitalize the *Resource Enhancement and Protection* tax credit by \$25 million and allow for more flexible credit trading.
- Expand DCNR's *Riparian Forest Buffer* program to \$1 million.
- Increase PDA's *Farmland Preservation* program to \$76 million to preserve more farmland during the pandemic and offset reductions in county investments.
- Establish an *Agricultural Cost-Share Program* and initially fund it at \$25 million per year to invest in farm pollution reduction projects that also improve land productivity.



Create a PA Conservation and Economic Recovery Corps (CERC) (see page 16)

- Set a goal of hiring at least 15,000 unemployed Pennsylvanians in the first 12 months for at least 6-month terms, which could be extended based on their needs and project needs.
- Projects would focus on state park and forest maintenance, habitat management, green storm-water infrastructure, stream buffers, Main Street beautification, agriculture projects, tree planting, and other natural infrastructure needs.
- CERC should supplement support for the agriculture sector as well as provide family-sustaining wages of at least \$24/hour, plus health benefits, paid sick leave, and paid time off.
- Counties should submit lists of CERC-based job opportunities, organized by DCNR's nature-based regions plus heritage areas so that projects are equitably spread across the Commonwealth.

Address Legacy Drilling and Mining Pollution (see page 19)

- Invest \$453 million over 4 years in DEP's *Abandoned & Orphan Well Program* to clear a backlog of 9,000 abandoned wells that are "shovel-ready."
- Invest \$220 million over 4 years to DEP for mine reclamation projects, doubling the number of projects sourced through existing funds.
- Create a public-private program, through the *Environmental Good Samaritan Act*, to expand the number of PA small businesses working to plug and reclaim abandoned wells and mine land.

Modernize Our Homes and Businesses through Energy Efficiency Projects (see page 21)

- Increase borrowing authority of the *Redevelopment Assistance Capital Program* by \$250 million to issues grants for energy efficiency retrofits in schools.
- Re-capitalize the *Pennsylvania Energy Development Authority* by \$100 million to provide financial vehicles for large efficiency projects.
- Increase funding for DEP's *Small Business Advantage* program to \$10 million and increase projects caps for efficiency projects at small businesses.
- Expand the DEP *Small Business Pollution Prevention Assistance Account* to \$20 million and expand loan eligibility to multifamily buildings.
- Expand DCED's *Weatherization Assistance Program* by \$20 million to support grants to low-income housing retrofits.



Support Shovel-Ready Clean Water Infrastructure Projects (see page 23)

- Appropriate \$360 million over 4 years to PENNVEST for drinking water and wastewater infrastructure projects, including set-asides for designing and implementing green infrastructure projects.
- Amend Act 30 of 2018 to include green stormwater infrastructure in the definition of “water conservation project,” so that clean water projects are eligible for Commercial PACE programs.
- Create a *Green Stormwater Infrastructure Grant* program at DEP, initially funded at \$25 million, to support projects in the design phase, including support for municipalities designing local projects.

Enable Community Solar (see page 27)

- Pass legislation that allows for community solar, increasing to 50 to 75 percent the number of PA residents with access to solar power if they choose to do so. Current bipartisan bills exist to do so, including HB 531 and SB 705.

Incentivize Grid-Scale Solar (see page 27)

- Amend the state *Alternative Energy Portfolio Standards Act* to ensure that a certain percentage of energy credits are obtained through competitively-bid long-term contracts as well as increase the share of electricity the state must source from renewable energy. Current bills exist to do so, including SB 600.

Expand Energy Efficiency Opportunities (see page 28)

- Remove the investments caps in Act 129 to allow for more energy efficiency projects at no net cost to consumers.
- Enact legislation to require the PUC to inquire if investment in available energy efficiency measures could achieve the same goals in proposed electric utility rate increases.
- Amend Act 30 of 2018 to include multi-family residential units as eligible to participate in commercial PACE programs so that landlords can retrofit apartment buildings.

Invest in Clean Transportation (see page 29)

- Prepare a transportation electrification opportunity assessment and set a statewide goal for vehicle electrification of at least 50 percent above business-as-usual by 2030. Existing bipartisan legislation exists to do so, including SB 596.



Conclusion



“THERE IS NO PLAYBOOK ON HOW TO NAVIGATE SUCH A CRISIS, BUT WE MUST PERSEVERE, ADAPT, AND ADJUST UNTIL THE THREAT OF THE VIRUS IS ELIMINATED.”

It is truly an unprecedented time in both Pennsylvania and the United States. A short decade after a historic global financial collapse, the state economy is being brought to its knees by a pandemic unseen in 100 years. Businesses are closing shop—many for good—as state leaders are all but forced to place restrictions on commerce and social interactions to limit the spread of the coronavirus and keep people safe and healthy. Until a viable vaccine or treatment is developed, the fear of infection will keep the state economy in a precarious limbo.

There is no playbook on how to navigate such a crisis, but we must persevere, adapt, and adjust until the threat of the virus is eliminated. While the safety of the state population is the first priority for any elected official, the economy is a close second. Unemployment and business closures bring about their own version of social pain that must also be limited as much as possible. Pennsylvania entered the pandemic in an already precarious position. Many counties and regions still had not recovered from the Great Recession, if not the longer-term economic decline caused by the collapse of heavy industry in the United States. While unemployment was low pre-pandemic, warning signs were blaring as the fracked gas and petrochemical industry hit yet another series of financial headwinds, farmers were injured by the Trump Administration’s trade wars with China and Europe, racial inequality continued to grow across the state, and the state’s ability to spark innovation and entrepreneurship had run flat. The pandemic has accelerated the economic decline that many observers warned was already starting to happen.

Unfortunately, the economy has declined rapidly, putting millions out of work in a few short months. Pennsylvania’s leaders should be working overtime to address the unemployment crisis, and this report lays out tangible investments to get people back to work safely. Historic times call for bold measures, and this policy agenda does not keep within the boundaries of past recessions because our current situation is not anything like those previous circumstances. Instead, it calls for bold investments and proposes new programming to rebuild our natural infrastructure, which not only provides people meaningful, profitable work, but it also creates a better, cleaner future—a true win-win.

“IMPLEMENTING THE REFORMS AND MAKING THE INVESTMENTS RECOMMENDED IN THIS POLICY PLATFORM WOULD BE IMPORTANT STEPS TOWARD BUILDING A MORE SUSTAINABLE, EQUITABLE, AND RESILIENT ECONOMY THAT PUTS PEOPLE BACK TO WORK TODAY...”



While this report is aimed at helping address the economic crisis, it is also an evergreen model for how state policymakers can diversify and modernize the economy. For too long, Pennsylvania has relied on natural resource extraction. The state has failed to grow its economy beyond this basic pillar, backing it into a corner whenever there is a national crisis or when the whims of the global market, investors, or even other countries hold it hostage. Stuck in this boom-and-bust cycle are its workers. Skilled labor, engineering, computer science, farm, white collar, blue collar, and service workers alike are impacted with little recourse. Black and brown communities continue to be beset by pollution and fewer economic opportunities. Decade after decade, state policymakers point to the same industries for help and the state gets the same results—a few boom years followed by environmental devastation and economic bust. A simple drive through small town Pennsylvania proves this point.

This time feels different. Many states surrounding Pennsylvania are diversifying their economies and pointing in new, more sustainable directions. Clean energy and the broader nature-based and sustainable industries have become bigger players than traditional fossil fuels, hiring a far more diverse set of workers for good wages. There is no reason why Pennsylvania cannot have the same. In fact, as this report details, we already have the underpinnings of these industries and they are ready to grow and expand operations. Natural resource extraction industries, like fracked gas and petrochemicals, are not offering a bold alternative as they scale back operations and face bankruptcies. Their time as economic leaders is waning. The traditional policy answer to an economic crisis—throw more taxpayer money at natural resource extraction industries—just does not fit Pennsylvania anymore.

Implementing the reforms and making the investments recommended in this policy platform would be important steps toward building a more sustainable, equitable, and resilient economy that puts people back to work today, but also advances industries to keep them employed in the future. We are also not shy about the platform's co-benefits: far less air, climate, and water pollution that makes people sick and impacts our communities. It is what makes these policies unique compared to other stimulus proposals. They simply cannot offer the important pollution reduction benefits that will greatly improve the quality of life of all Pennsylvanians.

Former Republican Governor of Pennsylvania and visionary leader of the U.S. Forest Service Gifford Pinchot once said that, “The vast possibilities of our great future will become realities only if we make ourselves responsible for that future.”⁴⁶ We call on Pennsylvania's leaders to take responsibility for the future of the Commonwealth and charter a sustainable path through the fog of a global pandemic and economic crisis. Bold leadership is needed and the pieces of a broad and prosperous green recovery are in place, if only our political leaders choose to take advantage of them.

Endnotes

- 1 Cases are tracked daily through the Pennsylvania Department of Health, accessed on July 7, 2020.
- 2 Pennsylvania has moved 67 counties to either a “yellow” or “green” phase reopening. A yellow phase re-opening includes continuing telecommuting, if feasible, prohibiting large gatherings of 25 or more people, continued closure of gyms, spas, nail salons, and entertainment businesses, as well as limiting restaurants and bars to carry-out and delivery. The “green” phase allows for further easing of restrictions on economic activity as long as CDC and Department of Health guidelines are strictly followed, including larger gathering sizes and more business capacity. Nonetheless, even a green phase includes restrictions and recommends strict social distancing guidelines.
- 3 The United Way Worldwide defines Family-Sustaining employment as employment that pays a family-sustaining wage, offers benefits including paid sick leave, and offers career pathways that provide opportunities for wage and career advancement. Also, the family-sustaining wage calculator through MIT estimates that in Pennsylvania a single adult with one child needs \$50,000 a year.
- 4 Note that Pennsylvania’s Department of Labor and Industry does not county agriculture employment due to the difficulty in gathering timely data. Nonetheless, it’s been well reported that farmers expect to be impacted by the pandemic, particularly as harvesting seasons begin in May. Referencing this state data does not ignore these issues, but rather is using the best available data for comparison.
- 5 A broad look at manufacturing can be found at Soergel (2020). A look at the trade impacts on steel and metal producers can be found at Daniel Moore (2020). A brief summary of impacts on Pennsylvania farmers before the Phase 1 U.S.-China trade deal, can be found at Pittsburgh Post Gazette Editorial (2019).
- 6 For a broader assessment of the industry, see Eavis (2020). In addition, it’s clear that the fracked gas industry must rely on subsidies to prop it up due to its economic fragility. For a summary, see Stonesifer (2020).
- 7 The total workforce complement in 2005 was 84,038 compared to 78,242 in 2019 according to the Pennsylvania Office of the Administration State Government Workforce Statistics—2020 report.
- 8 A significant body of literature exists that point to the economic and social troubles caused by austerity measures implemented, most recently, in response to the Great Recession. For recent input from economic experts, see the impacts of austerity in the United Kingdom (New Statesman, 2020), the impacts of austerity throughout Europe (Krugman, 2015), the lack of impact of fiscal expansion on debt/GDP ratios (Coppola, 2017), and a longer look back at the impact of austerity during the Great Recession in the United States and Europe (Krugman, 2019).
- 9 See Stuckler and Basu, 2013.
- 10 Beyond the direct costs of the two loan program projected costs, the additional policies listed are assumed to cost between \$500,000 and \$1 million to develop a hub of information on the DCED website as well as develop the industry-specific reopening plan. In addition, it’s difficult to estimate the cost in forgone tax revenue by allowing small businesses the ability to write-off clean and safety supplies, so a range in costs is provided.
- 11 The Department of Environmental Protection defines an environmental justice area as any census tract where 20 percent or more individuals live in poverty, and/or 30 percent or more of the population is minority. This is based on the most current census tract data from the U.S. Census Bureau and the federal guidelines for poverty. <https://www.dep.pa.gov/PublicParticipation/OfficeofEnvironmentalJustice/Pages/PA-Environmental-Justice-Areas.aspx>
- 12 The COVID-19 Working Capital Access Program was created to support small businesses (less than 100 employees) in the Commonwealth by providing low or no-interest loans of \$100,000 to cover 3 months of working capital costs. The Program was funded at \$61 million and is fully expended as of the drafting of this report.
- 13 If the programs are targeted correctly toward small family farms, the goal is to protect the 48,039 small farms that are less than 179 acres, but also assume this support will induce additional economic benefits for landscape, food and beverage manufacturing, and forestry segments of the industry. As such, a range is provided. It’s also difficult to assess new job creation potential of these programs, but increasing the conservation, buffer, and farmland preservation programs will provide new project support for both the CERC workforce described above as well as existing land accessors, watershed engineers, and project designers. A conservative range of 1,000 to 2,000 jobs for these policies is provided to reflect on this expected job creation.
- 14 TeamPA (2018) breaks employment data down further by noting that agriculture production (crops and animals) employ 80,645; forestry employs 64,078; food and beverage manufacturing employs 90,217; and landscaping employs 45,569.
- 15 It’s assumed that these costs include the proposed program costs described in the section above for the Pennsylvania Conservation and Economic Recovery Corps.
- 16 The PA Department of Agriculture Bureau of Farmland Preservation manages and tracks preservation funding. Their most recent 2019 spending allocation data for state funds totaled \$38 million.
- 17 According to the Bureau of Farmland Preservation, county governments invested \$18,265,081 in 2019 compared to \$56,264,081 total.
- 18 Cost estimate is based on the following calculation: \$50,000/year salary plus 15 percent for benefits, or \$57,500 total. For 15,000 new hires, this equals \$862,500,000. Administration costs are assumed to be 5 percent or \$28,750,000 for a total estimated cost of \$905,625,000. It’s assumed this is a maximum cost as the state will provide different salary grades for projects and this estimate assumes workers stay for a full year.
- 19 Many states have programs similar to the core ethic of the conservation corps, including the California Conservation Corps, Texas Conservation Corps, Montana Conservation Corps, and the Washington Conservation Corps. Many programs are certified through AmeriCorps.
- 20 Information about the Pennsylvania Outdoor Corps can be found here: <https://www.dcnr.pa.gov/outdoorcorps/Pages/default.aspx>
- 21 Leadership from the following agencies would be important to consider: Department of Environmental Protection, Department of Conservation and Natural Resources, Department of Community and Economic Development, Department of Agriculture, Game Commission, Fish & Boat Commission, and the County Conservation Districts.
- 22 CERC should consider diverse skill sets and job opportunities so that employment opportunities are available for laborers, engineers, architects, recent graduates, unskilled workers, and other trades.
- 23 This would be a 156 percent increase in workforce for environmental protection, agriculture preservation, and general conservation projects. According to the Pennsylvania Office of Administration Workforce Statistics Dashboard for 2020, DCNR’s full-time workforce totals 1,245, plus an additional 1,300 seasonal employees during peak park and forest visitor season. DEP’s full-time workforce totals 2,326. The Department of Agriculture totals 541, the Game Commission employs 642 workers, and the Fish & Boat Commission employs 348 workers. The total, existing workforce for the main environmental and conservation state agencies is 6,402.
- 24 Through conversations with the DEP and current well plugging companies, we estimate the existing well plugging workforce accounts for 15 Pennsylvania companies, each employing approximately 20 employees, or 300 total direct jobs. If the 15 currently operating companies were to add one crew of 6 to 8 employees to fulfill the proposal of plugging 9,000 wells over the next 4 years, this would add 100 new, direct jobs. The DEP internally estimates that the construction workforce needed to support plugging 9,000 wells would create 4,700 additional full time jobs. Broadly, the DEP estimates that 300 total jobs are created per \$25 million invested in abandoned well plugging, or 5,400 jobs.

- 25 Dixon & Billbrey (2015) calculated the economic benefit of abandoned mine reclamation by using the Department of Interior (DOI) annual economic benefit reports. For FY2012, 7,817 jobs were created from \$490 million in AML investment and 4,761 jobs were created in FF2013 on \$322 million. Respectively, this equates to 15.9 and 14.7 jobs created per \$1 million invested in abandoned mine reclamation. A more recent FY2018 DOI economic report provides data that suggests 2,027 jobs were created in Pennsylvania on \$55.7 million in AML grants, or 36.4 jobs per \$1 million investment. Using a more conservative estimate—14 jobs created per \$1 million invested—it's estimated that \$220 million in investment would create 3,080 new jobs.
- 26 Pennsylvania has mined coal since 1790, beginning just 14 years after the Declaration of Independence was signed. Coal and mining was essential to this state, to families and to communities, and to the success of the country, but its hey-day is past. It has left a bewildering legacy of harm: Tens of thousands of lives have been lost in mining accidents and many more have been lost to a horrendous disease called black lung.
- 27 In 2008, Congress reduced the per ton fee on surface mined coal by 10 percent to 31.5 cents and underground mined coal by 10 percent to 13.5 cents. In 2013, the fees were reduced again to 28 cents and 12 cents respectively. Combined with an industry-wide reduction in coal mining, Pennsylvania's share of AML funds has fallen from a high of \$67 million in 2012 to \$33 million in 2019.
- 28 For a look at some of Earth Conservancy's reclamation projects, see: <https://www.earthconservancy.org/projects/>
- 29 For more information on Growing Greener, see: <https://pagrowinggreener.org>. For more information on RestorePA, see: <https://www.governor.pa.gov/newsroom/governor-wolf-releases-seven-detailed-white-papers-on-restore-pennsylvania-initiative/>.
- 30 Through conversations with DEP, the approximate cost of properly plugging each abandoned well will cost \$50,000. To clear out the 9,000 well backlog on DEP's priority list, it would cost \$450 million or \$112.5 million per year over 4 years. Eight new DEP full-time employees to support managing this program would each cost \$100,000 per position for 8 positions or \$800,000. The total cost over 4 years would be \$3.2 million.
- 31 According to the DEP, AML Fund grants to Pennsylvania were \$33 million in 2019 and are projected to increase to \$55 million in 2020 and \$54 million in 2021.
- 32 The American Council for an Energy-Efficient Economy provides job multipliers for investments in energy efficiency. Because of the diverse, and more labor intensive, nature of energy efficiency activities, projects average 20 gross jobs per \$1 million of investment, of 7,940 projected new, gross jobs.
- 33 In an "Energy Burden" review of 48 major U.S. metropolitan areas that African-American and Latino households spend disproportionate amounts of their income on energy and that more energy efficiency measures would help close the gap by at least one-third. Philadelphia ranked 8th, with low-income households paying 8.8 percent of their household income on utilities - more than three times the amount than higher income households that pay on average 2.3 percent.
- 34 PEDA last awarded funds for 21 projects in 2014 for a total investment of \$81 million. With an investment of \$100 million, it's estimated that 25 large projects could be provided funding.
- 35 This convening was proposed by the Keystone Energy Efficiency Alliance (KEEA) in their Act 129 Phase IV public comments, found here: <https://kealliance.org/keea-covid-policy-response/>
- 36 The Value of Water Campaign study The Economic Benefits of Investing in Water Infrastructure finds that for every \$1 million invested in clean water and wastewater projects, between 15 and 18 jobs are created. Using the more conservative number of 15 jobs, this includes 6 direct jobs and another 9 indirect jobs triggered by the initial investment. Therefore, based on a total proposed investment of \$385 million, we estimate 5,775 jobs would be retained and created.
- 37 It's unknown what kind of job impact changes to the state C-PACE law would have, though it's estimated it would generate immediate project opportunities. As a result, the economic impact of that policy change is not included in the estimates for this report.
- 38 The study assumed that increasing rates on water and wastewater by 1.5 percent each would reduce the funding gap to \$4.2 billion. Federal funds would further reduce the gap, leaving Pennsylvania with a \$900 million state investment gap, of \$90 million per year.
- 39 Federal water infrastructure investment vehicles, such as the EPA's Water Infrastructure Finance and Innovation Act (WIFIA) and the USDA Rural Water Program, all limit the percentage of projects that can be funded by federal or program resources.
- 40 Other states, including New York, Massachusetts, and New Jersey provide much broader state grant programs for green infrastructure, in addition to traditional methods of financing water projects.
- 41 In addition to small distributed solar systems that often range from 5 kilowatts (kW) to 3 megawatts (MW) in size, Pennsylvania also has significant potential to install larger grid-scale solar systems such as the 70MW system that BP Lightsource is building under contract with Penn State University, or the similarly-sized system the Community Energy is building to supply power to the City of Philadelphia. One issue holding back development is that, without long-term contracts to sell the power generated, it's difficult to secure private investment. To incentivize development, a requirement could be added to the State's Alternative Energy Portfolio Standards Act to ensure a certain percentage of the energy and alternative energy credits be obtained through competitively-bid long-term contracts of between 12 and 20 years.
- 42 See e.g. SB 600, Section 3.2.
- 43 It's unknown what kind of job impact changes to the state C-PACE law would have, though it's estimated it would generate immediate project opportunities. As a result, the economic impact of that policy change is not included in the estimates for this report.
- 44 For example, the Coalition for Green Capital and the Nature Conservancy have proposed a Pennsylvania Energy Investment Partnership as a way to support distributed energy projects.
- 45 The United Way Worldwide defines Family-Sustaining employment as employment that pays a family-sustaining wage, offers benefits including paid sick leave, and offers career pathways that provide opportunities for wage and career advancement. Also, the family-sustaining wage calculator through MIT estimates that in Pennsylvania a single adult with one child needs \$50,000 a year.
- 46 Gifford Pinchot's quote can be found in his compendium of essays under the title The Fight for Conservation.

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Author Bios



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He has testified before Congress and his work has appeared in numerous national and state news and media outlets. Matthew was also a Christine Mirzayan Science and Technology Fellow at the National Academies of Science, where he worked with the Transportation Research Board to analyze light duty vehicle energy reduction policy strategies. He also served as fellow at the Breakthrough Institute, where he focused on clean energy innovation policy opportunities, and participated in the inaugural Millennial Trains Project.

Matthew holds a B.Sc. in Meteorology from Millersville University as well as a M.Sc. in Science, Technology, and Public Policy from the Rochester Institute of Technology.



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Lena serves as a Campaign Manager for Clean Water Advocacy for PennFuture. In this role, Lena leads a high-impact campaign around clean water issues, focusing on elevating green stormwater infrastructure as a key environmental issue among Philadelphia's municipal leaders and residents.

Before joining PennFuture, Lena was a Senior New Jersey Organizer and Policy Advocate with Food & Water Watch, where she organized communities to protect the right to public water in Atlantic City and block fracked gas pipelines in the Pinelands. She also successfully lobbied the New Jersey Senate and other state policy makers around a fracking waste ban, as well as renewable energy policies.

Lena holds a M.S.W. in Social and Economic Development from Washington University in St. Louis, and a B.A. in Social Work and Spanish from Gordon College in Wenham, Massachusetts.



Rob Altenburg

Rob acts as the director of the PennFuture Energy Center, in which he analyzes and provides expert comments and testimony on legislation and regulations. Rob speaks extensively throughout Pennsylvania to students, community groups, and other organizations on climate and energy issues.

Rob previously spent nearly 22 years with the Pennsylvania Department of Environmental Protection. He calculated and predicted emissions from factories, vehicles, and off-road equipment. That led to predicting concentrations of air pollutants for the Bureau of Air Quality using computer models. He served as an executive policy specialist in DEP's policy office advising the governor's office and department executive staff on a variety of environmental and public health issues.

Rob also attended Widener Commonwealth Law School and graduated cum laude, earning certificates in both environmental law and administrative/constitutional law through Widener's Law and Government Institute. He is licensed to practice law in Pennsylvania.

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Emily manages PennFuture’s issue campaigns, organizes coalition efforts, and maintains relationships with policymakers, members of the organization, and the general public. Overseeing a staff of experts, she is familiar with numerous environmental issues including watersheds, sustainability, urban issues, forest conservation, climate action, air pollution, and consumer energy issues.

She is the state lead for both the Coalition for the Delaware River Watershed (CDRW) and Climate Action Campaign (CAC). Emily also manages the “Our Pocono Waters” campaign, an Exceptional Value (EV) stream designation community and legislative outreach campaign in the Pocono Mountains region.

Emily earned a B.S. in Environmental Resource Management from Keystone College.



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Sarah is the Campaign Manager for Clean Water Advocacy in the Erie office. In this role she manages the Our Water, Our Future campaign advocating for clean water in the Lake Erie Watershed.

Prior to joining PennFuture, Sarah was the Chairperson of the Biology Department and Co-Director of the Environmental Science program at Mercyhurst University. She also previously served as the university’s Sustainability Officer. In that role, Sarah oversaw university efforts toward sustainability, including energy benchmarking, and chaired the Green Team and Sustainability Fund Review Board.

Sarah earned her B.S. and M.S. in Zoology at Michigan State University.



Renee Reber

Based in the Harrisburg office, Renee leads PennFuture’s clean water advocacy efforts in the Susquehanna basin and serves as the Pennsylvania state lead for the Choose Clean Water Coalition.

Prior to joining PennFuture, Renee served as an Associate Director of Clean Water Supply at American Rivers working in both the Delaware and Susquehanna river basins. At American Rivers, Renee focused on green stormwater infrastructure and municipal stormwater management. In her capacity as Associate Director, Renee also served on the Pennsylvania Department of Environmental Protection’s Chesapeake Bay Stormwater Workgroup and on the Department of Conservation and Natural Resources’ Riparian Forest Buffer Advisory Committee.

Renee holds a B.S. in Environmental Geography and a M.S. in Environmental Studies, both from Ohio University.



PennFuture is leading the transition to a clean energy economy in Pennsylvania and beyond. We are protecting our air, water and land, and empowering citizens to build sustainable communities for future generations.

Citizens for Pennsylvania’s Future—PennFuture—was created in 1998 as a statewide environmental advocacy organization. Since our founding, we have achieved significant legal and policy victories that reduce pollution and protect the environment. We have provided millions of dollars in pro bono legal services while setting critical precedents and enforcing environmental laws across the commonwealth.

Our team is working daily to protect public health, restore and protect natural resources, and move Pennsylvania toward a clean energy future. With offices in Harrisburg, Pittsburgh, Philadelphia, Erie, and Mt. Pocono, our team litigates cases before regulatory bodies and in local, state, and federal courts; advances legislative action on a state and federal level; provides public education; assists citizens in public advocacy; engages with grassroots citizenry to support environmental causes; and engages with communities to increase participation in democratic processes.



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Director of Government Affairs, PennFuture
to the Joint Pennsylvania Senate & House Democratic Policy Committees
“A People’s Budget: the Environment”

Good afternoon, Chairwoman Muth, Chairman Bizzarro, Subcommittee Chairwoman Fiedler, and Members of the Senate and House Democratic Policy Committees. Thank you for the opportunity to speak today on behalf of PennFuture, a statewide environmental advocacy organization leading the transition to a clean energy economy in Pennsylvania and beyond. We protect Pennsylvanians’ air, water, and land, and work to empower citizens to build sustainable communities for future generations.

My name is Ezra Thrush and I serve as PennFuture’s Director of Government Affairs, based in our Harrisburg office. I work as our organization’s chief liaison to the legislative and executive branches in our state and federal governments.

The Commonwealth finds itself today burdened with myriad challenges; some were created by years of state policymakers refusing to side with everyday Pennsylvanians and instead kicking the can down the road. Some of these challenges were created by policymakers who were happy to oblige Pennsylvania’s industry by making the Commonwealth’s treasury a piggy bank.

Pennsylvania Must Adequately Invest in Environmental Protection & Conservation

For years we knew that Pennsylvania had been chronically underfunding and understaffing its critical resource agencies, with the worst-hit being the Commonwealth’s Department of Environmental Protection (DEP). Though the agencies have been largely flat-funded the last several years, we are still slipping away from meeting our investment goals spectacularly, because these funding levels only provide for the cost-to-carry expenses. The historic budget cuts that have happened at our agencies over the last twenty years have left the DEP down 900 jobs and nearly 40% funding since 2002.

On top of this, we are obligated to invest \$324M annually into watershed cleanup in the Chesapeake, we face a \$1B backlog on maintenance and infrastructure at the Department of Conservation and Natural Resources, plus much more. PennFuture has been tracking and researching this issue for some time and preliminary findings show that the Legislature and Governor must increase funding levels in a 3 or 5-year plan to get Pennsylvania back on track or we will be underwater for quite a long time. We must reject all calls for austerity measures in public budgeting.

Simply put, Pennsylvania policymakers are not rising to the occasion. To meet the moment, at this juncture, the Commonwealth requires significant, bold, innovative, and robust investments. Making the same policy decisions around funding the environment and conservation in Pennsylvania as last year, and the last five to ten years, is not acceptable. To do this, policymakers must be serious about revenue generation.

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State Policymakers Should Harness, Leverage Opportunities for Stimulus & Recovery

To that end, PennFuture has been thinking about this for some time. This past July, we published a new report on [“A Green Stimulus & Recovery Platform for Pennsylvania”](#) offering a way forward through, and out of, the coronavirus pandemic and its induced economic recession. In it, PennFuture makes dozens of policy and funding recommendations, including putting forward ideas for revenue generation in Pennsylvania. We call for significant state and federal investment and include a push for a climate and conservation jobs platform.

The four overarching goals of the platform are:

1. Safely and equitably restart the economy in a way that protects human health from both the pandemic as well as pollution,
2. Avoid state budget cuts that will harm economic recovery and set back our nature-based businesses,
3. Target recovery investments that put Pennsylvanians back to work rebuilding our natural infrastructure, and
4. Support Pennsylvania’s homegrown sustainable industries, like clean energy, that have long-term growth trajectories.

The policy agenda is estimated to require \$2.83 billion in annual investments for the duration of the crisis and recovery, preserving or creating as many as 389,000 jobs.

	Total Investment	Jobs Preserved or Created
Preserve Nature-Based Small Businesses		
<i>Support Nature-Based Tourism Businesses</i>	\$130 million	250,000
<i>Support Small Farmers and Food Producers</i>	\$340 million	102,000
Green Jobs Program		
<i>Conservation and Economic Recovery Corps</i>	\$905 million	15,000 (Minimum)
<i>Legacy Drilling and Mining Pollution</i>	\$673 million	8,480
<i>Shovel-Ready Energy Efficiency Projects</i>	\$397 million	7,940
<i>Shovel-Ready Clean Water Infrastructure</i>	\$385 million	5,775
TOTAL, Jobs and Stimulus Proposals	\$2.83 billion	389,195

The federal government also has a role to play with advancing a just, People's budget for environmental protection and conservation in Pennsylvania that helps to put residents back to work, while cutting carbon emissions and curbing water pollution, for instance.

As a part of the executive committee for the new Reimagine Appalachia coalition with labor and economic development partners, PennFuture also supports its federal policy blueprint which could bring stunning, and much-needed, investment to the Keystone State and our Appalachian neighbor states. If enacted, Pennsylvania stands to gain as many as 243,000 family-sustaining jobs while building out our infrastructure to be more resilient, adaptive, and clean.

The Reimagine Appalachia coalition is advocating for federal policy change and appropriations to bring this money home to our region, centering on building a 21st century sustainable Appalachia, that would include repairing the damage done in the last century, modernizing the electric grid, expanding manufacturing by making it more efficient and cleaner, building a sustainable transportation system, and relaunching the Civilian Conservation Corps.

A parallel effort completed in the last few months is the Marshall Plan for Middle America led by the City of Pittsburgh, University of Pittsburgh, PERI, and other stakeholders. For similar levels of investments, we see similar jobs numbers. This federal investment and re grants to state and municipal governments through either of these programs would mean huge, positive growth for Pennsylvanians.

Curbing, Eliminating Fossil Fuel Subsidies Can Bring Significant Revenue to PA's Budget

A key way to bring about revenue generation for Pennsylvania's investments in environmental protection, clean energy, climate, and conservation initiatives is to reign in our out of control giveaway of money to polluting fossil fuel industries in the Commonwealth.

On February 22, PennFuture released its third edition of its fossil fuel subsidies report, "Buried out of Sight: Uncovering Pennsylvania's Hidden Fossil Fuel Subsidies." PennFuture was able to identify over 50 ways that our state and local governments subsidize fossil fuels. Of the \$3.8 billion total in FY 2019, the shale gas industry captured 52.1 percent, or \$2.0 billion. Pennsylvania's unconventional gas industry also caused at least \$11.1 billion in external damages in FY 2019, including water well contamination, negative health impacts like asthma and cancers, and damages to public infrastructure. These damages cost an average of \$867 per resident.

Fossil fuel subsidies distort Pennsylvania's economy in favor of an industry which degrades the environment, threatens public health, and destabilizes the climate, all while robbing our state and local governments of resources to pursue core functions including, ironically, the regulation of fossil fuel companies. The federal government is now stepping in to address these historic wrongs on the national level, and Pennsylvania legislators must do the same. Pennsylvanians doled out \$3.8 billion in fossil fuel subsidies for Fiscal Year 2019, or about \$296 per Pennsylvania resident. This represents a 14 percent increase from previous analyses conducted by PennFuture in 2015, which means our fossil fuel subsidy problem in Pennsylvania is getting worse, not better.

Conservative estimates put US fossil fuel subsidies at \$27.4 billion each year. After factoring in negative externalities, however, the International Monetary Fund (IMF) values this number closer to \$649 billion annually. This makes the United States the second largest fossil fuel subsidizer in the world. It is no mere coincidence then that the United States is also the largest producer of fossil fuels.

Despite widely accepted evidence that taxation plays only a minor role in investment decisions, states continue to use fiscal policy to attract oil and gas investment – and study after study shows that Pennsylvania is winning the race to the bottom.

Despite a scientific consensus regarding the climate crisis, Pennsylvania remains one of the largest fossil fuel states in the nation yet our elected officials have refused to move away from supporting the industry at every turn. If our elected officials had a chance to inject billions of dollars back into Pennsylvania’s annual state budget, why wouldn’t they act immediately to do so?

We offer 5 solutions:

- (1) End economic reliance on fossil fuels,
- (2) Reduce subsidies for greenhouse gas emissions,
- (3) Shift the public health burden of shale gas development to the industry,
- (4) Restore \$2.0 billion in foregone revenues by enacting a severance tax and forcing industry to pay its fair share, and
- (5) Track and reduce fossil fuel subsidies by requiring annual reports on the purpose, progress, cost, and success of DCED’s tax credit, grant, and loan programs.

Pennsylvanians Deserve a Budget that Centers Critical Environmental Investments

We call on Gov. Wolf and Members of the General Assembly to be bold and creative when crafting the finer details of this budget. Pennsylvania is still in the midst of intersecting crises with the ongoing pandemic, the climate crisis, and longstanding crises of inequity. We need real and immediate action, not for lawmakers to check boxes in a business-as-usual approach.

PennFuture stands ready to aid Pennsylvania policymakers in guiding, devising, and advocating for these good public policies that would bring about increased economic and environmental benefits to the People’s budget process.

“The vast possibilities of our great future will become realities only if we make ourselves responsible for that future.”

- former Governor of Pennsylvania & first leader of US Forest Service, Gifford Pinchot

Thank you, once again, for hearing my testimony today. Please feel free to reach out and let us be a resource for you.

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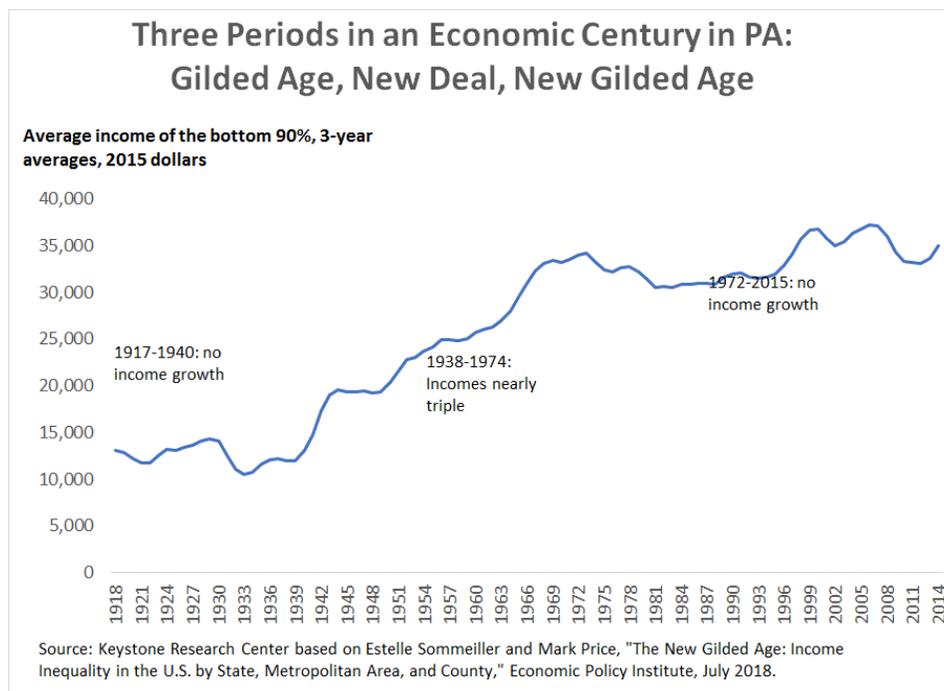


The ReImagine Appalachia Campaign: A New Deal That Works for US

Testimony of Stephen Herzenberg before the Joint Senate and House Democratic Policy Committee on
A People's Budget: The Environment

Thank you for the opportunity to testify before this joint policy committee today. My name is Stephen Herzenberg. I am an economist and the executive director of the Keystone Research Center (KRC), an economic research and policy organization that began operating in 1996 and the mission of which is to promote a more prosperous and equitable Pennsylvania. KRC is also proud to house the Pennsylvania Budget and Policy Center, which leads the We The People Pennsylvania campaign with many great partners. Since our creation by the leadership of Pennsylvania's statewide labor movement, the mission of KRC has always been to define, and elevate, an alternative to the conservative narrative in Pennsylvania politics—and, in so doing, to help persuade more hearts and minds to support policies that promote a Pennsylvania economy and politics that work for all, and the common good. We applaud this joint committee for organizing these hearings on a "People's Budget," and for seeking to offer Pennsylvanians a positive vision and the specific policies in such a budget that would improve people's lives.

I was asked to speak today about the "ReImagine Appalachia" campaign and about its potential economic impact in Pennsylvania. ReImagine is a four-state project focused on the Ohio River Valley spanning SW PA, SE OH, WV, eastern KY and on how to ensure that an aggressive response to climate change can boost economic opportunity and benefit working people. The framing and the messaging of ReImagine reflect its regional origins. The Ohio Valley includes a mix of some places that have faced persistent poverty (much of WV and KY, Greene and Fayette Counties in PA) and other places which thrived in the New Deal but have faced downward mobility since the 1970s (the rest of SW PA much of eastern OH including Youngstown). For all four states, a line graph shows that the inflation-adjusted average income of the bottom 90% (i.e., most of us) has not increased since the 1970s after tripling since the late 1930s (more in KY because of a lower starting point).



Because of its economic history, this region has viewed environmental regulation, and climate change, with deep suspicion. Because of the region’s economic history, the idea of a “Green New Deal” has not resonated, at least initially. Similarly, in this region more than others, many labor leaders interpret the concept of a “just transition” as “an invitation to a funeral.”

Given the economic history and politics of the region, ReImagine Appalachia campaign has approached the issue of climate change in three distinctive and complementary ways.

First, we developed our policy framework using a process aimed at making it resonate and unify people within the region. We received input from over 100 people and organizations within the region—starting with a digital convening in March 2020. We surveyed all the opinion and messaging research specific to our region that we could find. The resulting framework, released in July 2020, has three broad buckets: expanding opportunity through public investments, building a 21st century sustainable Appalachia, and rebuilding the middle class (an infographic in this [one-sheet summary](#) of the RA framework shows the framework visually).

- Expanding opportunity through public investments highlights the need to attach labor and community standards to government investment in reducing carbon emissions. Labor standards should ensure good wages and union rights—a sustainable economy should grow the number of good union jobs in our economy. Community standards must ensure that diverse workers can access those good union careers. In addition, we must create equivalent new jobs for coal workers. ReImagine Appalachia is not about creating new jobs that workers don’t want in places they don’t want to move to; it’s about creating good new jobs where they live.
- Building a 21st century sustainable Appalachia drills down into the carbon footprint of the region and spells out the public investments needed to achieve zero net carbon emissions by 2050.
- Rebuilding the middle class, our third bucket, recognizes that most jobs today are not carbon jobs or jobs directly associated with reducing carbon jobs. Most jobs are service jobs, too many of which pay poorly. Thus, a much higher minimum wage and real union rights for all—which allow many low-wage service jobs to be unionized and transformed into middle-class union jobs, like the transformation of manufacturing in the 1930s through 1950s—are needed alongside aggressive climate response to achieve a “New Deal That Works for Us.”

Second, we have highlighted that the investments needed to get to net zero—and detailed in our second bucket—will create hundreds of thousands of good jobs, many of them trades and industrial-type jobs. These are jobs for laborers laying rail, electricians and pipefitters building out a smart grid and universal high-quality broadband, operating engineers repairing the damage from centuries of extraction, boilermakers in combined heat and power plants, machinists and maintenance workers in energy efficient factories of the future, members of the Civilian Conservation Corps planting trees, restoring wetlands, and helping farmers adopt “regenerative agriculture” practices that absorb more carbon.

We commissioned state-level studies by the Political Economy Research Institute (PERI) at the University of Massachusetts-Amherst to estimate the number of jobs the RA blueprint would create in Ohio, Pennsylvania, and West Virginia, the third of these released earlier today. The Pennsylvania study, released in late January, estimated that 243,000 jobs would be created in Pennsylvania—and I should underscore that this is *Pennsylvania as a whole*, not just SW PA. The RA summary of the PERI PA study has tables that show job creation in each of the major investment areas in the RA second bucket. The full PERI study—135 dense, data rich pages—has immense detail on the quality and union density of these jobs. The PERI study also estimates job loss for coal workers and estimates the cost of what the

United Mine Workers call “true transition”—three years of wage insurance and full coverage of health and pension benefits for retirees. The general point is clear: even in Pennsylvania, the job creation from aggressive climate response is more than an order of magnitude—well over 10 times—the loss of fossil-fuel jobs.

Third, we have engaged labor unions extensively in the development of our framework and the fleshing out of that framework in white papers (so far on broadband, clean manufacturing, and regenerative agriculture/CCC 2.0; coming in the next months, a series of papers on “repairing the damage” and a white paper on community and labor standards). We want RA policies to be as union friendly as we can make them—and we can only achieve that with help from our labor friends. The good news is that a growing number of labor representatives share our view that aggressive climate response can be a jobs bonanza and are on board a broad campaign to ensure that as many of those jobs can be unionized as possible. (One illustration of this is the video that the IBEW local leader from the Harrisburg area, Rob Bair, narrated for the Biden Campaign. Since the election is over, I’m now able to share that link with you: https://youtu.be/CJ-V_WT0uAA.)

Over the next few months, the focus of the RA campaign will be lifting the voice of our region to help shape the climate infrastructure plan expected as the next major piece of federal legislation after the American Rescue Plan. We will be reaching out to elected officials in the region to encourage them to support a common “ask” for our region—one that will provide the federal investment we need to kick start the creation of a New Deal That Works for US in the Ohio Valley and in Pennsylvania. Right now, we are crafting that common “ask.” So, stay tuned for a knock on your door asking for your endorsement of that common ask and help advocating with the PA Congressional delegation.

Let me close my oral remarks on an optimistic note. Many of us spend a lot of time worrying about division—and the blue-green divide has been one of the deepest and most enduring in Pennsylvania politics. The ReImagine Appalachia campaign, however, has found that an overwhelming majority of people in our region share a common vision of the world they want. Working families and those worried about climate change want an economy with opportunity for all that also nourishes rather than destroys our planet. Women and men, and people of every hue and ethnicity, want hard work to be rewarded again and a way to contribute to the greater good while also putting food on the table and a roof over their head. Young and old want our communities and our region to thrive, and our forest and farmlands, the places people walk, bike, hunt, run, kayak, and find love within and across generations—the places called home—to blossom anew with hope and promise, not suffer from despair and decline. People of every stripe want to claim as never before their democratic birthright to shape the future we all want—and to end the tired tradition of distant corporations and one-percenters stealing political power for their narrow, selfish, and sometimes hateful, ends. If we approach climate response the right way—committed to ensure that it benefits working people—it can be the cause that brings us together to end four decades of conservative rule and to create a better future for us all.

[Some critical links to learn more about ReImagine Appalachia and to stay current on our campaign.

- The website: <https://reimagineappalachia.org/> — this is a good repository of RA material.
- The Facebook page: <https://www.facebook.com/ReImagineAppalachia/> — most RA public events are now streamed on Facebook live; for that reason and because of other posts, this is a good way to
- The RA campaign video: please watch it, like it, share it: <https://www.facebook.com/watch/?v=331010637929441>

- The blueprint: https://reimagineappalachia.org/wp-content/uploads/2020/09/ReImagineAppalachia_Blueprint_092020.pdf
- The blueprint one-sheet summary with the infographic referred to above: https://reimagineappalachia.org/wp-content/uploads/2020/07/ReImagineAppalachia_Summary.pdf
- The PERI study of the jobs impact of implementing the RA agenda: <https://reimagineappalachia.org/wp-content/uploads/2021/01/Pollin-et-al-PA-Final-Report-1-22-21.pdf>
- The RA summary of the PERI jobs brief: <https://reimagineappalachia.org/wp-content/uploads/2021/01/PA-RA-PERI-brief-1-25-2021-Final.pdf>
- White Papers: scroll down the “Resources page” — <https://reimagineappalachia.org/resources/>
- RA press coverage (which needs updating since late September) — <https://reimagineappalachia.org/press/>. RA has been extensively covered in the press, including a second time this past week in *The Atlantic* because of the potential of our agenda to unite urban and rural areas.
- The Weekly Newsletter: another way to stay current. On the resources page again, but scroll further down: <https://reimagineappalachia.org/resources/>

**Joint Senate and House Democratic Policy Committee
A People's Budget: The Environment (2/25/21)**

Hello. My name is Dr. Ned Ketyer. I appreciate the opportunity to speak to you today.

I live and work in Washington County just south of Pittsburgh.

I am a pediatrician who retired from clinical practice in 2017. I am still a member of the American Academy of Pediatrics Council on Environmental Health.

I am a medical consultant with SWPA Environmental Health Project — a non-profit public health organization dedicated to helping people living near shale gas operations avoid harm.

I am a board member and President-elect of Physicians for Social Responsibility Pennsylvania, which helps gather the evidence regarding the severe health threats all of us face in Pennsylvania from fracking, and from climate change.

I am a cancer survivor — kidney, filtering organ — so I understand how chemicals in the environment make people sick, and sometimes destroy lives and livelihoods.

I am also a husband and a father, obligated to protect my family's health and safety at any cost.

My children deserve clean air and pure water, and so do yours — that is their constitutional right here in Pennsylvania. And all children deserve to live on a planet with a stable climate system in order to thrive.

The waters of southwestern Pennsylvania are polluted. The air stinks more days than it doesn't, and that seems to be the case throughout Pennsylvania. **Industrial polluters** need to be held accountable for the damage they are doing to the health of the people living nearby and to the communities in which they operate. The constant industrial stench isn't helping anybody in this state, except maybe the bottom lines of the industries doing the polluting.

Achieving and maintaining clean air, pure water, and preserving natural, scenic, historic, and aesthetic values of the environment for all of us, and for future generations, requires agencies within our government — the DEP and DOH, especially — to actually protect the health of the environment and the people. The **statewide grand jury report** issued last summer made it crystal clear how those two agencies have failed to protect Pennsylvania's environment and public health. The report was scathing and found both agencies to be incompetent and negligent in their responsibilities to protect the citizens of PA, unresponsive to complaints of damage to health and property done by fracking. That damage is still happening today, and both agencies are underfunded and understaffed, made worse by the pandemic.

As you all know, we have a **childhood cancer crisis** in Southwestern Pennsylvania. High numbers of rare childhood cancers — leukemias, brain tumors, kidney tumors, and bone cancers like Ewing sarcoma — a rare and frequently fatal bone cancer in children, teenagers and young adults. Far more cases than would be expected to occur in a similarly populated, mostly rural area. And new cases keep popping up. Parents and doctors are deeply concerned that emissions, spills, chemicals, and dangerous toxic and radioactive waste from fracking may be to blame for this spike of rare childhood cancers. The DOH has commissioned two health studies regarding fracking, one of which will look a little deeper into the cancer crisis. But more studies need to be funded, including an urgent investigation into the industry's radioactive waste

stream, a crisis which the industry ignores, and the DOH and DEP show little interest in investigating.

The **grand jury** proposed eight recommendations that can go a long way to protect health, ensure safety, and regulate an inherently dirty and dangerous industry. These recommendations should be debated in the legislature and adopted. Regulators need the tools and the money to do their jobs of protecting the people without being influenced by the industries they regulate.

Funding will be critically important when Pennsylvania joins other states in the **Regional Greenhouse Gas Initiative**, to stay compliant with the rules and standards that are implemented.

DEP and other agencies will be critical to the success of the governor's efforts to eliminate fugitive **methane leaks** from natural gas infrastructure. Unfortunately, those methane rules are still too weak and they must be strengthened by ramping up inspections and covering emissions from all gas wells, including low producing wells. All of this will require well-funded agencies that are well-staffed and not influenced by money and corporate talking points.

Earlier, I mentioned the different hats that I wear when I speak about the need for environmental protection and the need for public health champions in government. But there are two hats I don't wear: economist and politician.

I don't have to tell you that scarred landscapes and degraded ecosystems aren't good for the state's **economy**. That shale gas development is a disaster for the small towns that allow it. That expanding **petrochemicals and plastics** in SWPA will also be a disaster for the region as it turns into a new Cancer Alley. I believe any job that directly threatens my health and the health of my children, and the sustainability of life on this planet, isn't worth filling. We need to move beyond fracked gas and make other arrangements for our energy, transportation, food, and material needs. And the science says we need to do so very, very quickly.

I am not a politician either. So I implore each of you to acknowledge your connection with the natural world and with each other. Be a champion of public health because the health of your children and grandchildren, of your friends and neighbors, and of your constituents throughout the Commonwealth depend on you.

My mother used to say, "If you don't have your health, you don't have anything at all." Without a clean and vibrant environment, without clean air and pure water, without protections that prevent profit-driven corporations from harming us, we won't have good health. We won't have anything. 6:40

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- “The Human Toll” by Don Hopey and David Templeton, Pittsburgh Post-Gazette

Part 1 (May 14, 2019)

<https://newsinteractive.post-gazette.com/childhood-cancer-pittsburgh-pennsylvania-canon-mcmillan-pollution/>

Part 2 (July 18, 2019)

<https://newsinteractive.post-gazette.com/fracking-and-health-2/>

- *The Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (the Compendium) - 7th edition* (December 2020)

<https://concernedhealthny.org/compendium/>

- Philadelphia Inquirer op-ed: “Biden’s executive order on oil and gas drilling does little to protect health in Pa.”

<https://www.inquirer.com/opinion/commentary/biden-executive-orders-climate-change-oil-gas-drilling-pennsylvania-20210202.html>

- SWPA Environmental Health Project

<https://www.environmentalhealthproject.org>

- Physicians for Social Responsibility Pennsylvania

www.psrpa.org

Heaven Sensky, Center for Coalfield Justice

Good afternoon. My name is Heaven Sensky, and I am a community organizer with the Center for Coalfield Justice serving Washington and Greene Counties in Southwestern Pennsylvania. The Center for Coalfield Justice is a grassroots environmental justice non profit that serves to educate our communities on fossil fuel operations and advocate for healthier, safer communities. My primary role is to serve as a community liaison around all issues related to fossil fuel extraction in our communities, particularly the impacts of oil and gas development. It is a privilege to present to you today on the substantial impacts of the state budget on the health and safety of our communities.

This past year, I have been the lead organizer on a frightening reality for the people of Southwestern Pennsylvania. We have seen disproportionate high rates of *rare* childhood cancers across our rural communities, increasing from 2008, that make up more than 30 cases of only 250 recorded nationwide. We have seen a 150% increase in the prevalence of bone cancers, sarcoma cancers, in our communities since 2008. We have seen lower birth weights, higher rates of thyroid conditions, and more children with debilitating asthma. I reference this because it notably coincides with the fracking boom that has taken over our backyards, and people are frightened.

People feel unsafe in our communities. There is widespread distrust in the government's ability to keep their children safe. Despite the alarming reality of what is statistically distinguishable, there has been little to no public health intervention. What there has been is continued permitting and build out of potentially dangerous fossil fuel infrastructure next to school yards and playgrounds and all around our homes.

In the midst of all of this, the agencies that are supposed to protect us are once again getting their resources cut. The Department of Environmental Protection and the Department of Health are the only authorities that stand between us, and the industrial buildout of harmful fossil fuel infrastructure in our communities. Cutting the resources of the authorities that are the last stand to protect us is not going to help them to do their job and will not minimize distrust among communities with their government.

Through the impacts of covid, we have seen the worst of what a lack of in-person inspections has led to. The oil and gas industry has operated unregulated, and residents have gone without support for potentially life threatening complaints. All of this in the wake of the Attorney General's investigation proving that Range Resources poisoned the waters of our communities. All the while industry continued to receive permits to build out new infrastructure. Now we face budget cuts, to the already struggling regulatory agencies that are supposed to be protecting us.

When operations go unregulated and unenforced because of under funding, the health and safety of our communities is threatened. We know that in 2019, the industry received 3.1 billion dollars

in tax subsidies. This is the same size as the GDP of some countries. Why are we allowing the industry to skate by on tax cuts, while our communities are suffering and our regulatory agencies are not resourced adequately to do their jobs? How is it even a question that we cannot minimize oversight of the operations of an industry that is *dangerous* to the extent of which is so immeasurable that we do not even know the existential impact of their operations?

If agencies were funded well enough, the unknown of industry operations would not go unregulated, uninspected, or unchecked. Residents could call the DEP with concerns of operations on their property, and expect an in-person inspection within 24 hours. Complaints and violations would be followed through, and companies would be held accountable to the mistakes that they make on their life-threatening sites. There is also something to be said about the ways in which the legislature could push to ensure that agencies are enforcing and providing oversight despite who holds the positions of authority in said agencies, despite the culture of oil and gas in our state, and despite the money that crosses hands in our political system.

It is absolutely imperative that these agencies hold companies accountable who continue to grow and establish larger operations in our backyards. Our lives depend on it.

Bret Jennings

Councillor, Great Bend Borough

Chairman, Hallstead Great Bend Joint Sewer Authority

With living in Susquehanna County, I have been seeing all the oil and gas development and have been wondering has anyone looked at any increases to the recognized pollutants: total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS)?

Or, how much has oil and gas development in the Chesapeake Bay watershed increased the recognized pollutants that the Commonwealth and lower subdivisions are responsible for removing?

Some areas this would be caused from oil and gas development run off, removal of planted tree buffers installed around water bodies and building increased drainage systems while increasing the weight holding ability of dirt roads for oil and gas development.

Some of the developments are well pads, pipelines, compressor stations, holding yards for pipes and chemicals, fleet truck maintenance facilities and building new gas company operational headquarters. On the small scale locally, it could be a few acres here, a few acres there, but when looking at it from a watershed level it is hundreds of miles of development or a good size urban area added to the watershed.

One small way to look at this is from the documents from each oil and gas related project which are highly theoretical, but instead using cross boarder testing that is already done to locate waterway crossing into New York State from Pennsylvania as gas drilling expanded in the Susquehanna River Basin. Examples would be the Snake creek or Choconut creek basins in Susquehanna county. Both are large enough, both cross the NYS and PA lines before entering the Susquehanna River and both were developed quickly to allow for a few years of pre, during and post oil and gas development.

If PA does not meet the 2025 reduction goals or fails to assure the EPA of progress to meet that goal or the past 2017 goals in the interim, the EPA as in the 2009 December letter where they spelled out the areas where they could use thier oversight with NPDES permits to force compliance. This will financially affect municipalities with MS4 or stormwater permits and the wastewater permits.

Erica Tarr

Pennsylvania Resident, Glen Mills, Edgmont Township
Written testimony, A People's Budget: The Environment

We are a family living with a contaminated well in Edgmont Township, and the DEP, the EPA and environmental laws have failed to protect us. We strongly feel that if a company laying a pipeline wants to drill through an area that only has private wells and no public water access, that company should be responsible for bringing public water access to all properties that may be affected by drilling activities.

Prior to construction of Sunoco/Energy Transfer's Mariner East 2 pipeline, our original well yielded clean, potable water and did not require any treatment; we were able to safely drink the water directly out of the ground without any filtration. After an Inadvertent Return (IR) at the Mariner East 2 drill site behind our property, that required continuous sucking of groundwater to clean up the spill, our original well water suddenly changed in quality and quantity and was ultimately deemed inoperable.

Our only option was to drill a new well, as public water access is not available where we live. We drilled a new well and discovered that the new well is contaminated with legacy contaminants from a previous Sunoco pipeline rupture of jet fuel that was not fully remediated back in the 90s. For months, we were unable to use the water to wash our hands or to brush our teeth; we had to use hand sanitizer to wash our hands and bottled water to brush our teeth. We were unable to shower or bathe our toddler in our own home. We drove our dirty dishes and dirty laundry to family members' homes to clean the necessities. We ultimately installed two granular activated carbon filters to remove the contaminants/volatile organic compounds (VOCs), in addition to two water softeners, a 5 micron and a 1 micron filter, and a UV light to treat bacteria. The installation of the equipment proved to be a short-term solution, as the harshness of the water has ruined the equipment beyond repair. We are back to showering and bathing our toddler at family members' homes and loading the car with dirty laundry to bring to our relatives and neighbor's homes to clean.

We have spent over \$40K attempting to get clean water, and we are back to square one, needing to invest in new equipment in order to treat our only water supply. We can't just drill a new well, because we don't know where exactly on our property and at what depth the legacy contamination exists. We would need to get hydrogeological studies done to determine the water quality underground, but that would set us back another \$50-100K, money that we simply do not have.

The DEP has stated, "the Commonwealth is one of only a few states where the legislature has chosen not to regulate private drinking water wells." While the DEP sampling has confirmed our VOC contamination, they have stated, "none of the (VOC) samples taken indicate any exceedances of USEPA's maximum contaminant levels or primary State medium specific concentrations... risk assessment would demonstrate that there is no need to replace your water supply for the volatile organic compounds (VOCs) found in your well."

Well water is supposed to be a natural, free resource. We have had to install multiple pieces of equipment to treat our water, we had no other option. We cannot simply live with (drink, bathe in, etc.) water that has trace amounts of jet fuel in it, even though it is "below EPA limits." It is not fair to my family to have to live with this contaminated well. According to both the PA constitution and the United Nations, clean water is a basic human right. We need clean water to live. Are profit margins for a big oil company more important than life itself?

The ultimate solution to our contaminated water supply and the legacy contaminants underground is public water. We do not have the resources and funding to extend the public water main 0.4 miles to our property for the \$500K that was quoted by Aqua, the public water supplier.

We live in Edgmont Township, in Delaware County Pennsylvania. Edgmont Township is 9.8 square miles in area and there have been three Sunoco pipeline leaks in history that have led to ground contamination leaving behind legacy contaminants. The Mariner East 2 pipeline was drilled next to all three contamination sites in Edgmont Township, none of which have access to public water at this time. Myself, in addition to my neighbors who live on the properties surrounding the contamination site, drafted a public water petition documenting the reasons why public water access should be made a priority for our general vicinity. There were 24 properties who signed and supported the petition. The petition was presented to Edgmont Township's board of supervisors who reached out to Aqua to get a quote. Without underground hydrogeological studies to "prove" the contamination, the Township could not present legal action against Sunoco/Energy Transfer and force them to pay for the installation of the public water main. The Aqua quote stated that each property would need to agree to tie in, and the fee would be approximately \$30K per property for the install of the water main, not including the connection fee to the house which would cost between \$10-15K depending on the distance away from the street to the water main. This needs to be addressed by the pipeline company, local, and state officials. Resident's water supplies have been impacted and it is unacceptable to force private well owners to fend for themselves and drown in their water woes without any assistance from the responsible parties.

Comment from Karen Feridun, Better Path Coalition re: A People's Budget: The Environment

Thank you for allowing me the opportunity to comment on behalf of the members of the Better Path Coalition, a statewide frontline and grassroots-led coalition calling for an end to shale gas development in Pennsylvania.

The methane molecule that enters the atmosphere as you read this will still be there when it's too late to avoid the worst impacts of climate change. That should be the only reason the state needs to draw down shale gas development as quickly as possible.

Hours before your hearing, the Delaware River Basin Commission is anticipated to vote to ban fracking in the basin, something they have been preparing to do since 2017. It is the [Commission's view](#) that "fracking activities have resulted in impairment to water resources, the environment, human health, and ecosystem health." Their assessment is backed up by roughly [2,000 peer-reviewed studies, reports, and government documents](#) that point to an even wider range of impacts than those the Commission identified.

An [analysis](#) of the research concludes that there is "no evidence that fracking can be practiced in a manner that does not threaten human health directly and without imperiling climate stability upon which public health depends." If there's any need for a second reason for a draw down, that's it.

Unfortunately, Pennsylvania shows no sign of slowing production of greenhouse gases. To the contrary, the state is trying hard to help the industry expand its operations. To make matters worse, there doesn't appear to be any evidence to suggest that regulators in Pennsylvania have had the capacity for or interest in trying to make those operations as safe as possible. In 2014, then-Auditor General Eugene DePasquale described the Department of Environmental Protection as being "[woefully](#)" unprepared to manage shale gas development. Last year, a [Grand Jury](#) "uncovered systematic failure by government agencies in overseeing the fracking industry and fulfilling their responsibility to protect Pennsylvanians from the inherent risks of industry operations."

Several years ago, I was part of a group that met with DEP's O&G chief Scott Perry and members of his staff. In our first meeting, he told us that he was working in another division of the DEP when fracking was on the horizon. He told us that he moved to the oil & gas division because he could tell it was going to be big and wanted to be where the action was. It is unacceptable to call something the big new thing and then treat it like the old thing, but that's what Pennsylvania did.

New York and Maryland banned fracking before ever allowing it to begin based on studies they did. No such studies were done in Pennsylvania. Pennsylvanians were treated like test subjects in a real time laboratory experiment.

And so it follows that the state that allowed its citizens to become externalities in the industry's business plan also refused to increase funding of the agencies that would be charged with oversight of the industry. In fact, during the first years of the fracking boom, DEP's [budget was cut](#) from "\$229 million in

2008 to \$125 in 2012.” According to the Independent Fiscal Office, the state collected \$198 million in [Impact Fees](#) in 2019. Of that, only [\\$6 million](#) went to the DEP.

During a decade of cuts, under both Democratic and Republican administrations, the agency was unable to keep up with routine oversight, much less emerging science on previously untested industrial practices. Rather, repeated attempts have been made to make DEP crank out permits faster by [streamlining the process](#), [privatizing it](#), and establishing a [Permit Decision Guarantee](#).

The only solution the DEP has found to stay afloat is to use the fines collected from companies that violate the rules, sometimes with catastrophic consequences. In 2019, [Perry explained](#) that the agency was able to avoid a shortfall by using the \$30.9 million collected from Energy Transfer for the explosion of the one week-old Revolution pipeline the previous year that leveled one home, damaged other homes, buildings, and vehicles, and traumatized the community. None of the money the DEP collected went to the victims of the explosion.

Similarly, charges resulting from the Grand Jury investigation into Range Resources, Cabot Oil & Gas, and others were filed under the Clean Streams Law, so any fines collected will go to the Clean Streams program. None of it will go to the people who have lost their private drinking water supplies.

Pennsylvanians left to their own devices to get compensation for their losses at the hands of a company enter into nondisclosure agreements that provide them with money in exchange for their silence.

The state has failed Pennsylvanians in every possible way. Given that the overarching issues are ones that threaten our very existence, fully funding the DEP doesn't begin to solve the problem. However, even if the state were to follow the DRBC's lead and ban fracking immediately to avert a climate catastrophe, the legacy issues that remain, like the maintenance of hundreds of thousands of orphaned and abandoned wells in perpetuity, will require staggeringly expensive regulatory oversight. Addressing the countless harms done to Pennsylvanians must become the state's job, rather than the victim's. Funding of the DEP at a level that equips it to deal with the challenges we face must be accompanied by measures that ensure that the state addresses the needs of those shale gas development has already imperiled.