

BURIED OUT OF SIGHT

UNCOVERING PENNSYLVANIA'S HIDDEN FOSSIL FUEL SUBSIDIES



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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

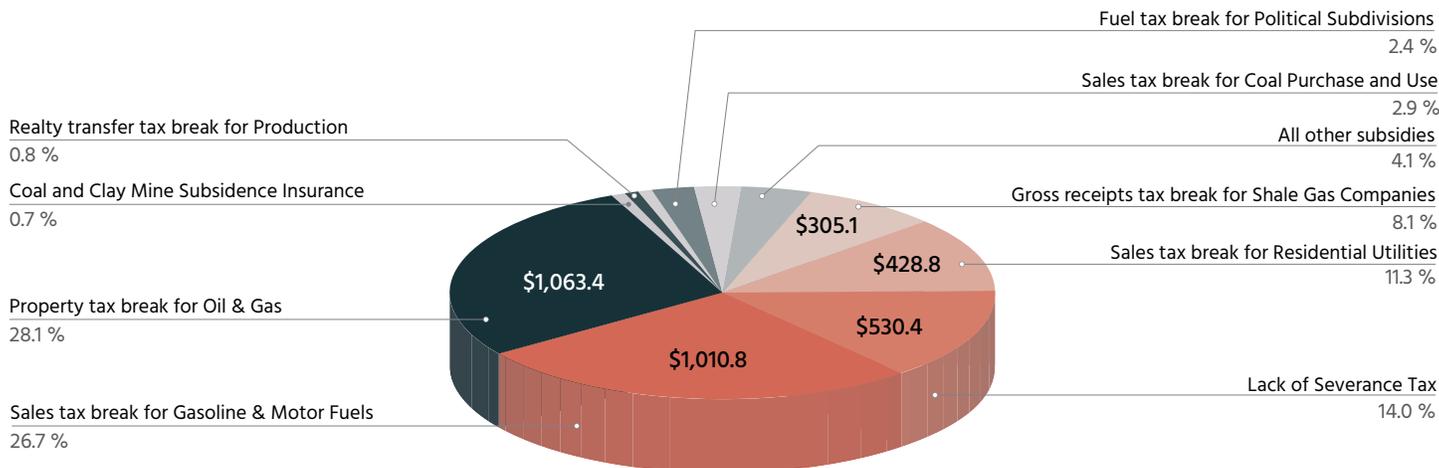


Climate scientists overwhelmingly agree that failure to drastically curb greenhouse gas emissions will result in calamitous social, ecological, and economic consequences. And right now, we are failing. Pennsylvania must act upon these dire warnings by taking concrete action to reduce greenhouse gas emissions, 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.

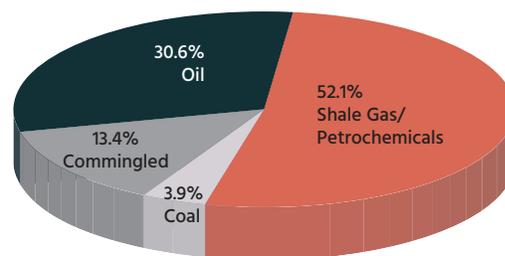


**PENNSYLVANIA'S
TEN LARGEST
SUBSIDIES COMPRISE
96 PERCENT
OF THE TOTAL
SUBSIDY VALUE.**

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.

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SEVERANCE TAX ON
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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.

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RESOURCE
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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
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A LEVEL OF DEMAND
FROM FRACKED GAS
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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
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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.

**THE SECOND
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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
APPALACHIA
WAS AWARDED
A \$10 MILLION
PENNSYLVANIA
FIRST GRANT FOR
THE CREATION
OF JUST 400 JOBS.
THIS IS ON TOP OF
THE \$1.65 BILLION
TAX CREDIT IT
RECEIVED FOR THE
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.

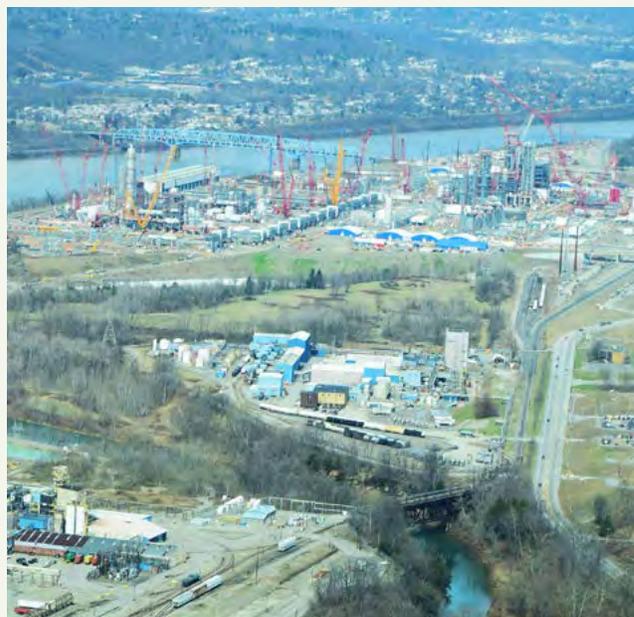
Beginning in 2011, Shell Chemicals announced plans to build a massive petrochemical complex in either Ohio, West Virginia, or Pennsylvania, pitting the three states against each other in a competition to land the company.

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.

INITIATED IN 2016
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PIPE’S FUNDING
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\$24 MILLION
APPROPRIATION
FROM THE UNDER-
UTILIZED ALTERNA-
TIVE ENERGY
INVESTMENT ACT,
WHICH SUPPORTS
WIND, SOLAR,
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
TRANSPARENCY
MAKES IT
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ASSESS EXACT
SUBSIDY
AMOUNTS.**

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.

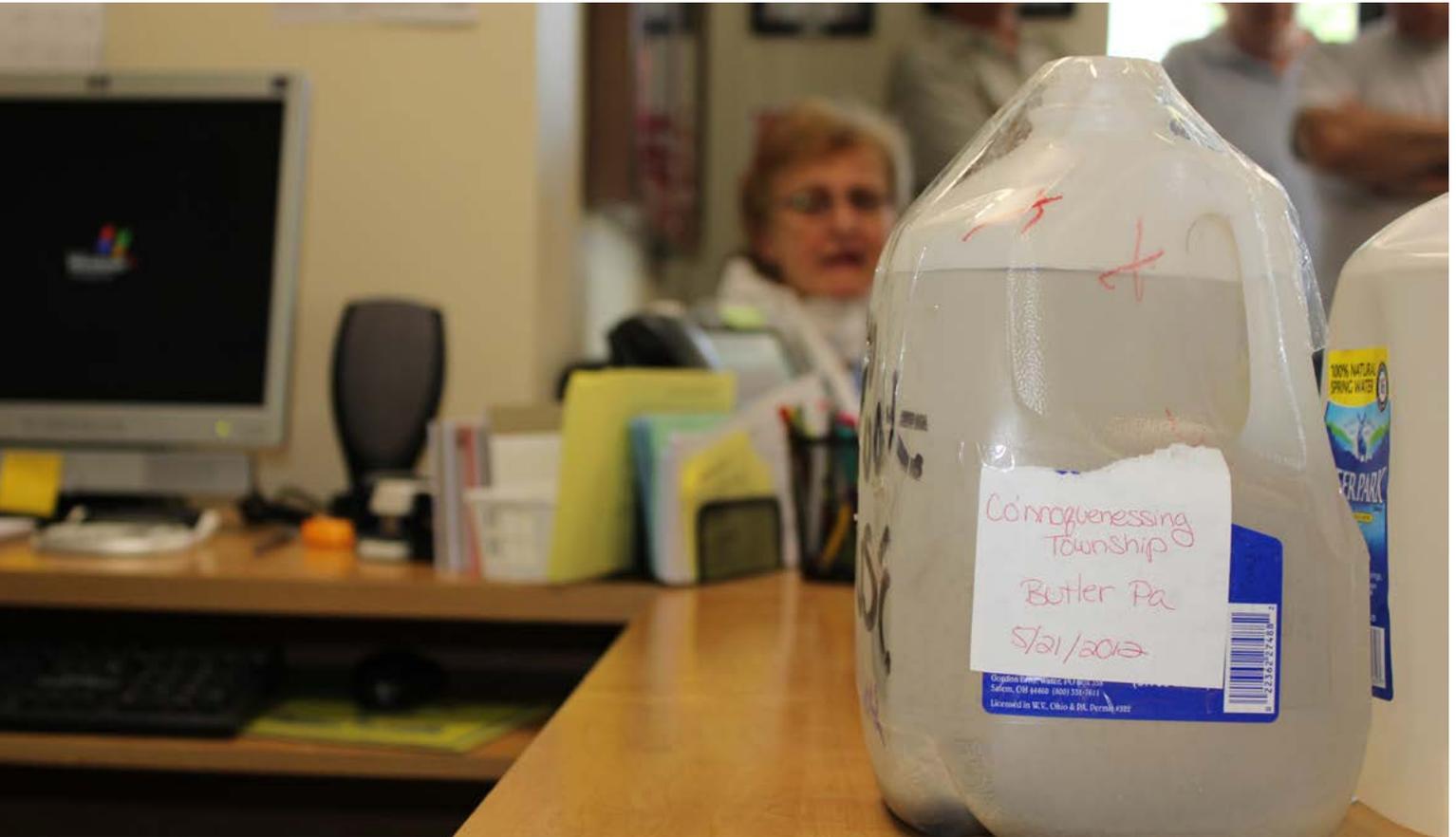
In contrast, current spending is intended primarily for economic development. While much of DEP’s spending can be attributed to past regulatory failures, DCED and PennDOT spending directly improve the economics of the present-day fossil fuel industry, either by intentionally targeting its growth or by 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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JOBS DRY UP,
AND RENTS AND
ROYALTIES DRY
UP SOON AFTER.**

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.



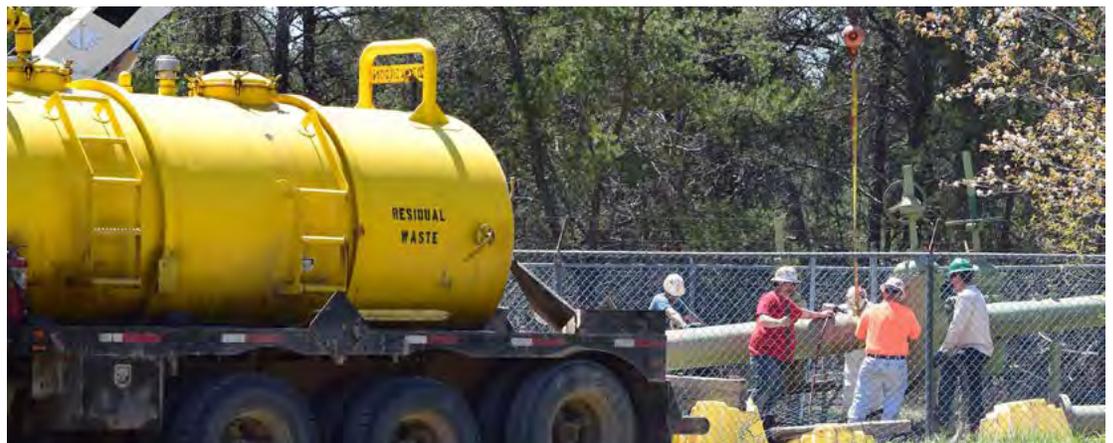
Pennsylvania's implementation of the CAA's aggregation policy is not protective of public health, resulting in reduced costs to the drilling industry which are then externalized as negative public health outcomes.

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.

THESE PIPELINES
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19 DAYS, RESULTING
IN A TOTAL OF
TWO INJURIES,
TWO FATALITIES,
598 BARRELS OF
HAZARDOUS
LIQUIDS SPILLED,
AND \$13.4 MILLION
IN REPORTED
COSTS.

- **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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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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OF NEWLY
ABANDONED
WELLS.

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.

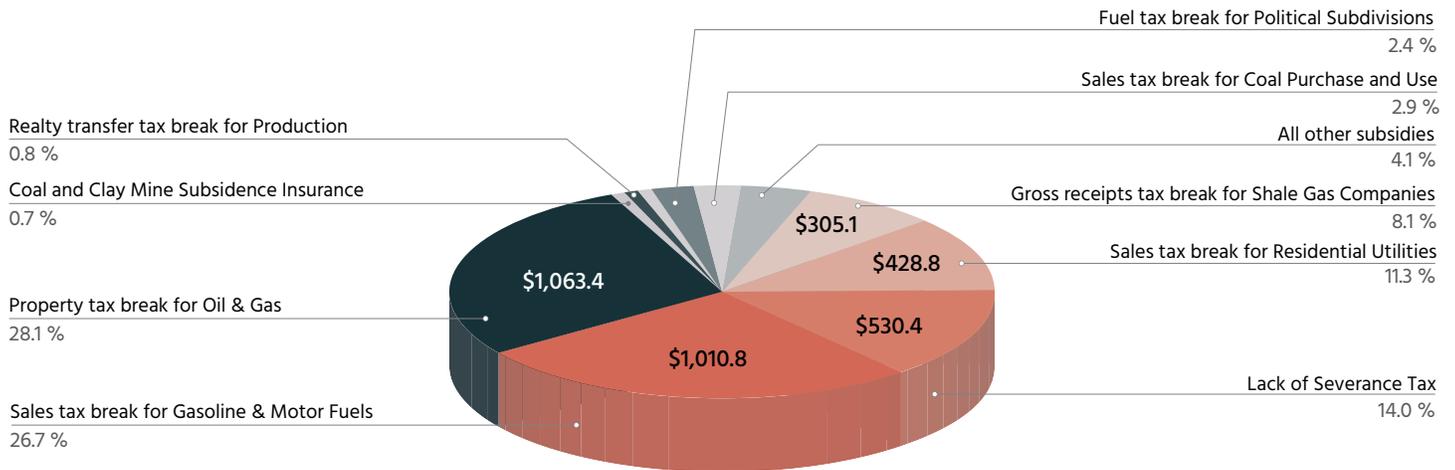
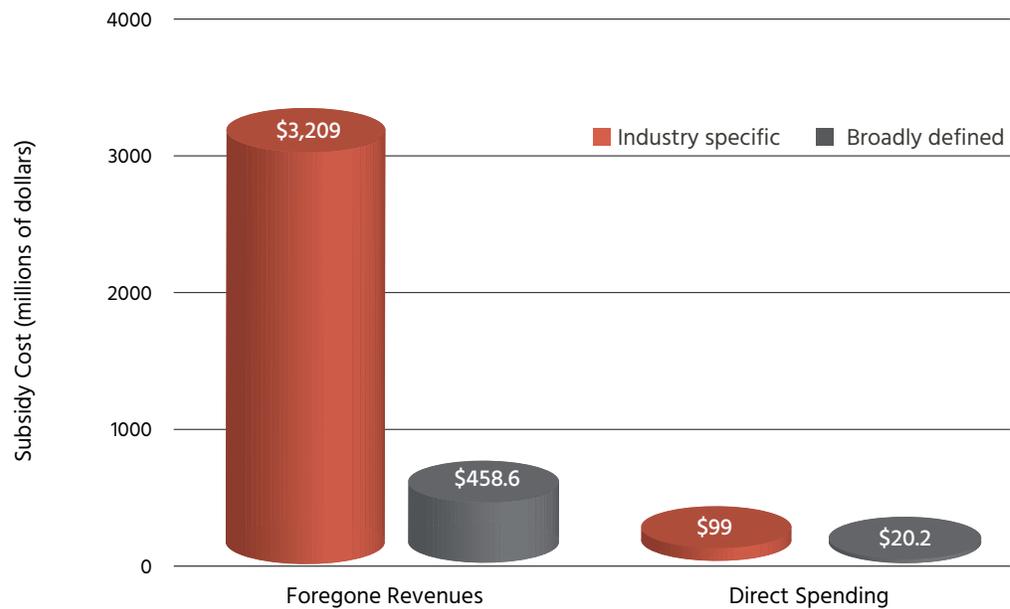


Figure 5. Nearly 97 percent of the subsidies identified were industry specific, meaning the entire value of the subsidy benefitted the fossil fuel industry. The remaining 3 percent of subsidies that applied to a broader range of industries like manufacturing or utilities (including gas, electric, and 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.

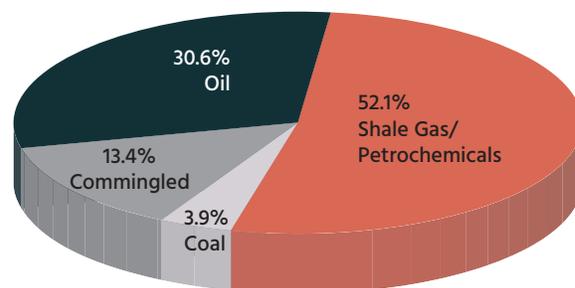


Figure 7. SUMMARY OF ALL FOSSIL FUEL SUBSIDIES

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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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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GASES ARE FELT
WORLDWIDE AND
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TO COME.

- **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.

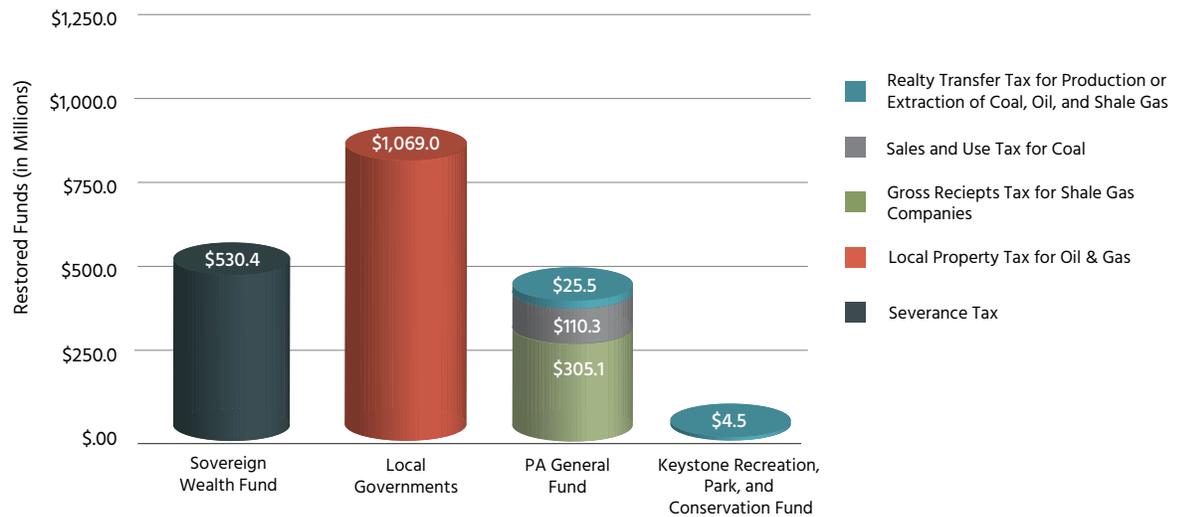
avoid hundreds of premature deaths, and prevent over 45,000 children from developing asthma. Unlike tax credits for petrochemical facilities and other fossil fuel subsidies, RGGI actually furthers our public health, environmental, and climate goals and *increases* revenues for state and local governments, 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	\$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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