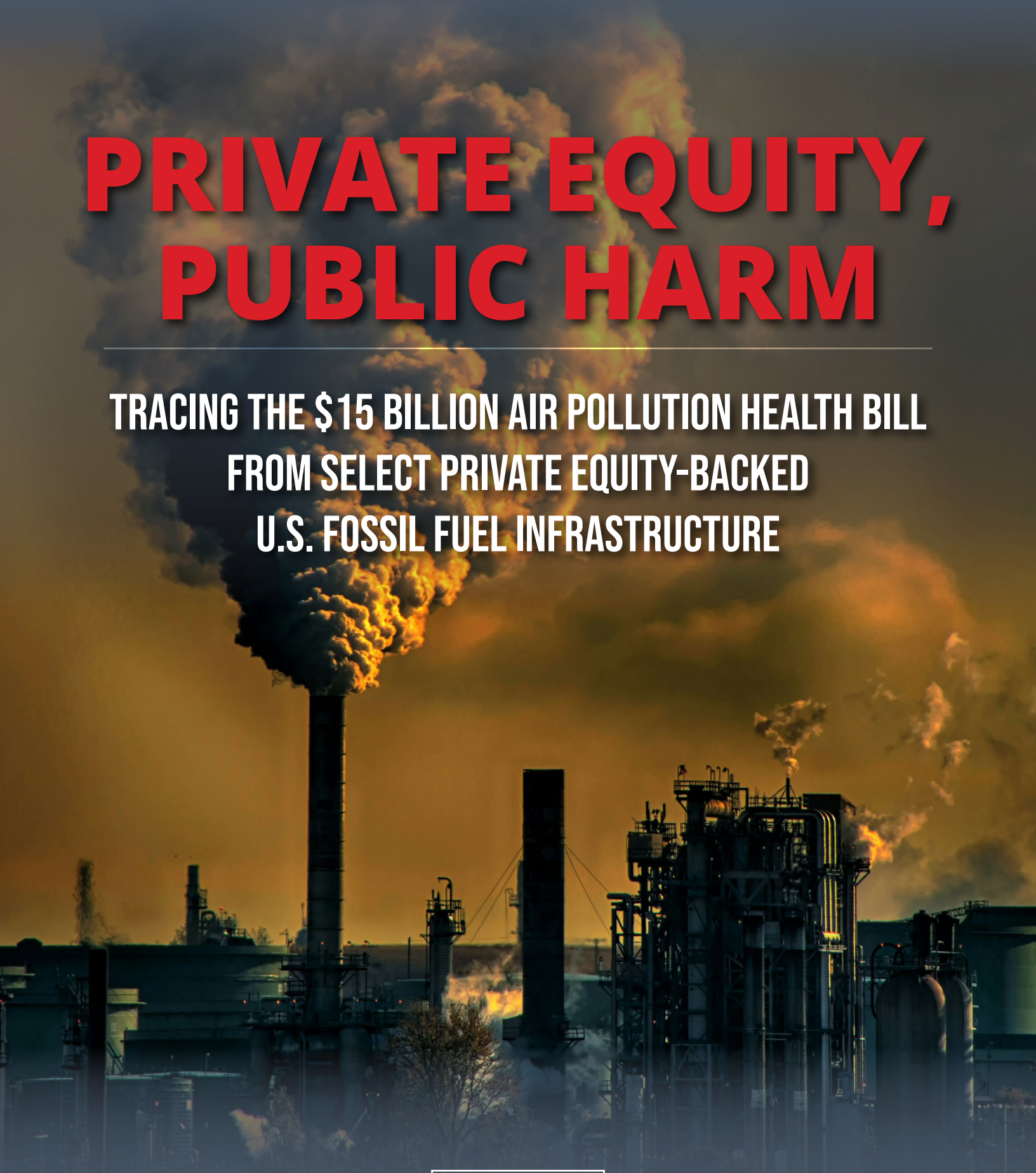
PRIVATE EQUITY, PUBLIC HARM

TRACING THE $15 BILLION AIR POLLUTION HEALTH BILL FROM SELECT PRIVATE EQUITY-BACKED U.S. FOSSIL FUEL INFRASTRUCTURE



PRIVATE EQUITY CLIMATE RISKS

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Alex Hurley led research efforts for this study. The foundation of this report was built on the 2024 PECR Climate Risks Scorecard dataset, which was jointly developed by the entire PECR team, including Dustin Duong, Aditi Sen, Oscar Valdes Viera, Alyssa Moore, Nichole Heil, Amanda Mendoza, and Alissa Jean Schafer. The PECR team advised research and analysis throughout the project. Global Energy Monitor is solely responsible for the content of this report.

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Global Energy Monitor
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Americans for Financial Reform Education Fund is a nonprofit, nonpartisan coalition of more than 200 civil rights, community-based, consumer, labor, small business, investor, faith-based, civic groups, and individual experts. It was founded in the wake of the 2008 financial crisis and its mission is to fight to create a financial system that deconstructs inequality and systemic racism and promotes a just and sustainable economy. @realbankreform

Private Equity Stakeholder Project
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The Private Equity Stakeholder Project (PESP) is a nonprofit organization with a mission to identify, engage, and connect stakeholders affected by private equity with the goal of engaging investors and empowering communities, working families, and others impacted by private equity investments. @PEstakeholder

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KEY FINDINGS

- This report, building on the 2024 Private Equity Climate Risks Scorecard, examines the public health impacts caused by emitted air pollutants such as **SO_2, NO_X, PM2.5, and VOCs** from private equity-backed coal-fired power plants, liquid natural gas (LNG) export terminals, and oil and gas extraction facilities in the United States.

- Air pollution from private equity-backed fossil fuel infrastructure causes measurable, expensive, and deadly impacts. Facilities within the scope of this study cause the equivalent of **$11–$15 billion** in health damages per year to local communities in the United States.

- A small group of firms, including **ArcLight, Energy Capital Partners, and Quantum Capital,** are responsible for roughly 20% of these impacts alone.

- Just eight facilities across five firms make up $5.1 of the $5.6 billion in annual health impacts in the Mid-Atlantic and New England regions, or 91% of the total impact on this subset of states.

- The single most harmful facility in this study is the General J.M. Gavin coal plant. Located in southeastern Ohio, **this plant is estimated to cause $1.7 billion in human health impacts per year**, or about 19% of all health impacts in this study.

- Texas, with a large population and close proximity to the Permian Basin, is one of the most heavily impacted states across all health categories.

- The findings underscore the urgent need to retire these **deadly** pieces of fossil fuel infrastructure and invest instead in clean energy solutions.

INTRODUCTION

Private Equity's Role in the Negative Health Impacts of Fossil Fuels

Private equity (PE) firms are major players in the global energy sector, having invested over $1 trillion since 2010—much of it directed toward fossil fuel infrastructure.[1] PE investments span the entire energy value chain, from upstream oil and gas extraction sites to pipelines, liquid natural gas (LNG) export terminals, coal- and gas-fired power plants, and many others.[2] Given the scale and scope of their investments, these firms carry significant responsibility for the harms this infrastructure causes.

The Private Equity Climate Risks (PECR) project's previous work has documented the greenhouse gas emissions associated with 21 private equity firms' energy holdings in coal-fired power plants, LNG terminals, and upstream oil and gas extraction sites, finding these firms responsible for over 1 billion tonnes of annual greenhouse gas emissions.[3] This study expands that focus to examine the impacts of non-greenhouse gas pollutants (non-GHGs)—including sulfur dioxide (SO_2), nitrogen oxides (NO_X), volatile organic compounds (VOCs), and fine particulate matter (PM2.5). These pollutants are known to cause or worsen cardiovascular and respiratory conditions such as asthma, lung cancer, heart attacks, and strokes, as well as neurodegenerative diseases like Alzheimer's and Parkinson's.[4]

The impact of these pollutants in the United States was analyzed using the U.S. Environmental Protection Agency's (EPA) CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA). Data from this tool was utilized to examine health impacts nationwide, at the firm-level, and within two case study regions.

At a time when fossil fuels are being framed as a pillar of energy security, when political leaders boast about supporting outdated industries like coal, and when polluters are given license to release toxins into the air, it is critical to remember the real and immediate harm this infrastructure causes people and communities.[5] Fossil fuel pollution affects human health at the most personal level, degrading quality of life—especially for children and vulnerable communities—and even resulting in premature death.[6] Emissions from this infrastructure spread across communities and regions, affecting millions each year in the United States, and many more around the globe.

The human suffering behind these conditions is real and should be acknowledged in its own right. At the same time, quantifying the economic toll of these health harms—including the costs of medical treatment, lost productivity, and even lives lost—gives a clearer understanding of the true cost to society of continued investment in fossil fuels and the potential benefits of a faster transition to a cleaner, healthier energy system. For example, in 2021, the World Economic Forum reported that air pollution from fossil fuels costs each American an average $2,500 per year.[7]

PECR makes these findings available to investors in private equity energy funds for decision-making purposes, to media and researchers who wish to tell the many stories in this dataset, and to communities and their policymakers to better understand these hidden impacts and act accordingly.

RESEARCH AND ANALYSIS

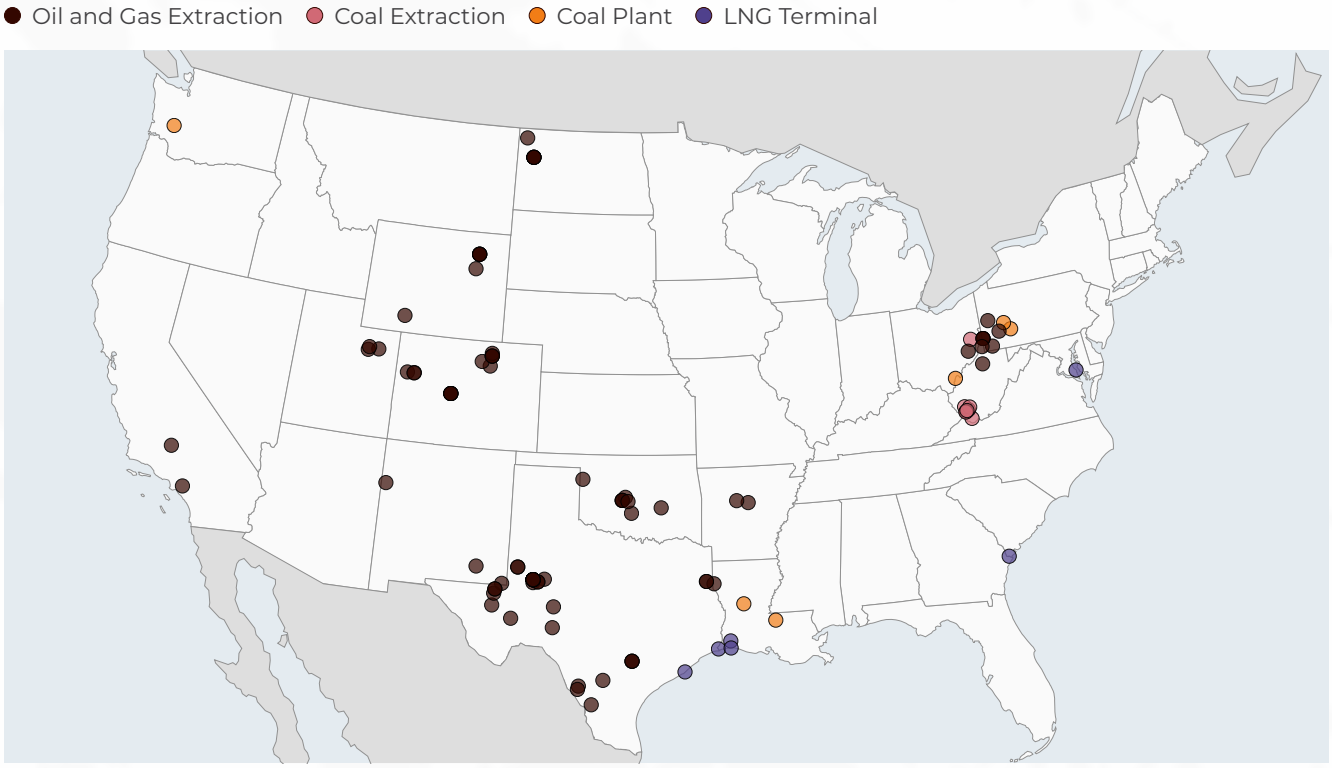
Study Overview

The list of fossil fuel facilities[8] in the 2024 PE Scorecard was filtered for those within the United States (see map below).[9] Raw emissions data for non-greenhouse gas pollutants were scraped or estimated across the pollutant groups (SO_2, NO_X, PM2.5, VOCs) and analyzed utilizing the EPA's COBRA tool,[10] which estimates how these particular pollutant emissions from power plants and other fossil fuel infrastructure translate into specific health harms like asthma, emergency room visits, and premature death down to the county level.[11] This tool also estimates the economic cost of these harms in dollars using a range of established methodologies.[12]

The coal plants in the study are primarily clustered near the intersection of Ohio, Pennsylvania, and West Virginia, with several more in Louisiana and one in Washington State. LNG terminals are all in the Gulf South with the exception of Cove Point LNG, which is located in Maryland, and Elba Island, located in Georgia. Upstream oil and gas operations are scattered throughout the continental U.S. across all major extraction basins.[13] One coal mining operator has several sites located at the border of West Virginia, Kentucky, and Virginia.

Private equity-backed fossil fuel infrastructure spans the United States

Geographic locations of fossil fuel facilities in this study by type



Source: Private Equity Climate Risks
Note: Private equity owns other types of fossil fuel infrastructure beyond those four categories listed here. For more details, please visit www.peclimaterisks.org.

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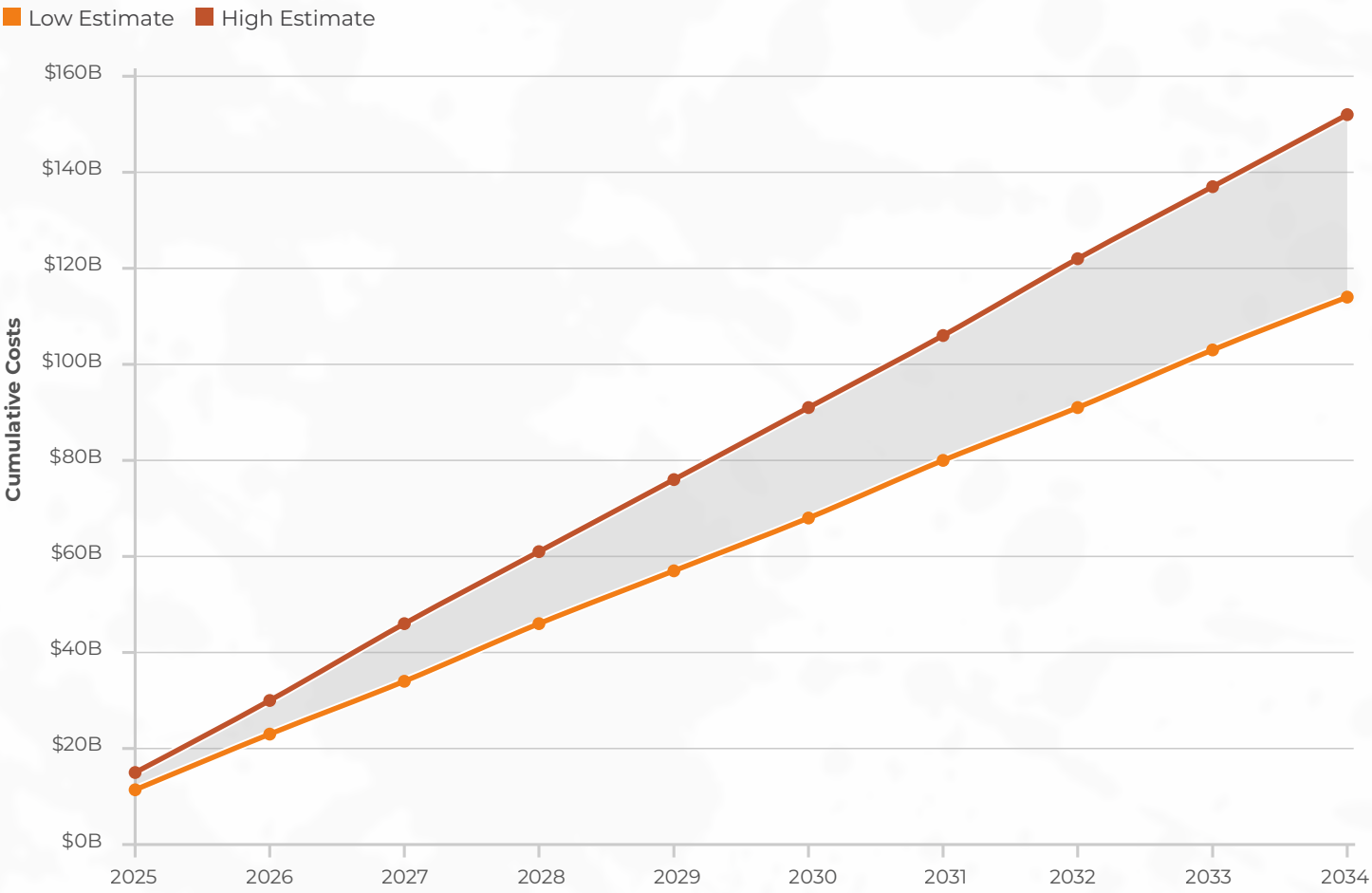
Monetary Impacts

The total monetary impacts across the entire dataset are estimated at **$11.3—$15.1 billion in human health damages per year, or roughly $31–$41 million per day.** For reference, the National Cancer Institute within the U.S. National Institutes of Health currently has a budget of just $7.2 billion for fiscal year 2025.[14] If held constant, by 2034, the total human health impacts are estimated to land between $113–$151 billion, or roughly what was spent on the Child Health Insurance Program during the decade of 2014–2023.[15]

Private equity-backed fossil fuel facilities in the U.S. projected to cause more than $100 billion in health impacts over the next decade

Annual health costs ($) of all facilities in this study, projected ten years into the future



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)
Note: Assuming continued PE-backing and normal operations.

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Health Impacts

In more concrete terms, these private equity-backed facilities and their associated air pollution are responsible for nearly 1,500 emergency room visits and nearly 1,000 premature deaths every year.[16] Moreover, U.S. communities have lost over 27,000 work days and over a quarter of a million school days due to health issues caused by this air pollution. The latter figure is roughly equivalent to the entire Los Angeles Unified School District—the second largest in the country—being shut down for a day due to poor air quality. Other respiratory issues such as asthma and hay fever (a general allergic reaction to airborne allergens) are also very common as a result of these air pollution sources.[17]

Private equity-backed air pollution contributes to ~1,000 deaths and ~300,000 lost school days per year

Estimated instances of health impacts by type across all PE firms and facilities

Health Impact	Annual Instances
 Mortality	1K
 Emergency Room Visits	1.4K
 Cases of Asthma Symptoms	584K
 Cases of Asthma Onset	3.7K
 Cases of Hay Fever	24K
 Work Loss Days	27K
 School Loss Days	302K

Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA), OpenClipArt

PRIVATE EQUITY CLIMATE RISKS

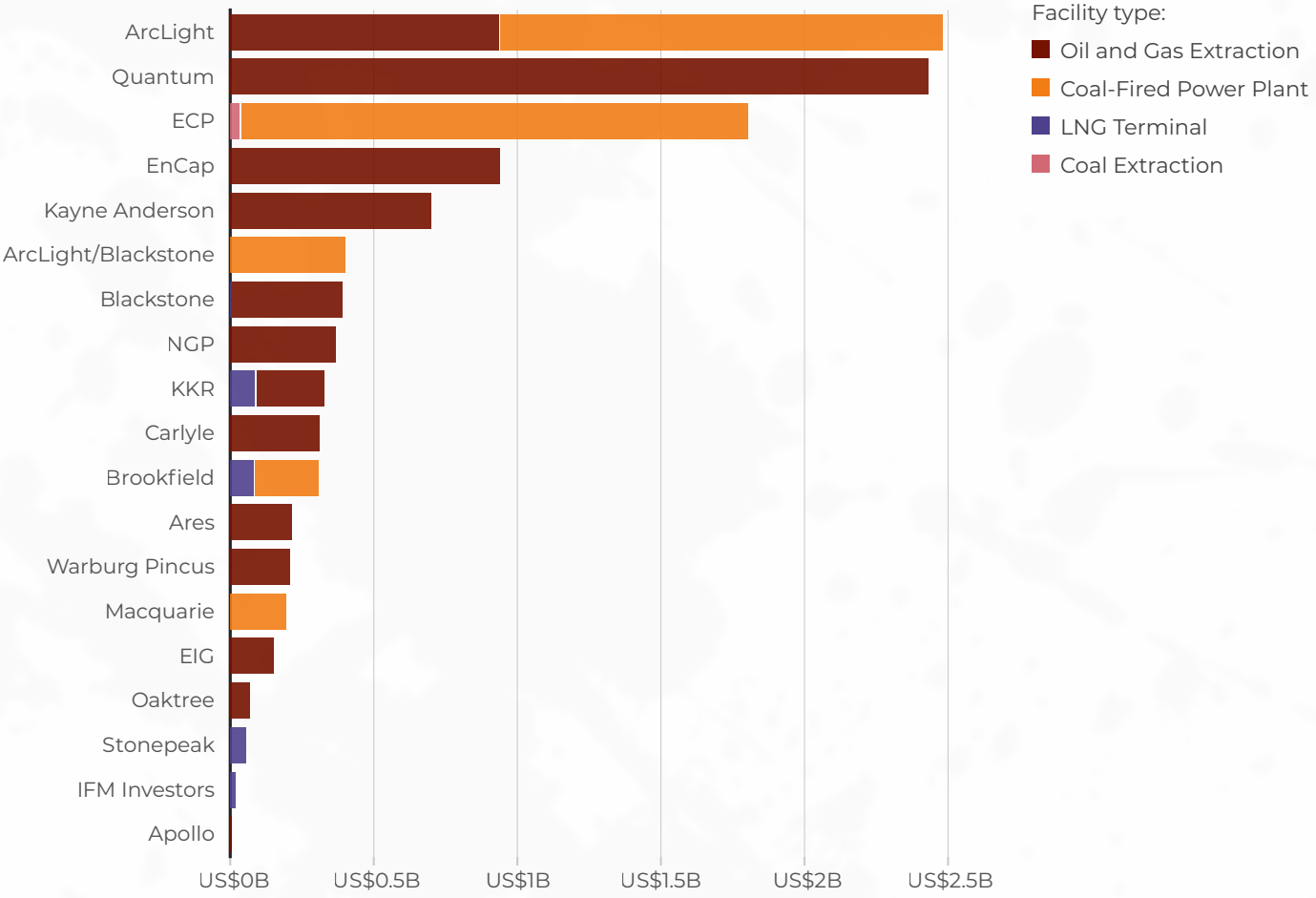
Impact by PE Firm

Behind all of these national impact numbers are the private equity firms in question and the fossil fuel companies and facilities in which they are invested.[18] Health impacts and monetary estimates have been disaggregated to the private equity firm level in this report and can be explored further in an **online data dashboard**. Impact numbers for a given firm are driven by a number of different variables, including number of facilities, type of facility, size of facility emissions, and the geographic location of the facility (such as proximity to large population centers).

The top five firms by facility count are all invested exclusively in upstream oil and gas within the universe of this study. LNG terminal investors include KKR, Brookfield, Blackstone, Stonepeak, and IFM. Coal plant investors include Brookfield, ArcLight,[19] Macquarie, Energy Capital Partners (ECP), and a joint-venture between ArcLight and Blackstone. ECP is also invested in the lone coal mine portfolio company, Ramaco Resources, in this study.

Fossil fuel assets held by three private equity firms are responsible for a fifth of all health costs

Health impacts by firm and facility type and count, in US$ billion



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)
Note: ArcLight/Blackstone are involved in a joint-venture in the Big Cajun II coal plant.

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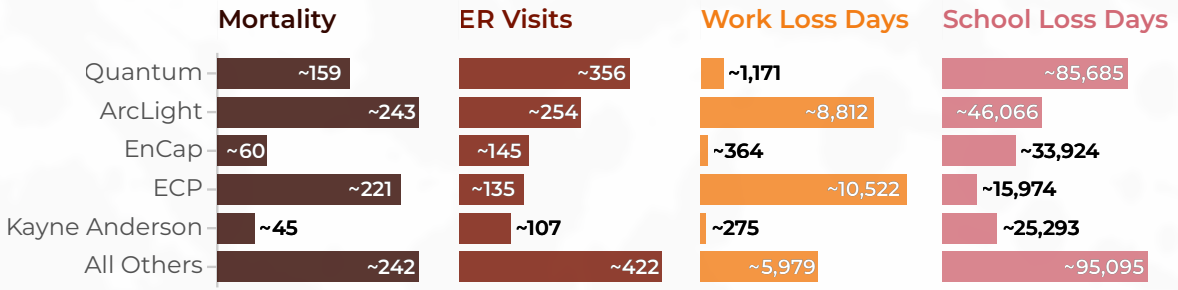
ArcLight, ECP, and Quantum cause the most impact, with estimates ranging from $2.5–$3.7 billion per year from just these three firms. Quantum holds the second largest number of facilities (all upstream extraction sites), while ECP and ArcLight hold fewer but with at least one coal plant each. These firms are also at or near the top of the charts for mortality, emergency room visits, work loss days, and school loss days caused by their facilities and make up a large portion of the total numbers in these data sets: 64% of mortality, 52% of ER visits, 76% of work loss days, and 49% of school loss days.

Air pollution from fossil fuels is dangerous and disruptive, varies by firm

Estimated impact by firm across health factors



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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REGIONAL CASE STUDIES

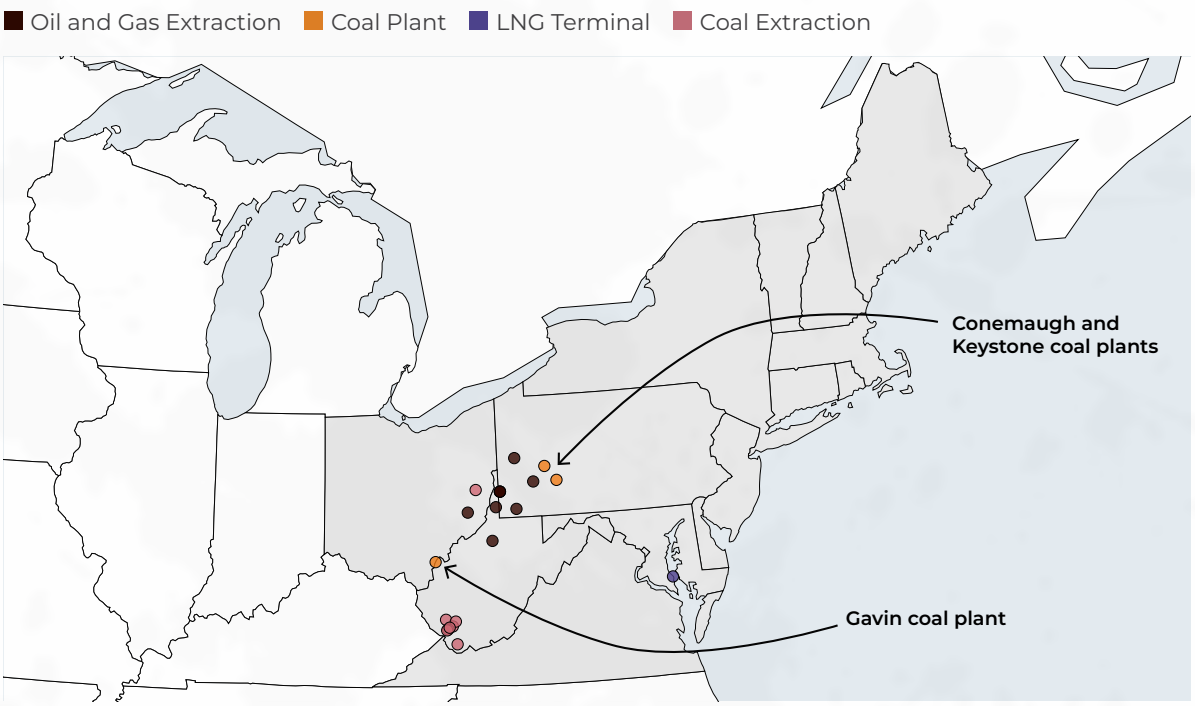
The PE-backed facilities in this dataset highly impact a number of U.S. regions, states, and counties (see the **online data dashboard** to explore more). Two regions in particular will be explored in closer detail here: the Mid-Atlantic/New England block of states and the Permian oil and gas basin, which is located in western Texas and southeast New Mexico. The pattern of infrastructure and actors behind the impact in each of these regions is unique and tells a different story.[20] In the Mid-Atlantic/New England block, just a handful of facilities cause 91% of the $5.6 billion in health impacts, driven in a big way by three coal-fired power plants. Meanwhile, the Permian case study demonstrates the disproportionate impact of oil and gas extraction facilities to communities in western Texas.

Case Study #1: Legacy Coal in Mid-Atlantic/New England

Roughly 26% of the U.S. population resides in the connected Mid-Atlantic/New England regions. Every infrastructure category in the dataset—coal-fired power plants, LNG terminals, upstream oil and gas extraction sites, and a coal mine—is represented here. Notably, three major coal plants are sited here (Gavin, Conemaugh, and Keystone)—a reflection of the deep legacy of coal in Appalachia. Meanwhile, gas extraction in the Appalachian basin has expanded sharply over the last 10–15 years due to new extraction methods.[21]

A small, dense region hosts large and diverse group of fossil fuel facilities

Case study states and proximate private equity-backed fossil fuel facilities by type



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Health and monetary impacts

The air pollution from these fossil fuel facilities is estimated to cause roughly 500 premature deaths per year in this case study area. Pennsylvania experiences 32% of these early mortalities, the largest share among states included in this case study.

Mid-Atlantic/New England regions experience ~500 early deaths per year due to private equity-backed fossil fuels

Estimated annual number of premature deaths per state in the case study region across all firms and facilities

Top 5 States	Annual Premature Deaths
Pennsylvania	162
Ohio	102
New York	59
Virginia	41
West Virginia	39
Grand Total*	**500**

Source: Private Equity Climate RIsks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)
*Note: Includes other case study states not shown in this table

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Despite having only about one-third the population and one-tenth the land area of the entire country,[22] this case study area experiences an annual mortality toll nearly equal to that of the rest of the U.S., meaning that people in these regions are three times more likely to die from PE-backed air pollution than the rest of America. The pattern holds true for monetary health impact estimates as well: This region experiences between **$5.6–$7.7 billion** in annual human health damages, compared to **$5.7–$7.4 billion** for the rest of the country.

Mid-Atlantic/New England disproportionately impacted by private equity-backed fossil fuels

Comparison of statistics between case study region and other areas

Geography	Population	Premature Deaths	Sum of Health Impacts
Mid-Atlantic/New England	88,400,000	500	$6,700,000,000
Rest of U.S.	250,000,000	467	$6,600,000,000
Total U.S.	**338,000,000**	**967**	**$13,300,000,000**

Source: Private Equity Climate Risks, U.S. EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)
Note: The health impact figures here have been averaged between high and low estimates.

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Population density appears to be a major explanatory factor: The pollution emitted from nearby facilities simply has more people nearby to deposit upon and less of a distance to travel. The coal-fired power plants are also particularly impactful compared to other infrastructure in the data. This facility class dwarfs the other infrastructure categories in average impact per person. This finding is even more noteworthy when considering that there are only six coal plant facilities in this dataset.

Private equity-backed coal plants create 5x more impact per person than all other facility types combined

Comparison of facility types by count and impact

Category	Facility Count	Average Impact Per Person
Coal-Fired Power Plant	6	$4.80
Oil and Gas Extraction	89	$0.53
LNG Terminal	6	$0.28
Coal Mine Extraction	1	$0.17

Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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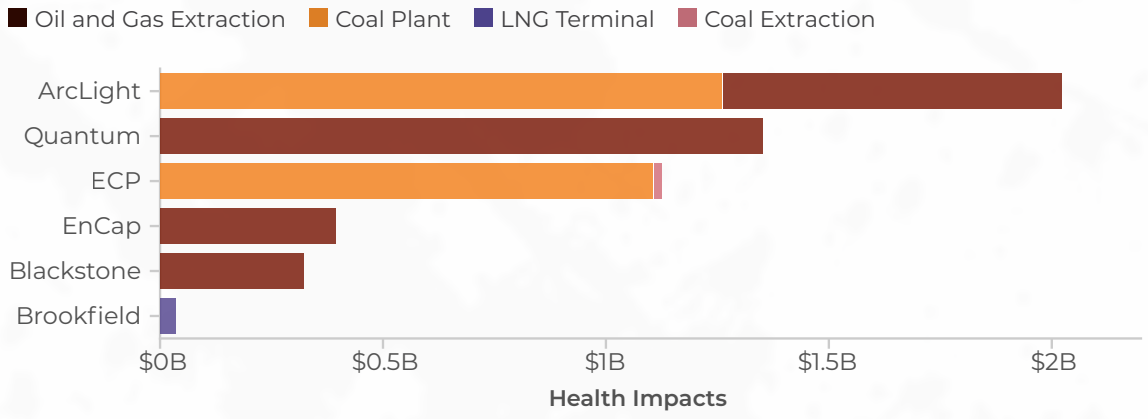
Firm involvement

Just eight facilities across five firms make up $5.1 of the $5.6 billion in health impacts in this region, or 91% of the total impact. The single most harmful facility is the General J.M. Gavin power plant. Located in southeastern Ohio, the Gavin plant alone is estimated to cause $1.7 billion in human health impacts per year, or about 19% of all health impacts in this study.

At the firm level, ArcLight is the most impactful private equity firm in any single state, with a particularly significant presence in Pennsylvania through its ownership of the Conemaugh and Keystone power plants, as well as upstream oil and gas operations in the Appalachian basin. **In total, ArcLight's fossil fuel-based impact on Pennsylvania is estimated at $813 million per year.**

Three firms each facilitate over $1 billion in health impacts in the Mid-Atlantic/Northeast region

Impact ($B) on case study area by firm and facility type



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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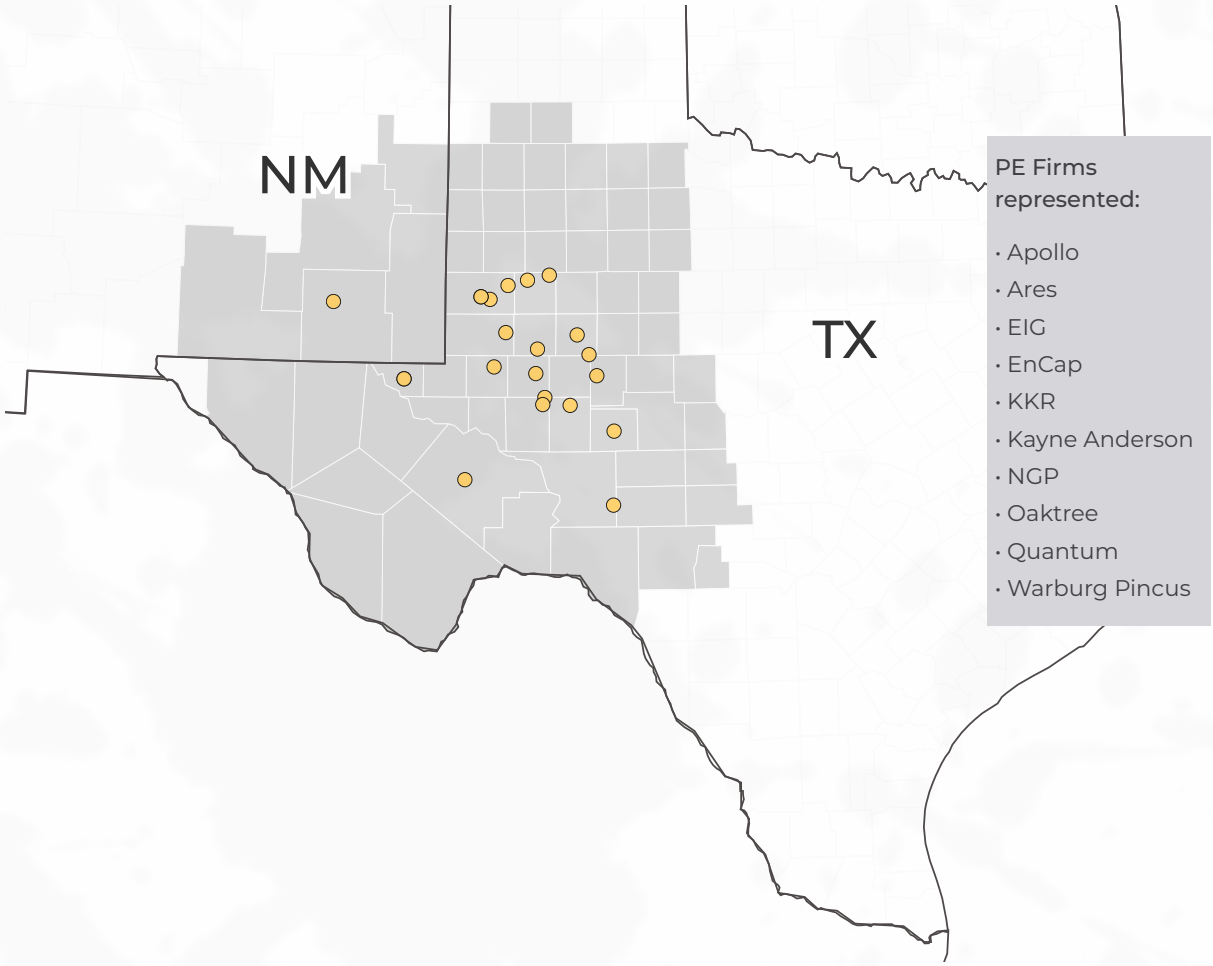
Case Study #2: Permian Basin Oil and Gas

Ten of the 21 private equity firms have an investment footprint in oil and gas extraction in the Permian basin. This concentration is unsurprising given that the Permian is one of the largest onshore oil basins in the world and has some of the lowest extraction costs available anywhere.[23] These favorable economics make the region particularly attractive to fossil fuel-focused investors. However, extracting oil and gas does not come without significant cost to community health in the region.

Private equity backs over 20 oil and gas operators in the Permian

Estimated locations of operations by PE-backed companies within the Permian Basin



Source: Private Equity Climate Risks, ShaleXP
Note: Some assets were jittered to make them more legible on the map.

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Integrated impacts

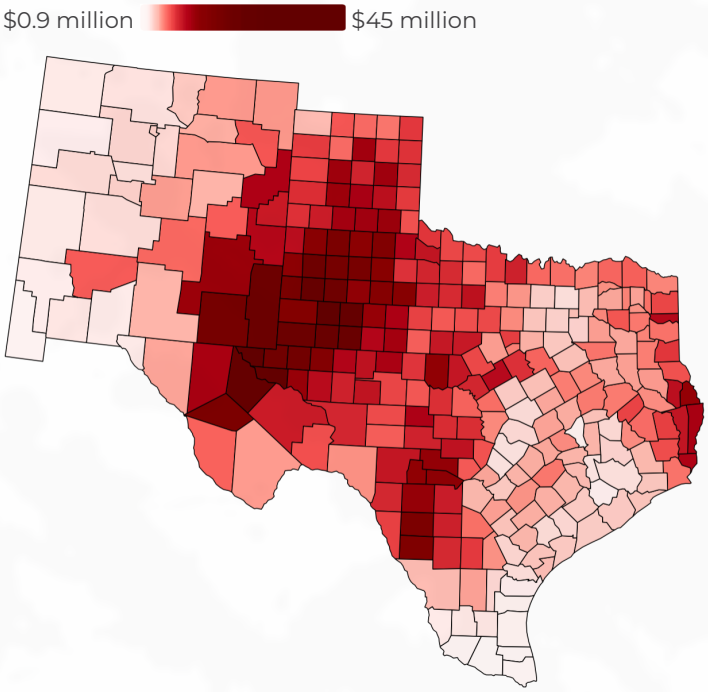
A number of unique patterns emerge from analysis of PE investment in the Permian. First, the per capita impact at the county level is substantially higher in Texas than in New Mexico. Given the distribution of upstream extraction infrastructure, this trend is likely driven by prevailing west-to-east wind patterns, which transport air pollutants from the oil and gas basin toward communities in western Texas.[24]

Second, the per capita impact in this region is overwhelmingly attributed to air pollution from oil and gas extraction sites. Indeed, oil and gas extraction facilities in the Permian Basin account for approximately $120 million of the $135 million (89%) in total human health damages across the counties that fall within the Permian basin.

Third, there is a gradual yet consistent shift in impact source—from oil and gas extraction to coal plants and LNG terminals—as one moves from western to eastern Texas. This trend underscores the significant role that geographic proximity plays in determining exposure to pollutant-emitting fossil fuel infrastructure.

Private equity-backed Permian Basin operations create substantial health impacts in nearby counties

Impact per 100K residents by county



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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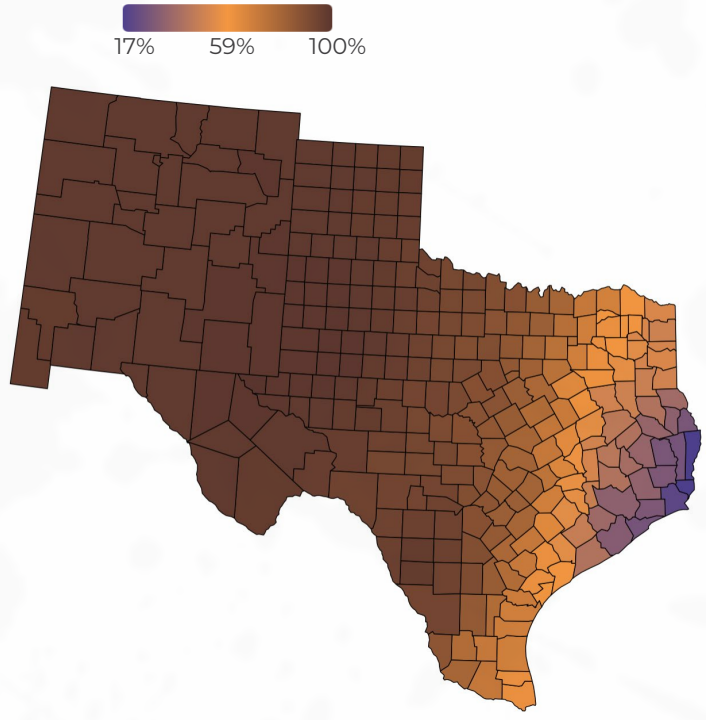
Oil and gas extraction impacts dominate the Texas and New Mexico region

Relative impact from oil and gas extraction compared to all other facility types



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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Health outcomes

When viewed on a per capita basis, both Texas and New Mexico register as roughly average in terms of health impacts compared to other states. However, Texas' large population—currently around 31 million, the second highest in the country—means that the absolute health burden is immense. In this dataset, Texas ranks:

- #1 in asthma onset
- #1 in asthma symptoms
- #1 in hay fever
- #2 in emergency room visits
- #3 in hospital admissions
- #3 in mortality

These figures highlight the considerable public health implications of fossil fuel development in high-population areas like Texas.

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CONCLUSION

Private equity firms play an outsized and under-examined role in the fossil fuel economy. From being the investor of last resort in the coal sector, to emerging as active participants in putting together the complex financing puzzle of LNG export terminals, to scavenging infrastructure in the upstream oil and gas market, private equity firms continue to finance infrastructure that generates harmful air pollution with measurable, expensive, and deadly health impacts. Pension funds and other institutional investors that continue backing fossil fuels through private equity should weigh the harmful health impacts their investments impose on communities and the added burden placed on local healthcare systems.

It should be noted too that this study ultimately represents a very small subset of the fossil fuel infrastructure in the United States that emits these harmful pollutants. The World Economic Forum estimated in 2021 that the total impact to the U.S. from all fossil fuel air pollution amounted to $820 billion and 107,000 premature deaths per year.[25]

Addressing this crisis requires a rapid transition to clean energy solutions and quick adoption of energy-conscious policy and practices. Across the economy, electrification, renewables, battery storage, energy efficiency measures, demand management, and smart grid modernization offer proven pathways to a healthier, less costly, and more sustainable future. Sector-specific solutions are also critical: In the case of coal-fired power plants, innovative financial mechanisms for coal power plant retirement are increasingly available and should be rapidly evaluated and deployed.[26] Investment in LNG infrastructure should be wholly reconsidered in light of serious concerns about health and environmental justice impacts and the financial risks of boom and bust commodity cycles.[27] And upstream oil and gas, a silent but massive contributor to air pollution, must be subject to urgent demand- and supply-side phaseout strategies at the national and international level.

For more information and to explore our data dashboard, please visit **https://peclimaterisks.org/health-impact-report/**.

Accountability for Private Equity

Given the trillion-plus dollars private equity firms have invested in fossil fuels and the need for immediate environmental action, this report recommends a set of standards based on the climate demands in the private equity scorecard.[28] Private equity managers must be transparent about investments in fossil fuels and must also account for the impacts and risks their fossil fuel portfolios have on the environment and local communities. The industry must act to remediate the harms, particularly in communities of color where climate impacts and toxic pollution are the highest. Private equity managers must simultaneously transition to a clean energy economy.

Standards

1. DISCLOSE FOSSIL FUEL EXPOSURE, GHG and NON-GHG EMISSIONS, AND IMPACTS

- Disclose all fossil fuel infrastructure and financial estimates and assumptions regarding facility impairment.
- Disclose all direct and indirect emissions and health-related community impacts.

2. IMMEDIATELY CEASE INVESTMENTS IN FOSSIL FUEL EXPANSION

- Achieve a fossil-free energy portfolio by 2030.
- Retire fossil fuel energy facilities by 2030.
- Cease gas flaring and venting by 2025.

3. REPORT A PORTFOLIO-WIDE ENERGY TRANSITION PLAN

- Disclose a portfolio-wide transition plan.
- Disclose role of voluntary carbon offsets immediately and cease their utilization by 2025.
- Disclose use of carbon removal, carbon utilization and storage, and related technologies.

4. INTEGRATE ENVIRONMENTAL JUSTICE

- Establish robust due diligence, verification, and grievance redress mechanisms to ensure that human health, human rights, and land rights are respected.
- Require all portfolio companies to adopt no deforestation, no peat, and no exploitation (NDPE) policies.
- Develop a just transition program with impacted communities and workers.

5. PROVIDE TRANSPARENCY ON POLITICAL SPENDING AND ENERGY LOBBYING

- Disclose political spending and climate lobbying at asset manager, portfolio company, and trade association level.
- Provide transparency on alignment with global standards on responsible corporate climate lobbying.

METHODOLOGY

Building the Facility List

Portfolio company verification

To compile energy holdings for private equity firms, the PECR researchers drew on information from Pitchbook, Securities and Exchange Commission (SEC) filings, company web pages, press releases, news stories, and other sources. All data was backed up using publicly available sources.

Facility verification

Once financial deal and portfolio company information are verified with a given private equity firm, the next step of the research process is to identify the facilities currently owned by portfolio companies. This is accomplished by searching through a variety of online sources including company websites, news articles, press releases, corporate financial reports, and government databases including those from the Environmental Protection Agency (the FLIGHT tool and the ECHO database), the Energy Information Administration (Form 860), and the Pipeline and Hazardous Materials Safety Administration, Global Energy Monitor's Trackers, Climate Trace, Urgewald's Global Oil and Gas Exit List and Investing in Climate Chaos databases, ShaleXP, and others. Facility lists were shared with all of the firms ahead of publication of the 2024 Private Equity Climate Risks Scorecard, along with the request that the firms correct any errors and/or omissions. Some firms responded and provided corrections.

Geolocating facilities

Geolocations for point-based facilities such as coal plants and LNG terminals were sourced from Global Energy Monitor, which uses a variety of publicly available to geolocate assets, including satellite imagery. Upstream oil and gas extraction operations are frequently more difficult to pinpoint on a map, so approximate locations were used based first on oil and gas basin (e.g. Permian) and even sub-basins (Wolfcamp shale play). Other proxies for upstream geolocations include city and county names where information was available. When no details could be found, the centroid of the basin was used as an estimate for latitude and longitude.

Collecting and Estimating Non-GHG Emissions Data

Coal plants

Annual emissions of sulfur dioxide (SO_2), PM2.5 (particulate matter), and NO_X (nitrous oxide) were found at the EPA eGRID dataset at the plant level.[29] Volatile organic compound (VOC) data was sourced from EPA's NEI dataset via "Air Pollutant" reports from the EPA ECHO interface.[30]

LNG terminals

Emissions data was sourced from air permits analyzed by the Environmental Integrity Project's Oil and Gas Watch. This permit data was neatly prepared and publicized by Greenpeace and the Sierra Club in 2024 in their "Permit to Kill" report.[31, 32]

Oil and gas extraction sites

Emissions data was estimated using emissions factors based on Climate Trace data.[33] Climate Trace publishes estimated greenhouse and non-greenhouse gas emissions from various oil and gas basins all over the world. For each basin relevant to this study, a ratio of CO_2e to each non-GHG in this study was established. Using the previously calculated CO_2e estimates for a given upstream oil and gas facilities from the 2024 PE Climate Risks Scorecard, a non-GHG emissions estimate was then calculated using the relevant emissions factor from the relevant basin. This returned estimates for SO_2, PM2.5, NO_X, and VOCs for each facility.

Coal extraction sites

Emissions estimates were made in a similar manner to the Oil and Gas Extraction sites as outlined above. Only VOC data was available from Climate Trace though. CO_2e data for the Ramaco coal mines was estimated using methods outlined by Global Energy Monitor.[34]

Using the COBRA Model

Background on the model

EPA's CO–Benefits Risk Assessment (COBRA) screening model is a free tool that helps users:

- Explore how changes in air pollution from clean energy policies and programs, including energy efficiency and renewable energy, can affect human health at the county, state, regional, or national levels.
- Estimate the economic value of the health benefits associated with clean energy policies and programs to compare against program costs.
- Map and visually represent the air quality, human health, and health-related economic benefits from reductions in emissions of particulate matter (PM2.5), sulfur dioxide (SO_2), nitrogen oxides (NO_X), and volatile organic compounds (VOCs) that result from clean energy policies and programs.

For more information, see their website.[35]

Example from one facility (Gavin coal plant)

Plant	State	County	Coal Type	Pollutant	Pollutant Value	Pollutant Metric	Pollution Data Source
Gavin	OH	Gallia	Bit	NO_X	5,571	Short Tons	US EPA CAMPD
Gavin	OH	Gallia	Bit	PM2.5	623.91	Short Tons	US EPA PPNC
Gavin	OH	Gallia	Bit	SO_2	20,422	Short Tons	US EPA CAMPD
Gavin	OH	Gallia	Bit	VOC	156.27	Short Tons	US EPA ECHO, NEI

The table above represents input data for the COBRA model for just one facility, again the Gavin coal-fired power plant, located in southeastern Ohio along the Ohio River. COBRA models how these pollutants are dispersed into the atmosphere through weather pattern data and then estimates health impacts at the county level based on local demographic data. So for instance, a county with a high proportion of older residents will likely see more health impacts due to a higher rate of cardiovascular vulnerabilities as compared to a county with a younger demographic.

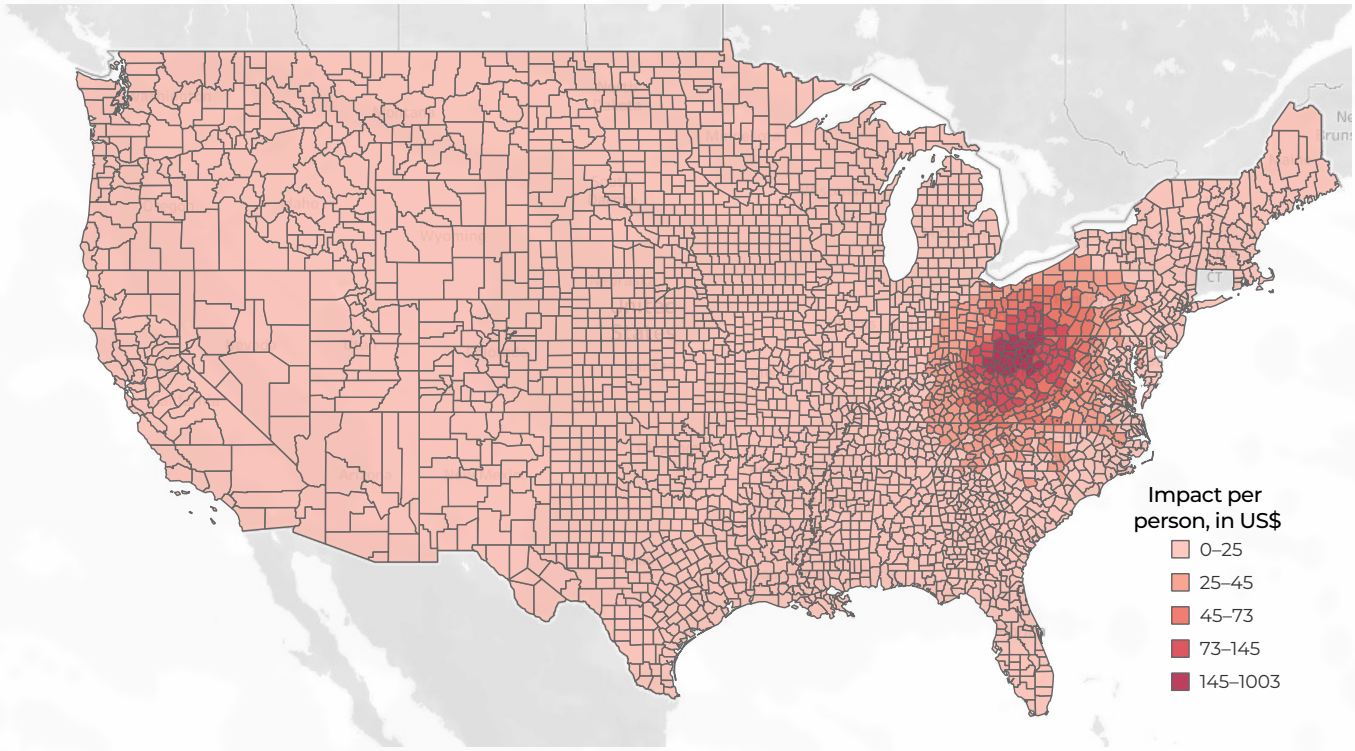
The table below and map (on the next page) are example outputs of the COBRA model for the same facility. The various health conditions/issues are outlined along the left column, with low and high estimates given for incidence and monetary value. These line-item estimates are then aggregated across all impacted counties and summed along the bottom of the table.

Results for All Contiguous U.S. States

Health Endpoint	Pollutant	Change in Incidence (cases, annual)		Monetary Value (dollars, annual)	
		Low	High	Low	High
Mortality	$PM2.5,O_3$	110	220	$1,700,000,000	$3,200,000,000
Nonfatal Heart Attacks	PM2.5	61	61	$5,100,000	$5,100,000
Infant Mortality	PM2.5	0.7	0.07	$11,000,000	$11,000,000
Hospital Admits, All Respiratory	$PM2.5,O_3$	12	12	$300,000	$300,000
Emergency Room Visits, Respiratory	$PM2.5,O_3$	13	130	$210,000	$210,000
Asthma Onset	$PM2.5,O_3$	360	360	$27,000,000	$27,000,000
Asthma Symptoms	$PM2.5,O_3$	62000	62000	$9,200,000	$9,200,000
Emergency Room Visits, Asthma	O_3	0.37	0.37	$300	$300
Lung Cancer Incidence	PM2.5	6	6	$270,000	$270,000
Hospital Admits, Cardio-Cerebro/ Peripheral Vascular Disease	PM2.5	12	12	$340,000	$340,000
Hospital Admits, Alzheimers Disease	PM2.5	41	41	$930,000	$930,000
Hsopital Admits, Parkinsons Disease	PM2.5	5.8	5.8	$140,000	$140,000
Stroke Incidence	PM2.5	5.2	5.2	$330,000	$330,000
Hay Fever/Rhinitis Incidence	$PM2.5,O_3$	2300	2300	$2,600,000	$2,600,000
Cardiac Arrest, Out of Hospital	PM2.5	1.2	1.2	$75,000	$75,000
Emergency Room Visits, All Cardiac	PM2.5	27	27	$58,000	$58,000
Minor Restricted Activity Days	PM2.5	62000	62000	$7,800,000	$7,800,000
School Loss Days	O_3	15000	15000	$25,000,000	$25,000,000
Work Loss Days	PM2.5	11000	11000	$3,300,000	$3,300,000
Total Health Effects from PM2.5				**$1,300,000,000**	**$2,800,000,000**
Total health Effects from O_3				**$440,000,000**	**$440,000,000**
Total health Effects				**$1,800,000,000**	**$3,300,000,000**

Case study example: Gavin coal plant

Impact categorized into quintile bins, in $US



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)
Note: Connecticut data is absent from this map because Tableau still recognizes counties as the standard geographic unit for mapping, although Connecticut transitioned to "Planning regions" in 2022.

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The map is a county-level display of the high-end estimated monetary impact data from the table. The lighter in color that a given county is, the more negative the monetary impact upon that county from the air pollution from just this single facility. The map illuminates the nature of pollution dispersion from an facility like a coal plant well—the center of the impacted counties is near to the geographic location of the coal plant itself, along the Ohio/West Virginia border. It is important to note that the COBRA model not only accounts for the physical dispersion patterns of the pollutants themselves, but also takes average weather patterns into account when estimating dispersion range.

This single modeling run of the Gavin coal plant was combined with modeling runs from all other facilities in the dataset to create a fully aggregated, national dataset of health impacts across all health condition categories and monetary estimates.

Data Analysis

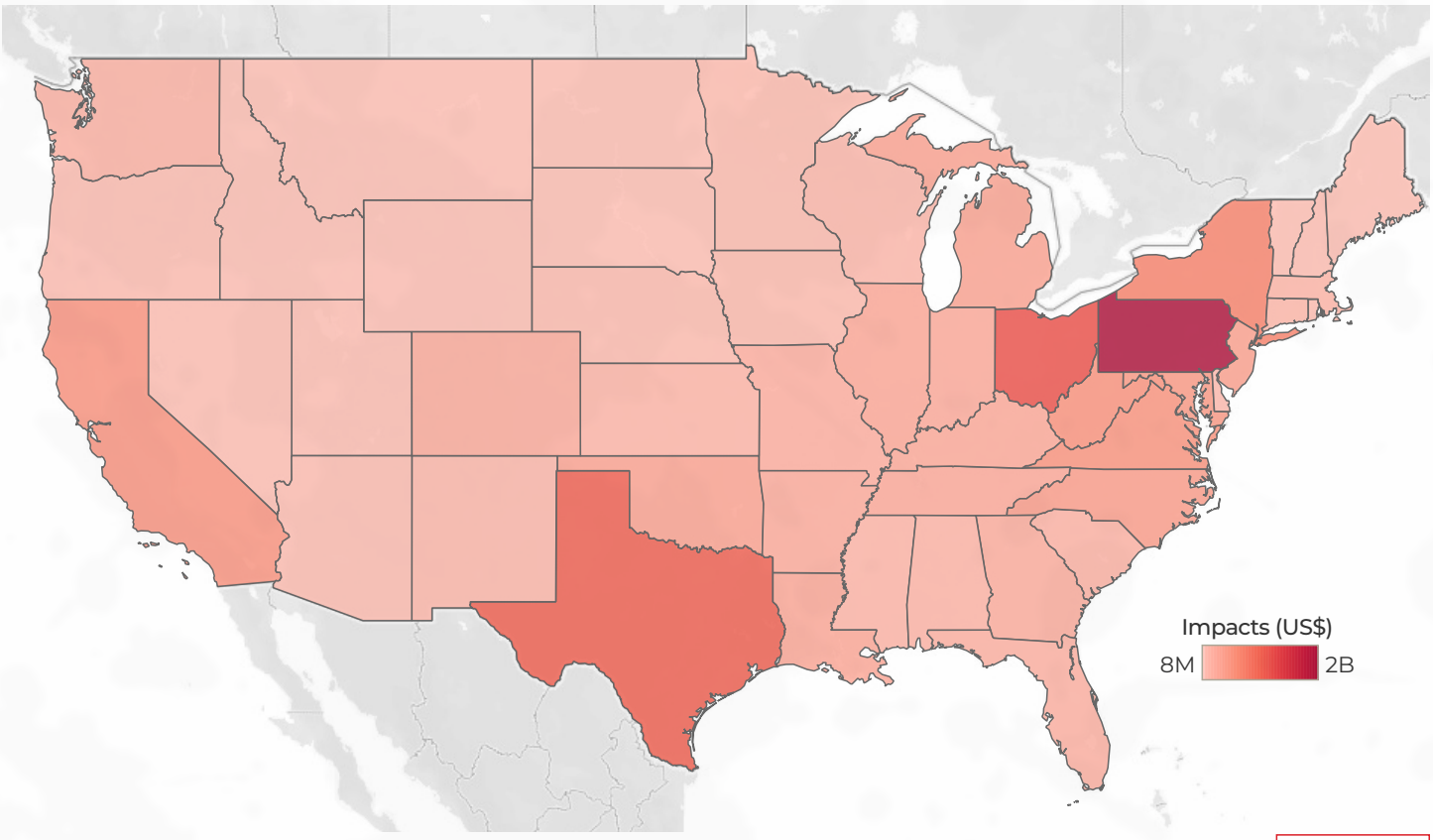
COBRA model output data was analyzed using R and Tableau applications. Data visualizations were created using Flourish.

APPENDIX

Case Study Selection Process

To select case study regions, national impact data was first broken down to the state and county levels and analyzed in various ways. The map below and chart (on the next page) display monetary impact figures at the state level.

Total health impacts by state, in US$



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

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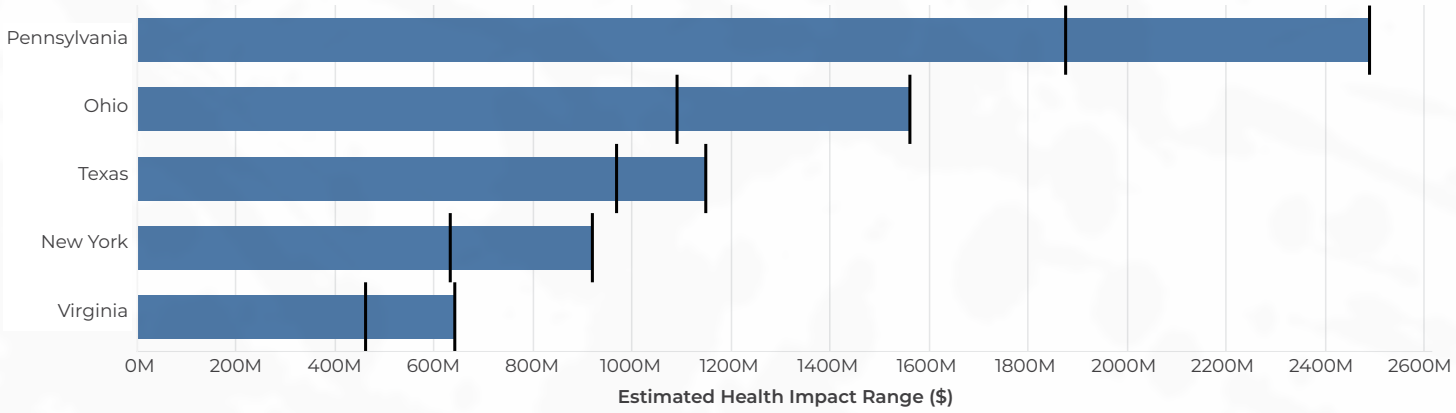
Pennsylvania and Ohio bear the greatest health-related costs from private equity-linked fossil fuel facilities, with estimated impacts reaching up to **$2.4 billion** and **$1.5 billion**, respectively. Other heavily affected states include Texas, New York, and Virginia—highlighting the geographic spread of impact across densely populated regions and where the fossil fuel sector is most active on the ground.

Top five most impacted states

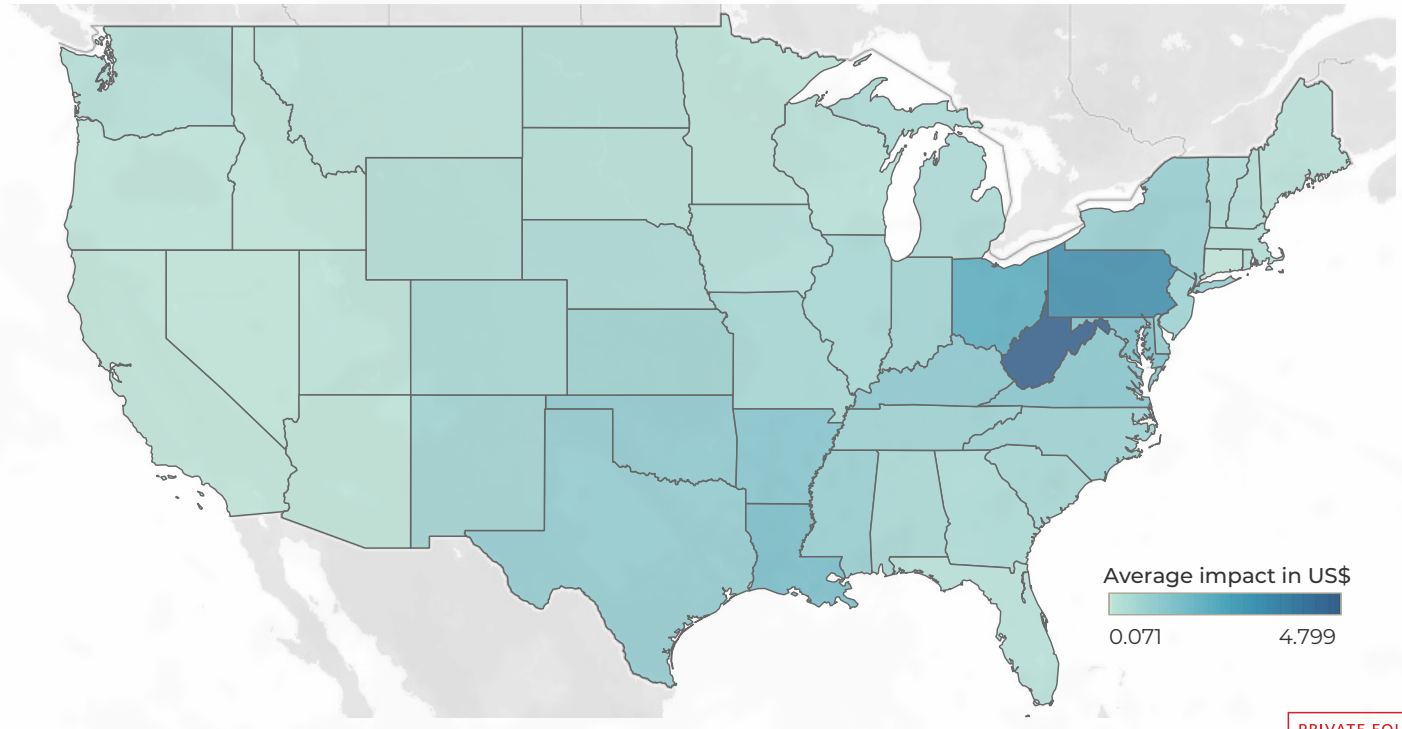


Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

PRIVATE EQUITY CLIMATE RISKS

The chart below (blue) builds upon the geographic analysis by adding in population data to calculate impact per resident, which helps to normalize comparisons between more and less populated states. This map emphasizes significantly higher impact values in West Virginia, most notably. Together, the data on total impact per state and total impact per resident per state suggested that the Mid-Atlantic/New England region was an area worth exploring in more detail.

Average impact per person, in $US



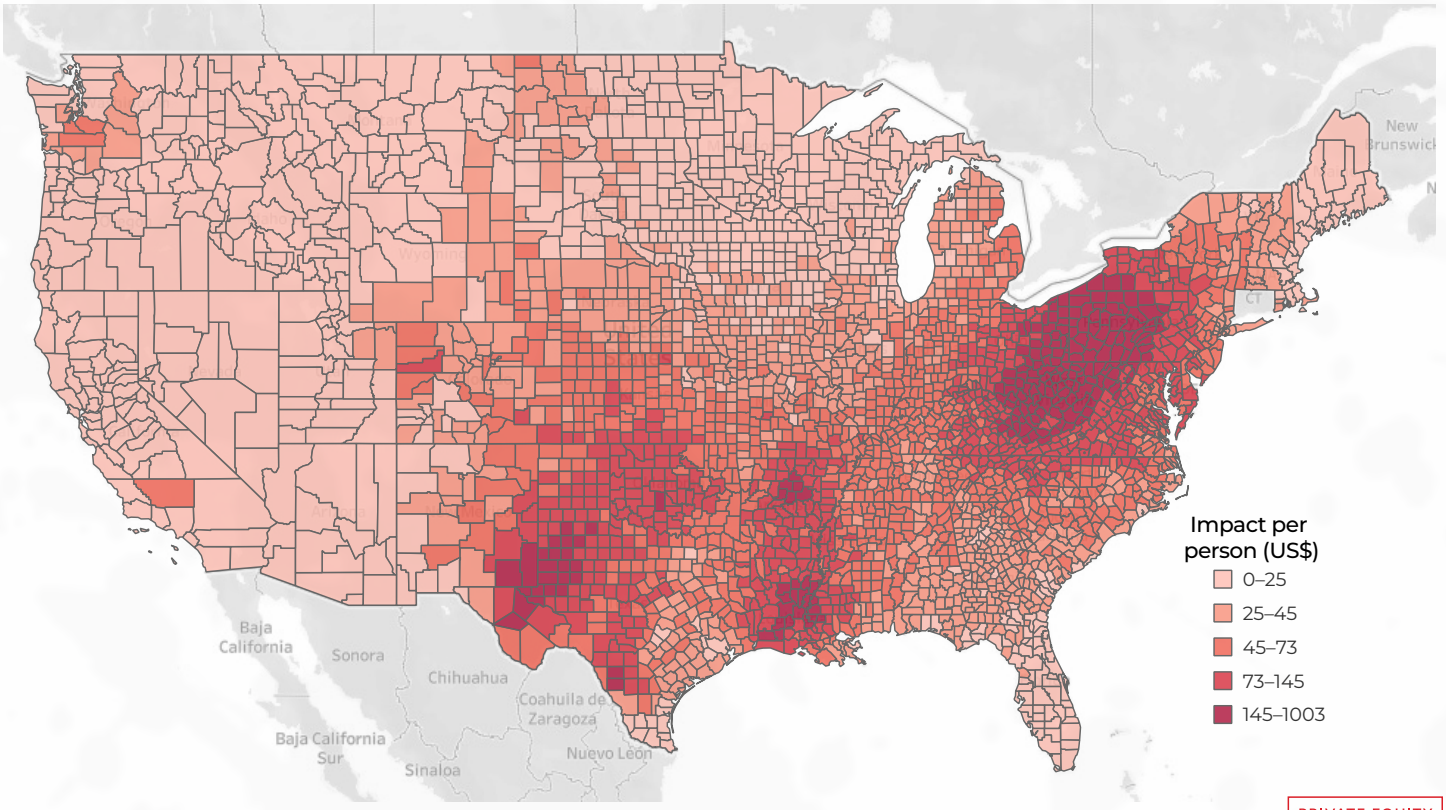
Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

PRIVATE EQUITY CLIMATE RISKS

After gleaning additional insights from the impact per resident analysis, this approach was applied at the county level to search for more granular insights. Because the range of the county level data was so wide, the data was categorized into five statistical quintiles (categories) for easier comparison. This allowed for a more clear examination of relative peaks in the impact per person data around the country. The map below (red) is a visual representation of this data.[36]

Various impact peaks exist around the country

Impact per person sorted into quintiles, in US$



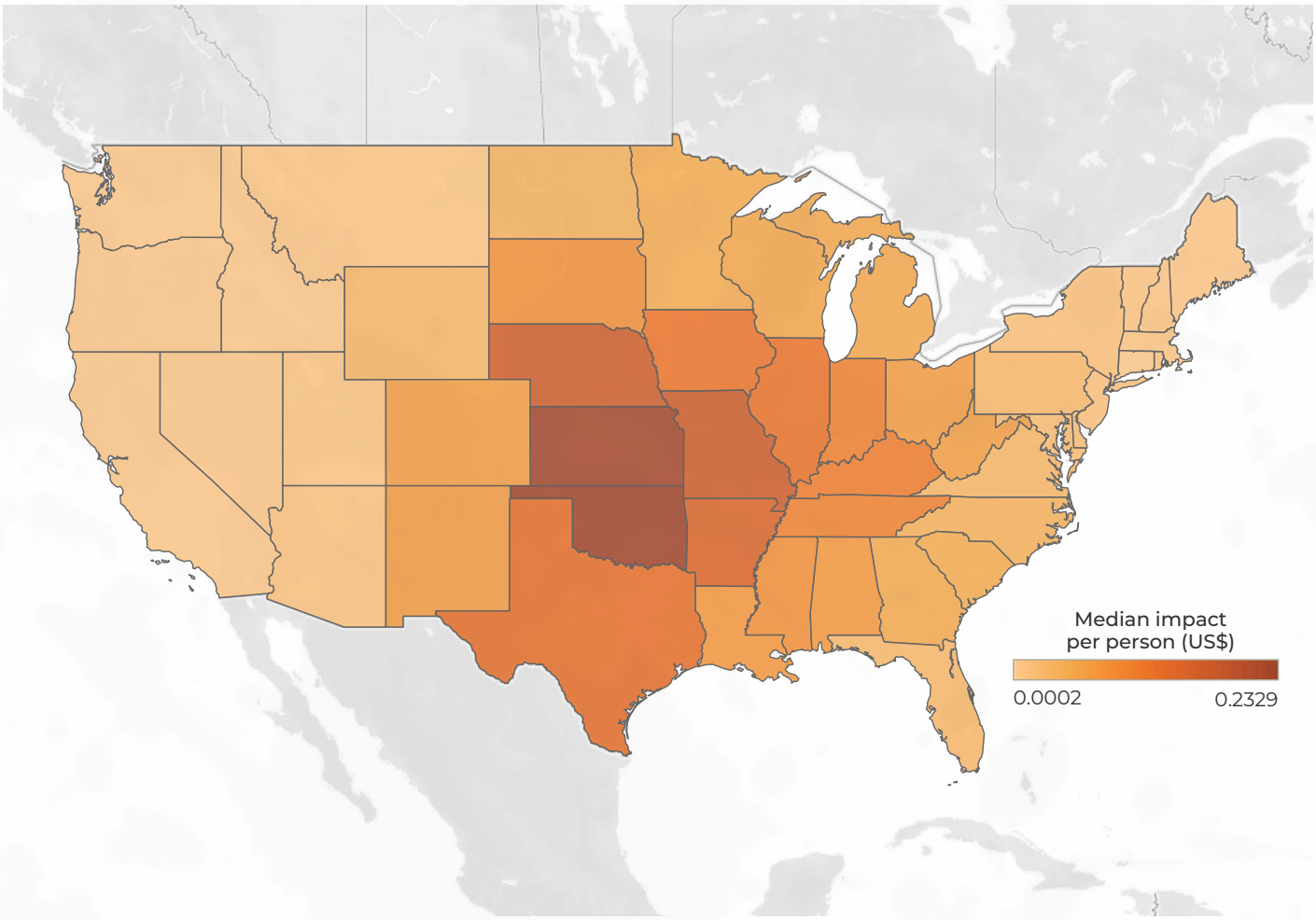
Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

PRIVATE EQUITY CLIMATE RISKS

The most geographically broad peak in impact per person once again lands at the intersection of Ohio, Pennsylvania, and West Virginia. Other relative peaks emerge in west Texas/southeast New Mexico (the heart of the Permian basin) and in Louisiana, Arkansas, and Oklahoma. Given the profile of the Permian basin in the U.S. oil and gas industry, this was selected as another area ripe for closer examination of the stories behind the data.

While Louisiana shows up as a strong relative peak in the impact data no doubt to the co-location of coal-fired power plants, LNG terminals, and upstream extraction sites in the state, it was noted by this research group that excellent and inspiring work on the health and economic impacts of LNG export terminals in the U.S. Gulf South has recently been published elsewhere in the environmental advocacy community, so we sought to prioritize other regions of relative impact peaks instead.[37]

Median impact per person, in US$



Source: Private Equity Climate Risks, US EPA CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)

PRIVATE EQUITY CLIMATE RISKS

The next analytical lens applied involved looking at median impact per resident, which would mitigate the influence of outlier data and instead highlight states where the *typical* county faced relatively higher health impacts. In the map above (orange) we see the results of this analysis, which shows a peak in the Oklahoma/Kansas region. For capacity reasons, this case study was not pursued.

ACKNOWLEDGMENTS

Enormous thanks goes out to everyone within the Private Equity Climate Risks consortium, which includes members from Americans for Financial Reform and the Private Equity Stakeholder Project. None of this work would have been possible without the collective efforts of the PECR team to verify private equity's portfolio company holdings. This group was also invaluable for forming the original concepts for this work, and for reviewing and editing the various versions of this report.

Kudos to the authors of the "Permit to Kill" report for creating a very interesting publication that provided numerous inspirations and for answering early questions.

Thank you to the communications teams at Global Energy Monitor and the Private Equity Stakeholder Project for helping to bring the research and data to life on the page and in the public realm.

Lastly, many thanks to the support and leadership from Louisa Plotnick and Flora Champenois at Global Energy Monitor.

ENDNOTES

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8 Six coal plants, six LNG terminals, 89 upstream oil and gas sites, and one coal mine.

9 The COBRA model is bounded by the geography of the United States.

10 U.S. Environmental Protection Agency. "Why Use COBRA?" EPA.gov. Last modified August 27, 2024. **https://www.epa.gov/cobra/why-use-cobra-0**.

11 The sheer number of variables in the output data puts a full accounting of relevant narratives beyond the scope of this report. We highly encourage those interested in exploring the data further to access an **interactive dashboard** on the Private Equity Climate Risks website (insert link), where users will be able to determine their own filters and frames to apply.

12 These include the Value of a Statistical Life (VSL) for mortality, treatment costs or hospital charges for major health events like emergency room visits, and willingness-to-pay estimates for less severe outcomes, such as work loss days. The model does not assume who pays these costs (e.g. insurance, out-of-pocket, societal burden). Regarding "work loss days," see "How COBRA Works" manual for more details on quantifying health impacts in dollars: **https://www.epa.gov/system/files/documents/2024-04/how-cobra-works_17-april-2024.pdf**

13 The geolocation of upstream oil and gas extraction sites were frequently estimated within the proper basin area based on publicly available sources.

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16 This is ultimately a very small subset of the fossil fuel infrastructure in the United States that emits these harmful pollutants. The previously cited 2021 World Economic Forum report estimated that the total impacts to the U.S. from all fossil fuel air pollution amounts to $820 billion and 107,000 premature deaths per year.

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18 Private equity investments in this study were verified in July 2024. Facility-level affiliation with a given PE firm is assumed to have remained the same unless otherwise noted.

19 ArcLight and Blackstone are in the process of selling the Gavin coal plant to Energy Capital Partners (ECP), another PE firm in this study. For the purposes of this research, we have assumed ECP as the PE firm of record backing this facility. See: **https://ieefa.org/resources/private-equity-firm-leading-investor-energy-transition-buy-gavin-coal-plant** and **https://www.bridgepointgroup.com/about-us/news-and-insights/press-releases/2024/bridgepoint-announces-closing-of-ecp-transaction**.

20 For a full explanation of case study selection see the Methodology section of this report.

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34 Global Energy Monitor. "Estimating Methane Emissions from Coal Mines." *GEM.wiki*. Accessed June 3, 2025. **https://www.gem.wiki/Estimating_methane_emissions_from_coal_mines**.

35 U.S. Environmental Protection Agency. *CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool*. Last modified April 14, 2025. **https://www.epa.gov/cobra**.

36 Note: Connecticut counties are excluded here in this map because of a geographic data discrepancy between legacy counties and modern "planning regions." Any state level data for CT is still included in totals and charts.

37 Heureaux-Torres, Johanna, Andres Chang, and Tim Donaghy. *Permit to Kill: Potential Health and Economic Impacts from U.S. LNG Export Terminal Permitted Emissions*. Washington, D.C.: Sierra Club and Greenpeace USA, August 2024. **https://www.greenpeace.org/static/planet4-usa-stateless/2024/11/47b90812-permit-to-kill.pdf**.