



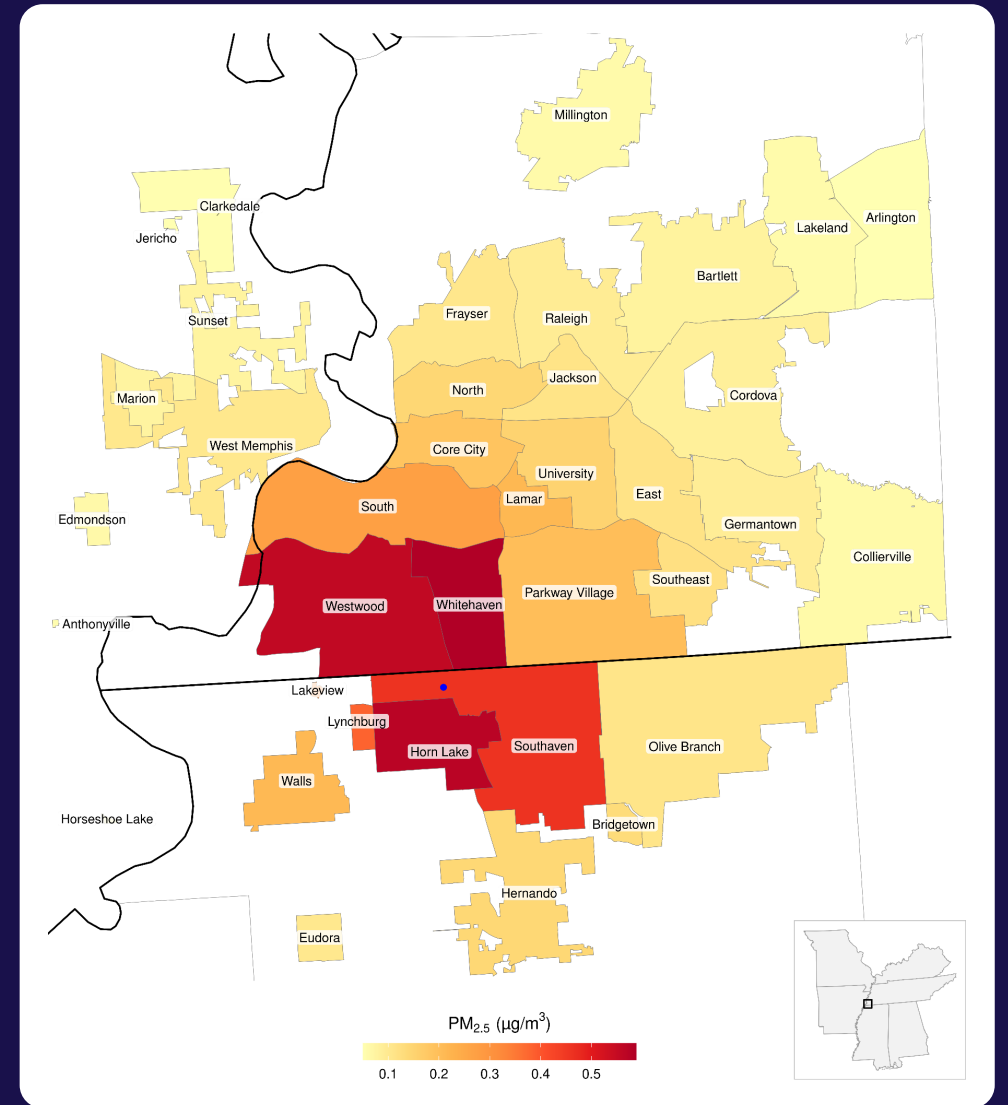
Data Centers, Air Pollution, Pollution, and Health in Memphis

Health impacts of the proposed xAI/MZX Tech power facility

Michael Cork, PhD, MPH

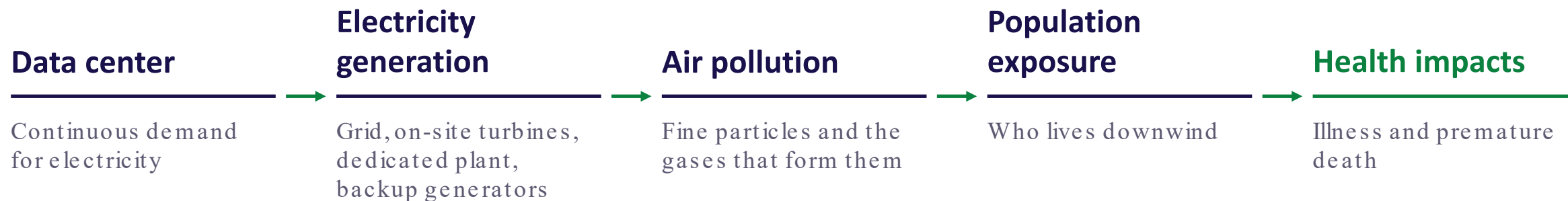
Founder & CEO, EmPower Analytics Group

Memphis City Council | Planning & Zoning Committee | October 6, 2026



Estimated increase in annual-average PM_{2.5} by community, draft-permit emissions scenario (report Figure 4). Report prepared for the Southern Environmental Law Center, February 2026.

The health question starts with how a data center is powered



How a data center is powered, and where that power is generated, determines its air-pollution footprint.

Air permitting

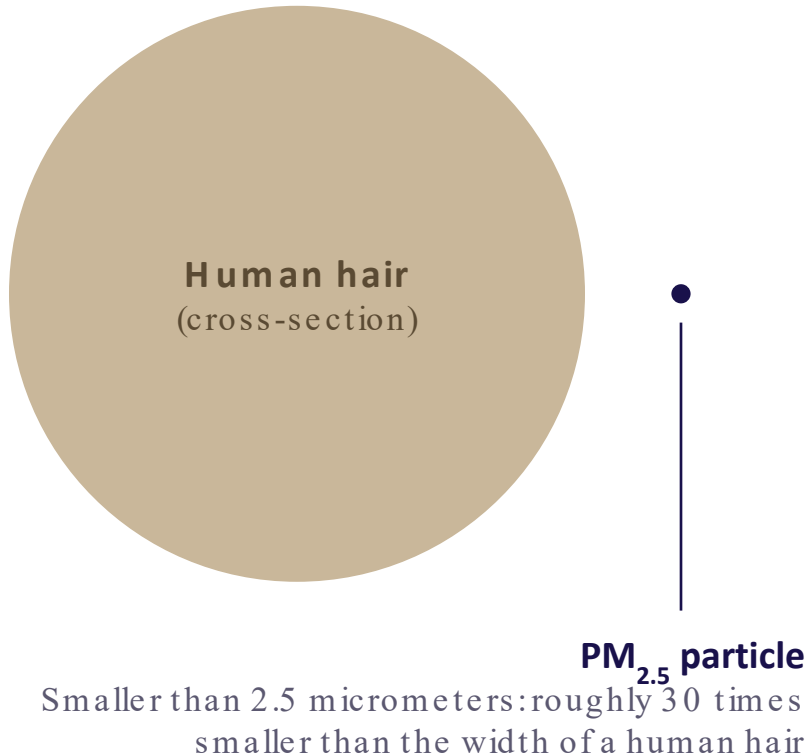
Does the facility meet applicable regulatory requirements?

Health-impact assessment

What population-health burden is associated with its emissions?

Related, but not the same question.

Small changes in air pollution can matter when many people are exposed



PM_{2.5} is extremely small

Particles this small can penetrate deep into the lungs.

PM_{2.5} affects health

Long-term exposure is associated with cardiovascular and respiratory disease and premature mortality.

Added pollution adds risk

Health risks have been observed across the concentration range, including below current regulatory standards.

Combustion sources emit PM_{2.5} directly and gases (NO_x, VOCs) that form PM_{2.5} and ozone downwind.

A new facility adds an increment to what people already breathe.

Memphis is not dealing with one source in isolation

OPERATING SINCE 2024 | NOT ANALYZED HERE

Colossus 1

Southwest Memphis, Tennessee

Data center with on-site gas turbines

PERMITTED MARCH 2026, UNDER APPEAL | ANALYZED HERE

MZX Tech power facility

Southaven, Mississippi

41 gas turbines | about 1.2 GW

Dedicated generation for xAI's Colossus 2 data center in Memphis

Residents breathe the combined atmosphere, not one facility at a time.

Southwest Memphis sits in and near an industrial cluster, in a region with relatively high existing $PM_{2.5}$.

The proposed power plant is in Mississippi. Much of the exposure is exposure is in Tennessee.

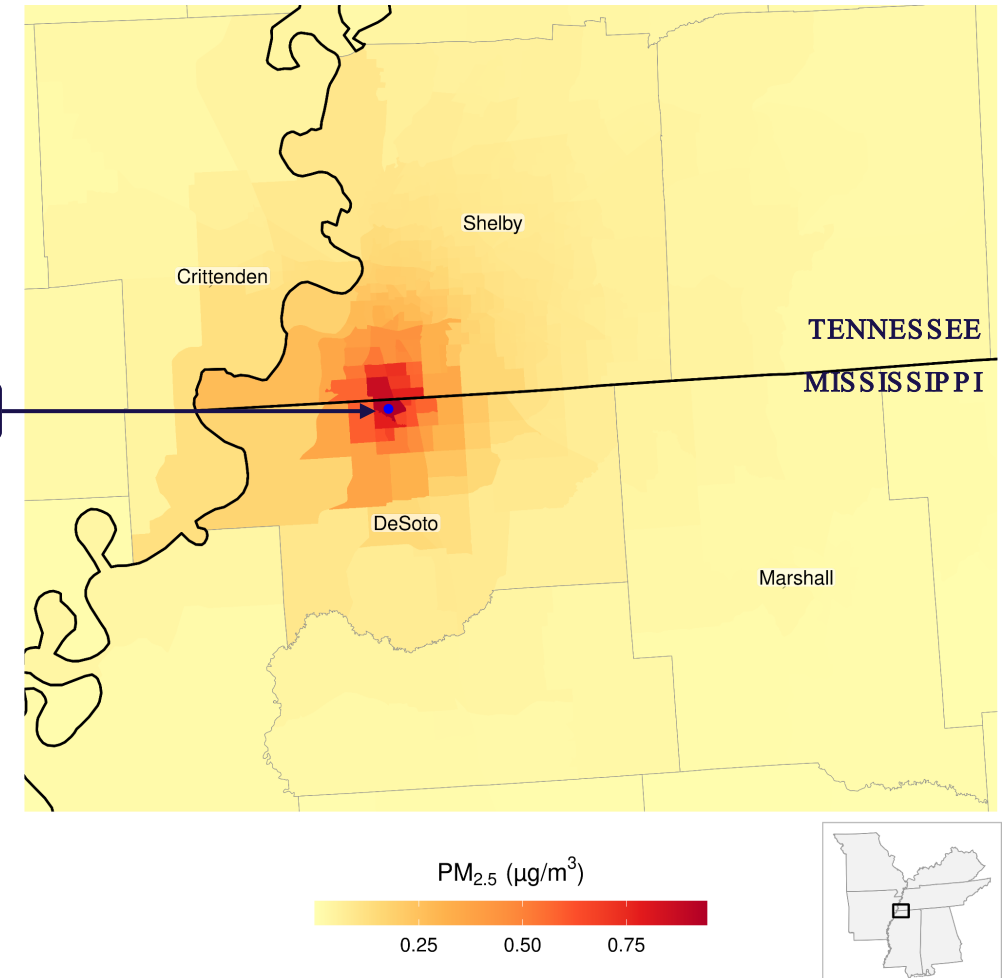
1.2 GW

41 gas turbines in Southaven, Mississippi, to power xAI's Colossus 2 data center in Memphis

The map shows the estimated increase in annual-average $PM_{2.5}$ under the draft-permit emissions scenario. The permit was issued in March 2026 and is under appeal. Estimated using atmospheric modeling; not measured concentrations.

Air pollution moves across state and municipal boundaries.

Proposed facility





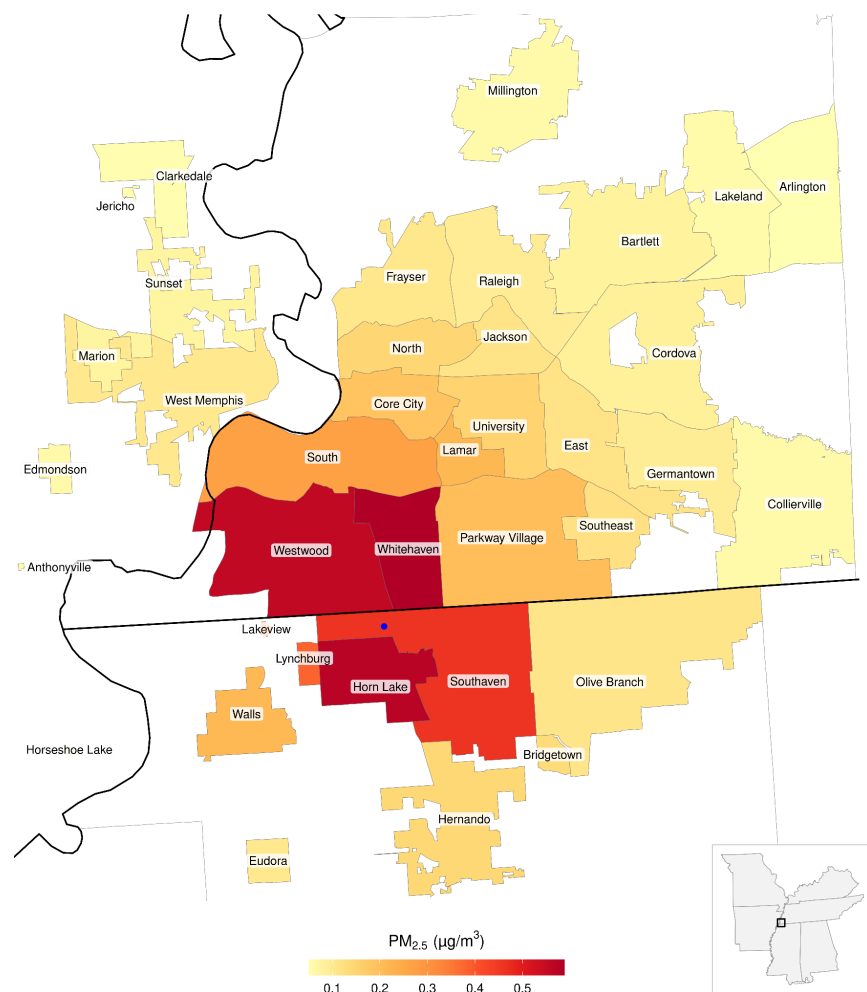
of the estimated population exposure from the proposed facility falls in Shelby County, Tennessee

LARGEST ESTIMATED INCREASES, $\mu\text{g}/\text{m}^3$

Whitehaven (Memphis)	0.588
Horn Lake (Mississippi)	0.572
Westwood (Memphis)	0.558

Estimated increases under the draft-permit scenario, not measured concentrations. Health impact depends on where pollution travels and how many people are exposed, not on tons emitted alone.

The plant would be in Mississippi. Most of the estimated population exposure would occur in Tennessee.



The largest estimated increases reach predominantly Black Black communities

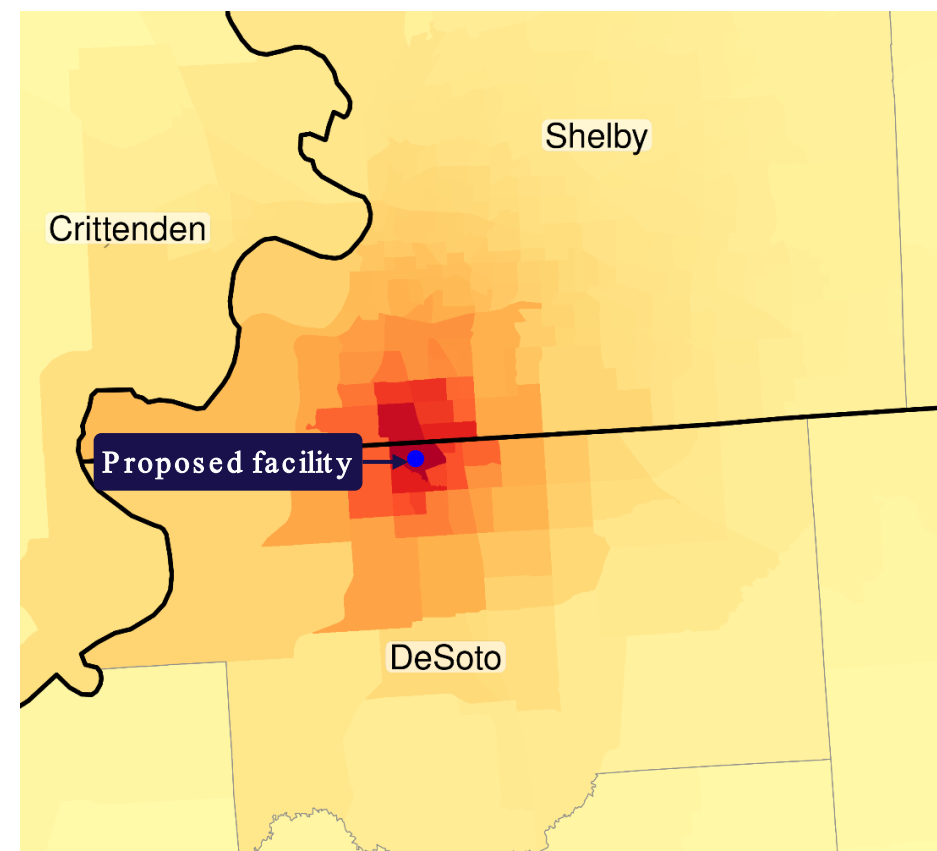
89,200 people

live in census tracts with estimated $PM_{2.5}$ increases above $0.5 \mu g/m^3$

73%

of residents in those tracts are Black

These communities also have higher measured social vulnerability and asthma prevalence; national studies have found larger $PM_{2.5}$ -associated mortality effects among Black Americans.



Close-up of report Figure 2: estimated increase by census tract. The darkest tracts are those above $0.5 \mu g/m^3$.

The estimated pollution translates into population-health health impacts

1.9–2.8

estimated premature deaths per year

\$30–44 million

per year in estimated health-related economic damages

Also estimated: additional asthma, asthma symptoms, missed school, and missed work.

Annual population-level estimates under the draft-permit emissions scenario.

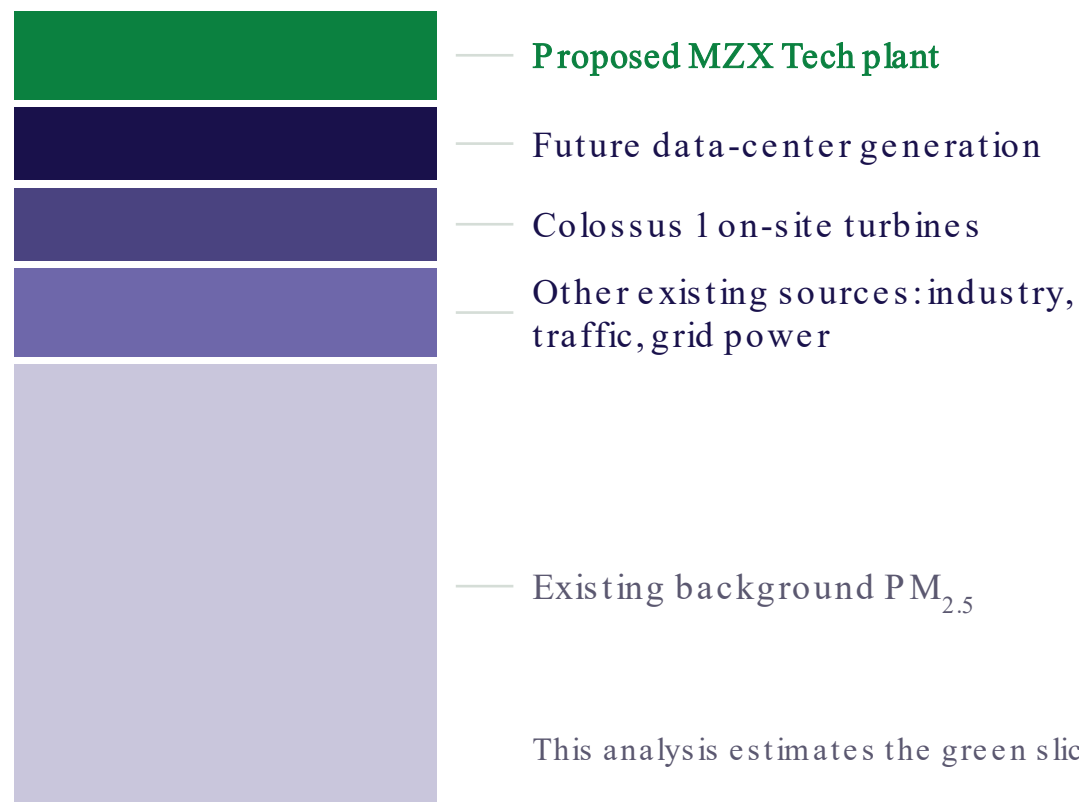
The mortality range reflects two alternative established concentration-response estimates, not values to add together.

Economic damages are the economic value of the estimated health impacts, not a separate health effect or a bill paid by residents.

These are estimates of the additional burden from one proposed facility, the 4 1 MZX Tech turbines. They do not include Colossus 1, other existing sources, or Memphis's total pollution burden.

This increment is added to air with relatively high existing PM_{2.5}

What a resident breathes



This analysis estimates the green slice only.

Background already there, 2023

11.8	9.6	10.6
Memphis metro	Shelby County	DeSoto County

µg/m³ annual-average PM_{2.5}, against a federal annual standard of 9.0 µg/m³.

Southwest Memphis sits in and near Memphis's industrial cluster, and the metro area ranks among the highest in the nation for asthma emergency visits and deaths.

Single-year EPA values, not an attainment determination.

Monitoring and health-impact modeling answer different different questions

UNIVERSITY OF MEMPHIS | COLOSSUS 1, OPERATING

What changed after Colossus 1 began operating?

- Satellite-based before-and-after comparison
- No significant increase detected in $\text{PM}_{2.5}$, NO_2 , or formaldehyde

No field monitors in Southwest Memphis. Monitoring is valuable, but limited by where monitors are, the time needed to observe a change, and attributing a change to one source.

EMPOWER | MZX TECH FACILITY, PROPOSED

What would the proposed facility add?

- Facility-specific emissions, atmospheric and health-impact modeling
- Estimates the added exposure and population-health burden

Established, peer-reviewed methods estimate a source's contribution before it is built. Prospective, not a measurement of today's air quality.

Different facilities. Different questions. Complementary evidence.

What would give Memphis a clearer picture?



Burning fossil fuels to power data centers adds air pollution and health risk. For the Southaven plant, the largest estimated increases fall on South Memphis communities with higher vulnerability and relatively high existing $PM_{2.5}$ concentrations.

- 1 MEASURE**
Local air monitoring
Establishes what nearby communities are actually breathing.
- 2 QUANTIFY**
Facility-specific health impacts
Connects emissions to transport, exposure, and estimated health outcomes.
- 3 LOOK CUMULATIVELY**
Major sources together
One analysis estimates one source. Residents experience all sources together.

Better disclosure of equipment, emissions, controls, and operating hours improves all three.

Questions?

Residents breathe the combined atmosphere. The analysis should increasingly reflect it.

Michael Cork, PhD, MPH
EmPower Analytics Group
michael@empoweranalyticsgroup.com

Source: EmPower Analytics Group, Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility (February 2026), prepared for the Southern Environmental Law Center; University of Memphis School of Public Health, Impacts of the xAI Colossus 1 Data Center on the Air Quality and Temperature in Southwest Memphis. Health estimates: U.S. EPA COBRA, annual impacts under the draft-permit emissions scenario, 2023 dollars.

Backup: who lives in the most exposed census tracts

	Tracts > 0.1 µg/m ³	Tracts > 0.5 µg/m ³	Mississippi	United States
People living in these tracts	6 8 3,10 0	89,200	2,9 5 8,8 0 0	3 3 1,0 9 7,6 0 0
Black residents	5 9 %	73%	3 7.2%	12.5 %
Poverty rate	22.1%	22.6%	19.5 %	12.5 %
Median household income	\$5 9,3 0 0	\$49,000	\$5 6,5 0 0	\$75,10 0
Social Vulnerability Index (0 – 10 0)	6 2.6	75.8	5 8.9	—
Adult asthma prevalence	12.6 %	12.6%	10.5 %	10.5 %

The Social Vulnerability Index is a CDC/ATSDR percentile ranking; no single national mean is reported. Race is a descriptor of the exposed population, not a susceptibility factor in the analysis.

Backup: estimated annual health impacts by outcome

Outcome	Cases per year	Valuation
Premature deaths (PM _{2.5} and ozone)	1.9–2.8	\$27–41 million
New asthma cases	9.6	\$730,000
Days with asthma symptoms	1,500	\$450,000
School-loss days (ozone)	720	\$1.2 million
Minor restricted-activity days	560	\$71,000
Work-loss days	95	\$30,000
Nonfatal heart attacks	0.7	\$62,000

Totals: PM_{2.5} \$11–25 million, ozone about \$19 million, combined \$30–44 million per year. Over 30 years of operation: \$900 million to \$1.32 billion undiscounted, or \$588–862 million at a 3% discount rate (Table 5). Other endpoints in Appendix A contribute smaller amounts.

Backup: different kinds of information answer different questions

Information	What it tells us	What it does not establish by itself
Countywide emissions trend	Whether reported emissions from major sources are rising or falling overall	The added health burden from one new source
Facility emissions ranking	Relative reported or permitted tons emitted	Relative population-health impact, which also depends on chemistry, transport, and who is exposed
Ambient monitoring or satellite analysis	Observed or detected concentrations and how they changed	The future contribution of a proposed facility that does not yet operate
Facility-specific health-impact assessment	Estimated added exposure and health burden from specified emissions	Today's measured air quality, or the total burden from every source combined

Each kind of information is useful. They are strongest when read together, and none of them substitutes for the others.