

THE REFINERY RISK MAP

Estimating premature deaths attributable to a single year of oil refinery emissions.

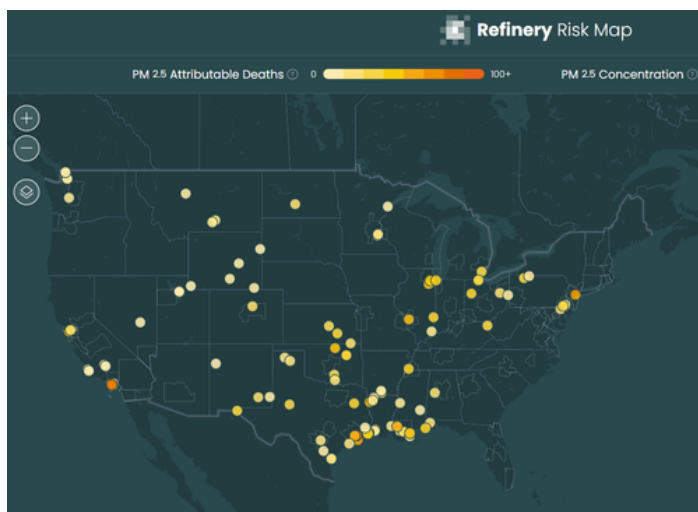
Background

Oil refineries convert crude oil and other unfinished petroleum products into fuels such as gasoline, diesel, and jet fuel. Analysis of the [2021 National Emissions Inventory](#) finds that oil refineries rank 3rd among large industrial facilities for PM_{2.5} emissions. Living near refineries is associated with a number of harmful health outcomes, including higher risks of [leukemia](#), [asthma](#), [hospitalizations](#), and [emergency department visits](#).

Overview

As [shifting fuel demands](#), [aging infrastructure](#), and [depleting oil fields](#) cause California refineries to shut down, the Gulf Coast is preparing to construct the first major oil refinery in the U.S. in nearly half a century. These trends reflect an evolving political and economic landscape that yields different pathways for the future of domestic oil refining. As decision makers navigate these pathways, the public health impacts of these refineries represent an often overlooked consideration.

The [Refinery Risk Map](#) is the first interactive data visualization tool to provide emissions data, estimates of PM_{2.5}-related premature deaths, links to regulatory and enforcement data, and fenceline community demographic, socioeconomic, and health characteristics for nearly all active oil refineries in the contiguous U.S.



KEY TERMS

FINE PARTICULATE MATTER (PM_{2.5})

Airborne liquid or solid particles that travel into the deeper parts of the lung and into the bloodstream due to their microscopic size.

PM_{2.5}-ATTRIBUTABLE DEATHS

Estimated number of excess deaths from one year of exposure to increased PM_{2.5} attributable to refineries.



Key Findings

National Burden. Nationwide, an estimated 990 annual PM_{2.5}-related premature deaths are attributable to emissions from oil refineries, resulting in an estimated \$13.5B in annual economic damages.

Emissions Underreporting Matters. When correction factors are used to account for likely underestimation of emissions, this number increases to over 1640 PM_{2.5}-attributable premature deaths (\$22.4B in economic damages).

Disproportionate Impacts. Asian, Black, and Latino populations together account for 54% of the estimated refinery-attributable deaths nationwide, despite representing only 37% of the U.S. population.

Distribution of Risk. A small subset of facilities drives a disproportionate share of impacts: the top 10% of refineries (12 of 116) account for more than 50% of the estimated mortalities. Nearly half of these high-risk facilities are located in Los Angeles, CA, where the proportion of the Latino population within a 5 km radius of an oil refinery is 2.8 times higher than the national average.

Fenceline Communities: An estimated 4.3 million people live within 5 km of at least one oil refinery on the Refinery Risk Map. Approximately 1760 day care centers, 1600 schools, 370 nursing homes, 135 hospitals, and 75 prisons are also located within 5 km of these refineries.

COMMUNITY HEALTH AND AIR QUALITY IMPLICATIONS OF REFINERY RETROFITS AND RETIREMENTS (CHAIRS)

The Refinery Risk Map was developed as part of the CHAIRS project, a collaboration between PSE Healthy Energy, UC Berkeley, and UCLA, with input from a Community Advisory Council.

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» METHANE + HEALTH INITIATIVE

PSE's Methane + Health Initiative aims to improve the scientific and public understanding of the link between methane emissions, air pollution, and public health.