

Permit To Kill

Potential Health and Economic Impacts from U.S. LNG Export
Terminal Permitted Emissions

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A new analysis from Sierra Club and Greenpeace USA shows that permitted emissions from operating and planned LNG terminals are associated with major public health costs.

Among the key findings:

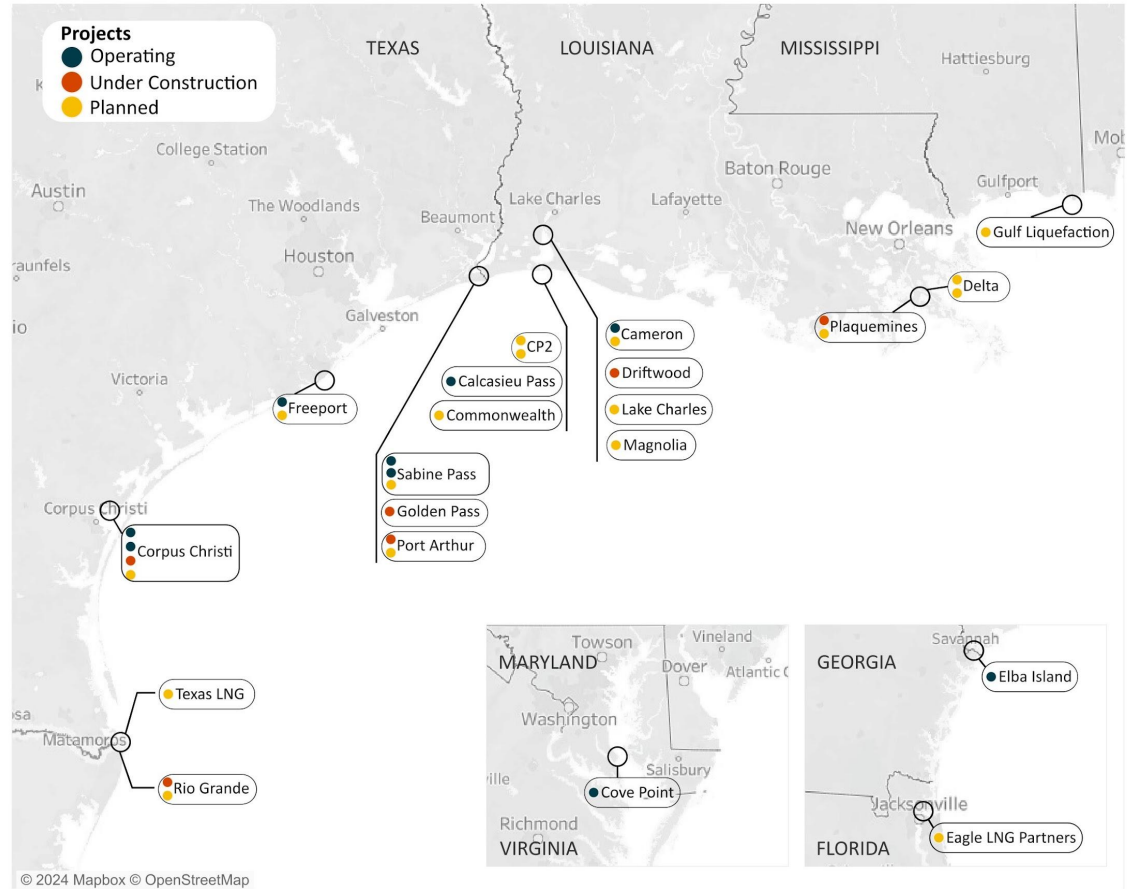
- Direct air pollution from currently operating LNG export terminals is estimated to cause 60 premature deaths and \$957 million in total health costs per year.
- If all the planned terminals and expansion projects are built, these numbers would increase to 149 premature deaths and \$2.33 billion in health costs per year.
- By 2050, the same permitted air pollutants from currently operating LNG export terminals alone are slated to yield cumulative impacts of 2,020 premature deaths and \$28.7 billion in total health costs, with these figures rising to 4,470 and \$62.2 billion respectively in a scenario where all planned projects are built.
- There is a strong overlap between areas that are already environmentally overburdened and the counties and parishes slated to suffer the worst air pollution impacts. Moreover, at the national level, Black and Hispanic Americans would respectively experience air pollution from LNG terminals at 151–170% and 110–129% the rate of white Americans, if all projects slated for 2030 are built.
- If DOE ceases to approve new LNG export applications, it would save an estimated 707 to 1,110 lives and avoid \$9.88 to \$15.1 billion in health costs through 2050, by comparison to a scenario where all projects are built. A policy to phase out all LNG exports, consistent with limiting warming to 1.5C, would save even more lives and health costs.
- This analysis does not consider the likely public health harms associated with air pollution from infrastructure upstream or downstream of LNG terminals, hazardous air pollutants such as benzene, the impacts from explosions or other emergencies, or the climate impacts of LNG's life cycle emissions.

Recommendations:

- DOE, FERC, and other agencies should reject any approvals or permits for LNG export projects, as well as related pipelines and compressor stations.
- DOE's review of the studies and analysis it uses to assess LNG exports, as well as its review of individual LNG export project applications, should make clear that any projects that exacerbate climate change or worsen local health outcomes are simply not in the public interest and must be rejected.
- DOE and FERC should evaluate the cumulative impacts of air pollution from existing and the slate of planned LNG terminals when evaluating the impacts of any specific project on the surrounding communities.
- EPA must develop and enforce more robust controls on the cumulative impacts of air pollution for the most overburdened communities.
- DOE and other agencies should create frontline community member boards to inform of concerns that arise from LNG operations such as high pollution emitting events (e.g., flaring, leaks); and consult with them as new studies are developed for the public interest determination process, and for LNG permitting decisions.

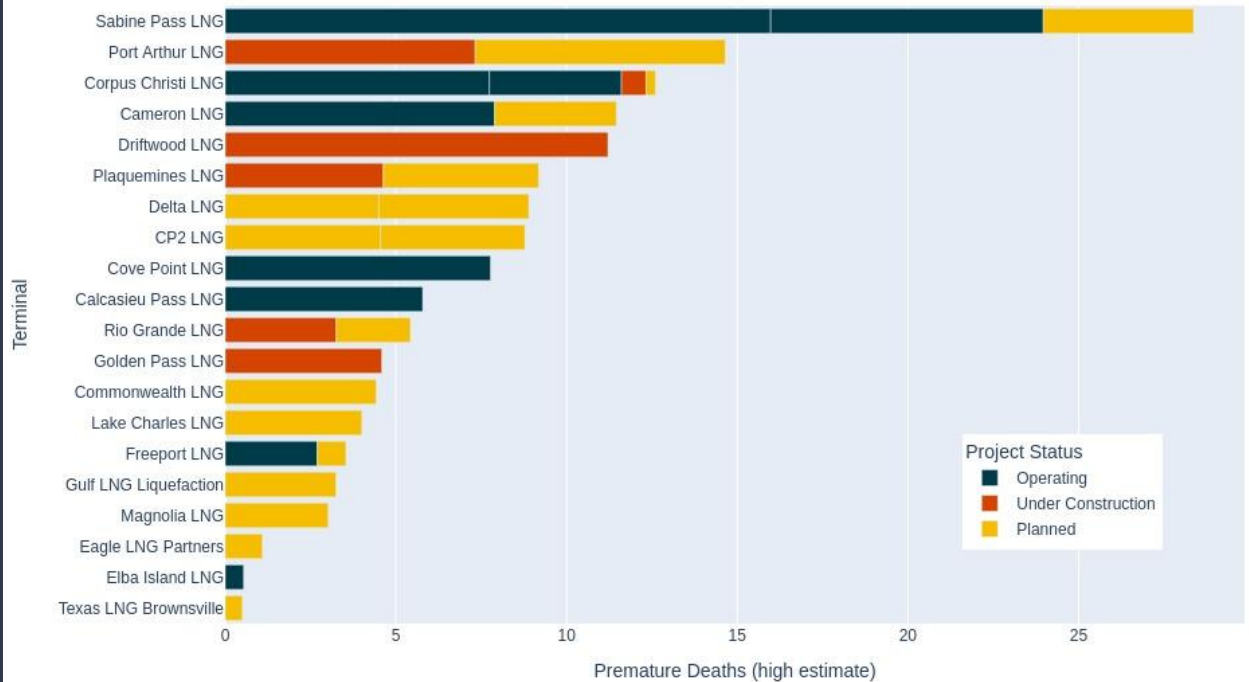
Map of LNG export projects analyzed in this study

- Our analysis covers all 32 operating, under construction, and planned onshore LNG projects in the lower 48 states with draft or final Clean Air Act permits.
- These permits contain self-determined estimates of potential air emissions.
- We use these permits as inputs to the Environmental Protection Agency (EPA) CO-Benefits Risk Assessment Health Impacts (COBRA) tool to estimate county-level health impacts from LNG terminal air pollution.



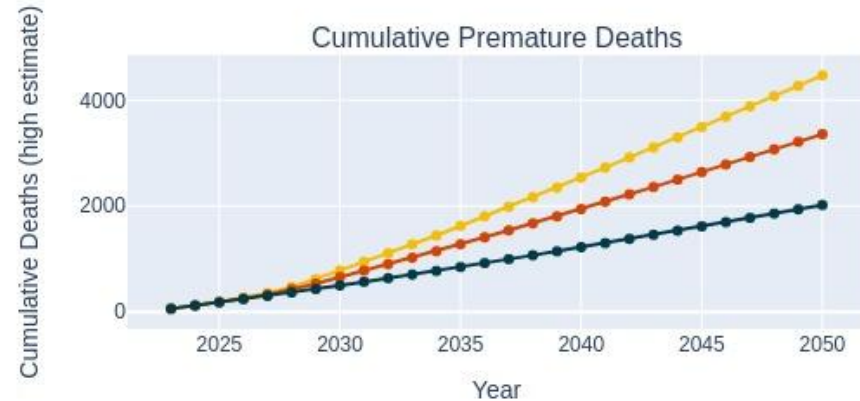
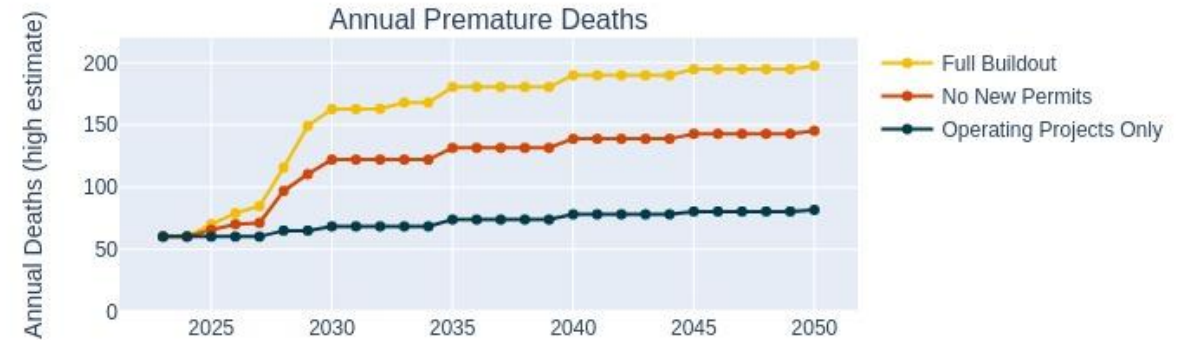
Single-year premature deaths by LNG terminal

- The COBRA tool uses emissions inputs at the county and sector level to estimate changes to particulate matter (PM2.5) and ozone concentration for receptor counties.
- Based on these concentrations, COBRA outputs a wide range of health metrics at the county level using known epidemiological relationships between pollution exposure and health outcomes.
- This figure shows estimated premature deaths from LNG terminal air pollution by terminal and project status.



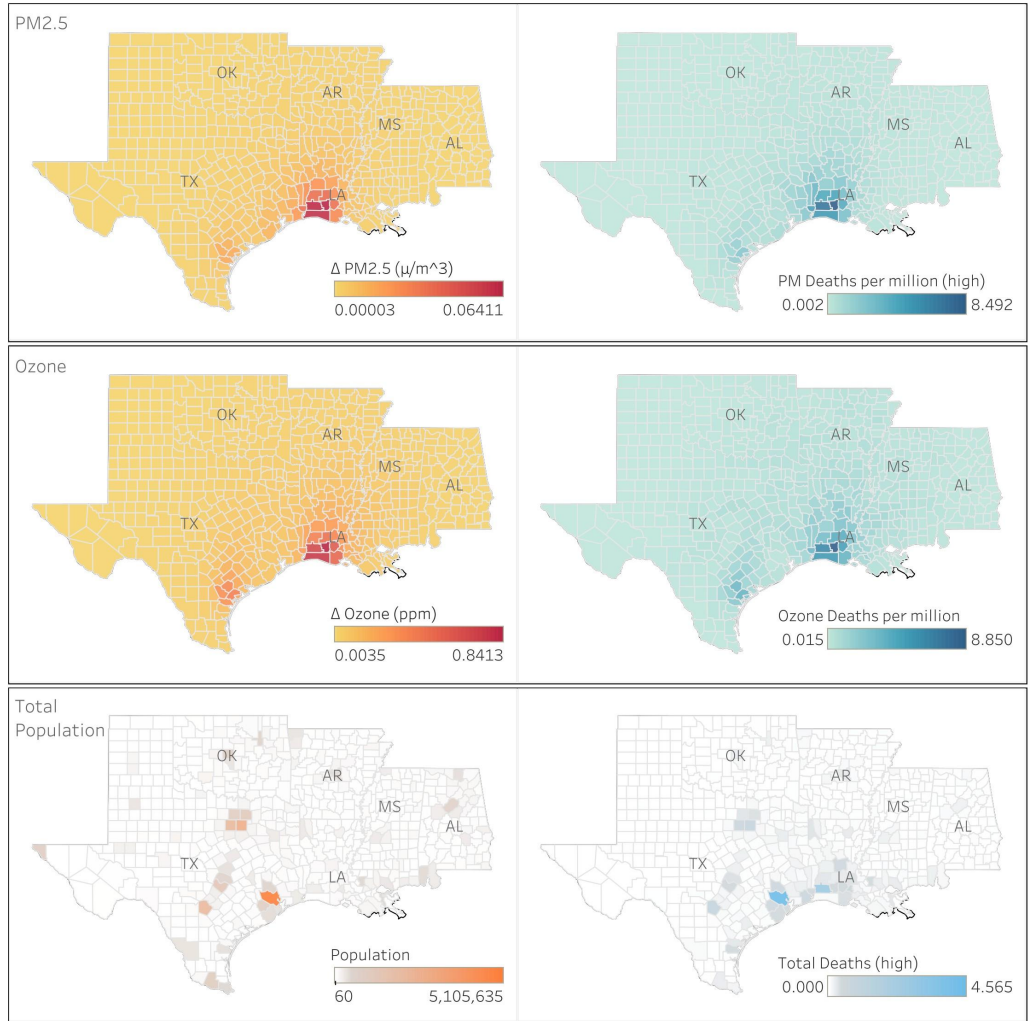
Annual and cumulative premature deaths across three LNG buildout scenarios

- We use three LNG buildout scenarios to investigate the impact of the LNG industry over the 2023–2050 timeframe under different assumptions:
 - Full Buildout
 - No New Permits
 - Operating Projects Only
- This figure shows the annual and cumulative premature deaths in each scenario over time. Some of the projected increase in annual deaths results from population growth.



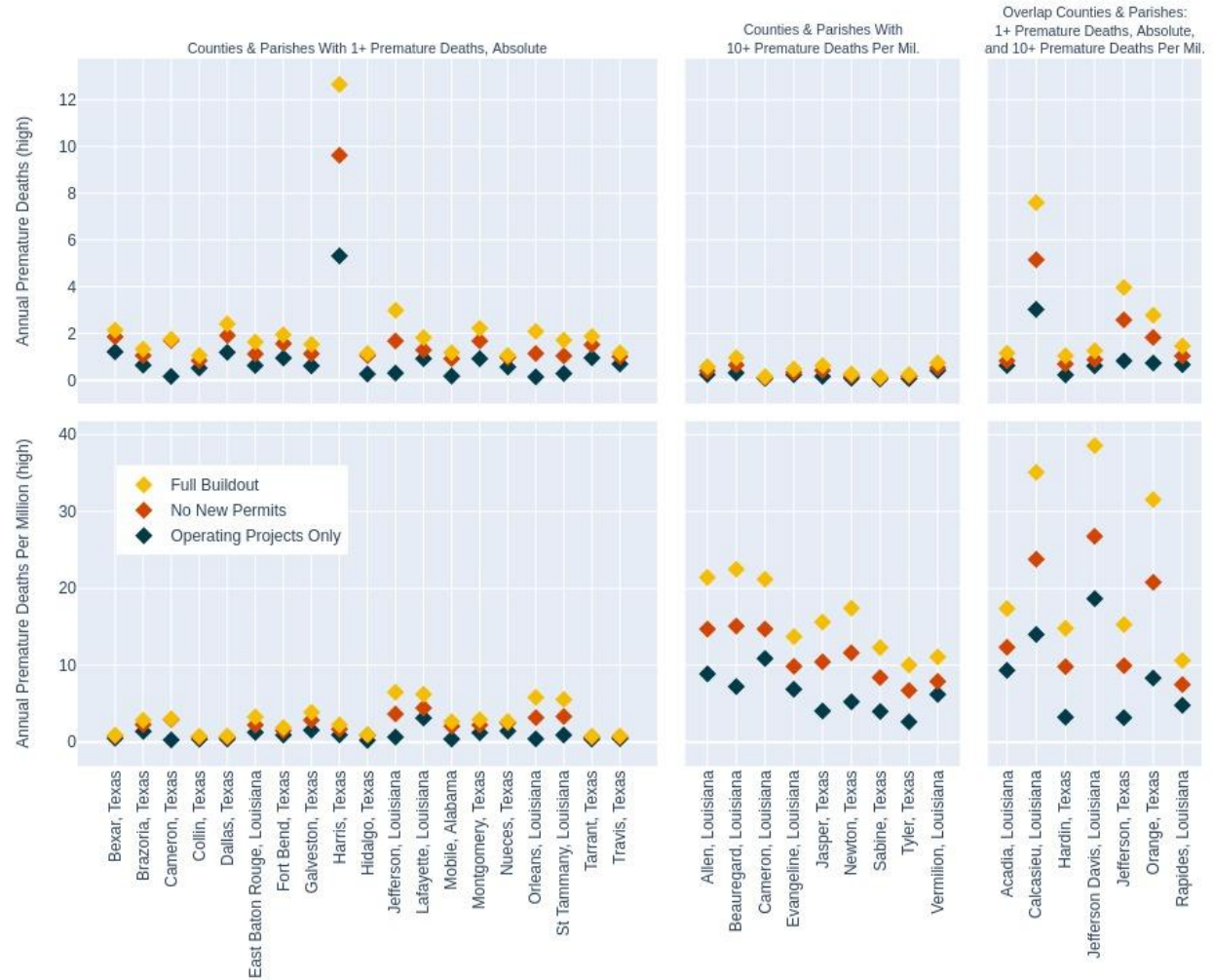
LNG pollution distribution and county population compared to premature deaths in counties

- The top two rows show that LNG PM2.5 and ozone pollution levels are highest near where LNG is clustered (e.g., in Southwest LA and parts of the TX Coastal Bend). As a result, individuals in counties close to LNG, regardless of county population, experience higher health impacts and deaths per million.
- At the same time, high population areas, even farther away from LNG (e.g., Dallas County, TX 250 miles away) have higher total health effects and deaths, simply by having more people exposed to the pollution. Shown in the bottom panel.



Annual absolute and per million premature deaths for the Most Impacted Counties and Parishes across all three buildout scenarios in 2030

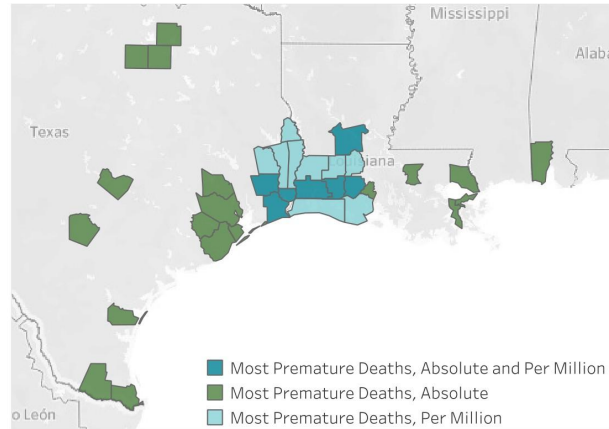
- Using the 2030 annual results of the Full Buildout scenario, we identify 35 counties with at least 1 premature death, in absolute terms, or 10 premature deaths per million people for further investigation.
- This figure shows the absolute and per million premature deaths for these counties across all three buildout scenarios.



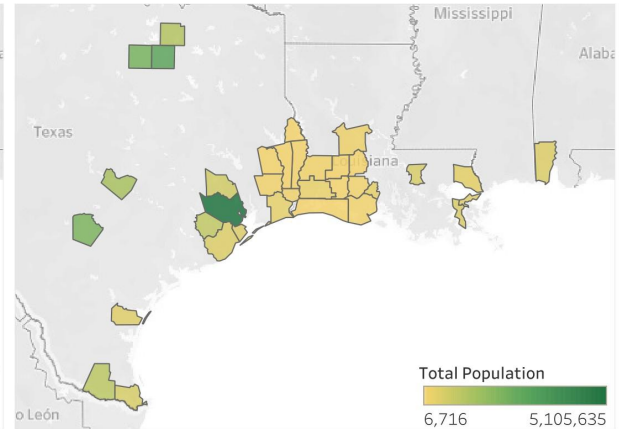
Map of Most Impacted Counties and Parishes and overlap with EPA Nonattainment Zone and CVI datasets

- The 35 counties and parishes that would experience the worst air pollution impacts from the full LNG buildout (Most Impacted Counties and Parishes) are already overburdened and experience poor air quality.
- 10 out of the 35 Most Impacted Counties and Parishes are already in nonattainment.
- The majority of the Most Impacted Counties and Parishes rank above the CVI's 82nd national percentile

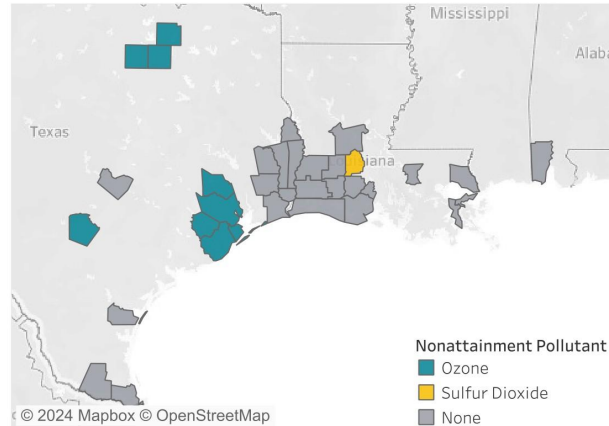
Most Impacted Counties & Parishes



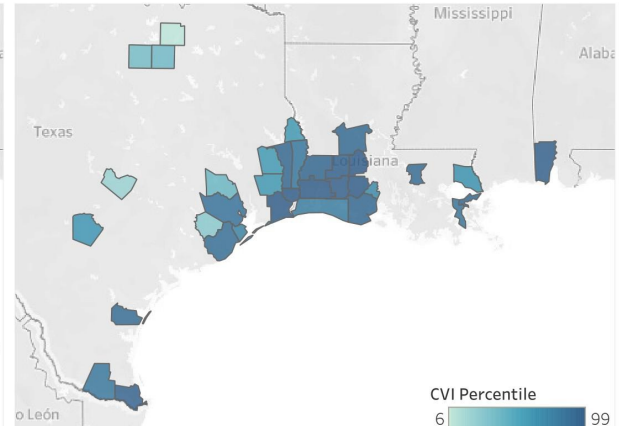
Population



Nonattainment Status

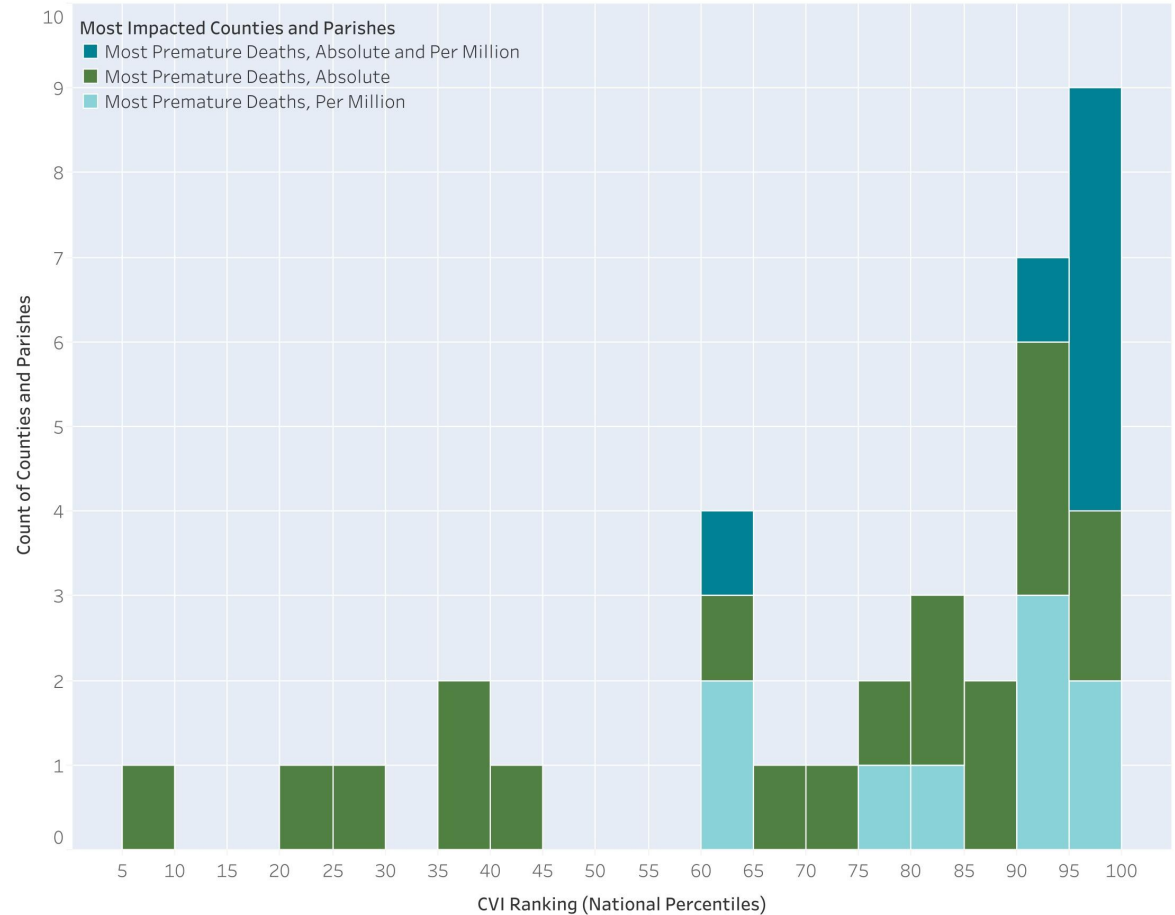


Climate Vulnerability Index Ranking



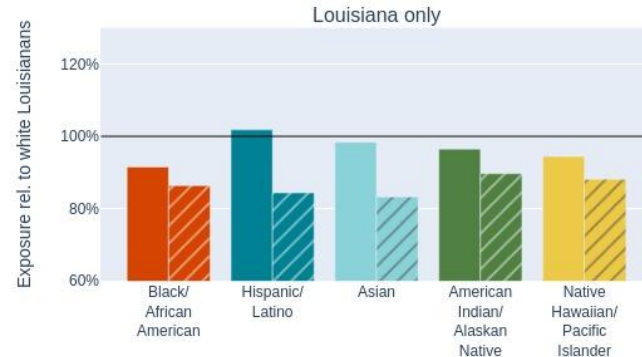
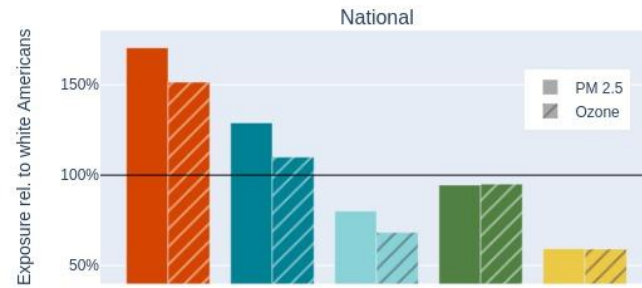
Climate vulnerability ranking of Most Impacted Counties and Parishes

- The Climate Vulnerability Index (CVI) is a cumulative impacts assessment that ranks communities' vulnerability to climate destabilization using a percentile score.
- The score accounts for indicators relating to socioeconomic vulnerability, pollution exposure, health outcomes, infrastructure conditions, and climate and environmental conditions and risk.



PM 2.5 and ozone exposure relative to the white population

- If all projects slated for 2030 reach operation, nationally Black and Hispanic Americans will have much higher exposure to PM2.5 and ozone pollution from LNG terminals than white Americans.
- This partly reflects that Louisiana and Texas are slated to have high average exposure rates to LNG terminal air pollution and have a larger share of the country's Black and Hispanic populations than its white population.
- Within Texas, the Black population is slated to have the highest average exposure rate to LNG terminal air pollution. Otherwise in Texas and Louisiana, it is clear that white populations are not shielded from this pollution.



Stopping new LNG export authorizations would carry major health benefits

- Many climate and EJ groups applauded the Biden administration's announcement that the DOE would implement a "temporary pause" on approving new LNG permits in order to update the studies used to inform the public interest determination for LNG export applications.
- This figure summarizes the health benefits that would accrue through 2050, solely from reduced LNG terminal air pollution if LNG projects that are not currently authorized are not built compared to the Full Buildout scenario.

Health benefits from avoided air pollution if LNG projects not currently authorized by DOE are not built (2023–2050)



707 – 1,110
avoided deaths



\$9.88– 15.1 billion
avoided health costs



3,070
avoided cases
of childhood asthma



510,000
avoided asthma
symptom occurrences



210,000
avoided school loss days



3,100
avoided work loss days

Avoided health impacts relative to the Full Buildout scenario

- Scenarios aligned with limiting global warming to 1.5°C show a peak in global LNG trade around 2025-2030 followed by a decline to 2050.
- If U.S. LNG exports were to follow that trajectory, it would necessarily require no new LNG exports and imply a managed phase-out of currently operating LNG exports
- This figure shows the health benefits that would result from the Operating Projects Only scenario alongside those that would result from the No New Permits scenario

