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Truck Parking and Idling is Having an Impact on Disadvantaged Communities in California

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Issue

Under California Assembly Bill 617 (Garcia, 2017), local and state agencies are working to reduce air pollution exposure in low income communities. These communities—often referred to as AB 617 communities—are disproportionately impacted by air pollution due to their proximity to transportation corridors, industrial installations, and logistics centers. A research team at the University of California, Davis investigated the impact of truck parking related activities on air quality in California's AB 617 communities in Kern County, including truck idling, time spent searching for parking, and parking locations in communities. Searching for parking involves trucks driving extra miles to find available parking spaces, which leads to additional fuel consumption and increased emissions of pollutants such as nitrogen oxides (NOx) and particulate matter (PM 2.5 and PM 10). Once parked, prolonged or illegal parking can exacerbate congestion, noise, and localized pollution. These combined activities heighten exposure to harmful emissions in AB 617 communities, potentially leading to health issues (e.g., asthma and cardiovascular diseases).

Key Research Findings

Truck idle time is directly influenced by the proportion of heavy-duty trucks in the area, proximity to points of interest (e.g, schools, parks), and land use (e.g., industrial, commercial) and socio-economic factors. Areas with higher HDTs tend to experience longer idling times. Land use composition surrounding a location can significantly impact idling behavior, e.g., industrial or commercial areas may attract more truck activity, increasing idling. For example, an increase in commercial land use area typically corresponds with a higher demand for truck parking due to the need for goods delivery and transportation services. This highlights the importance of ensuring adequate parking facilities in commercial zones. An increase in the total population generally leads to a higher demand for goods and services, which in turn translates into a higher demand for truck parking spaces. Overall, the findings underscores the importance of both spatial and socioeconomic factors in predicting truck idling time.

The amount of time trucks spend searching for parking directly relates to distance from the main roads and higher employment levels in various industries. Parking search times vary based on truck type, indicating that some trucks spend more time looking for suitable parking spaces. Heavy-duty trucks had the largest average idle time, followed by medium- and light-duty trucks. Additionally, road accessibility influences parking search behavior. Employment, as a proxy for freight activity intensity, in sectors such as agriculture, forestry, fishing and hunting in the study areas in Kern County evidence parking dynamics associated with the type of freight activity. Additionally, a

higher number of employees in industries not classified may indicate more diverse land use or parking demand, making it harder to find available parking spaces.

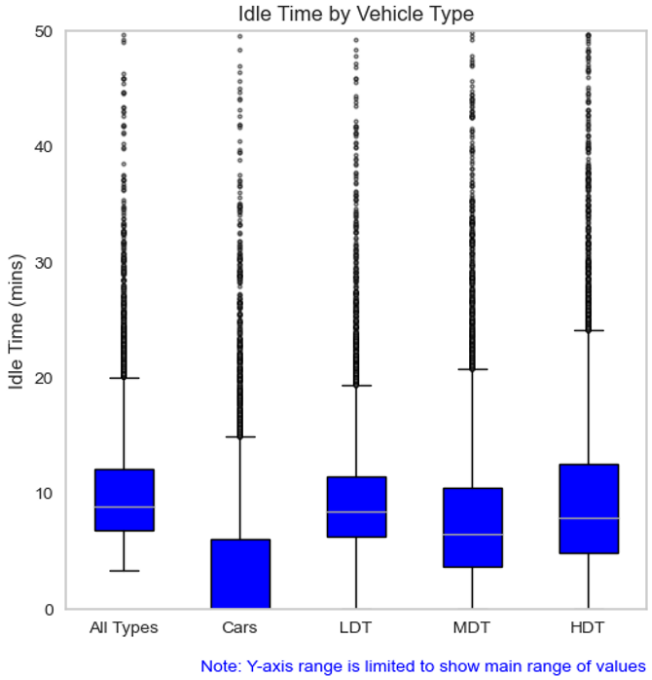

Figure 1. Average idling time for various vehicle types.

Higher truck parking demand is linked to the amount of nearby commercial land, the distance to main roads, income inequality, and population characteristics such as age and education levels. The study also identified parking demand hotspots, suggesting areas where targeted interventions could improve parking efficiency. The prevalence of pronounced idling hotspots, particularly in urban centers like downtown Bakersfield and Shafter, underscore a concentration of idling activities. A shorter distance to major roads implies easier access to parking spaces, which may result in a shorter search time for parking. An increase in the total population generally leads to a higher demand for goods and services, which in turn translates into a higher demand for truck parking spaces. Areas with higher income and education levels can also represent increased freight demand, thus increasing the potential for parking related activities.

As demand for truck parking rises, so does harmful air pollution. As demand for truck parking increases, trucks spend more time driving and/or idling in and around communities, resulting in more PM 2.5 emissions. The results highlight significant relationships between PM 2.5 concentration and several socio-economic variables, such as the number of employees in agriculture, forestry, fishing and hunting; in construction; in manufacturing; and in retail trade. These relationships help to explain the variation in PM 2.5 concentration further.

Disadvantaged communities are often more susceptible to the negative impacts of idling activities than other communities, as they tend to be located near major roads and logistics centers with higher truck traffic. Thus, reducing truck idling activities is particularly important for improving these communities' air quality and environmental health conditions.

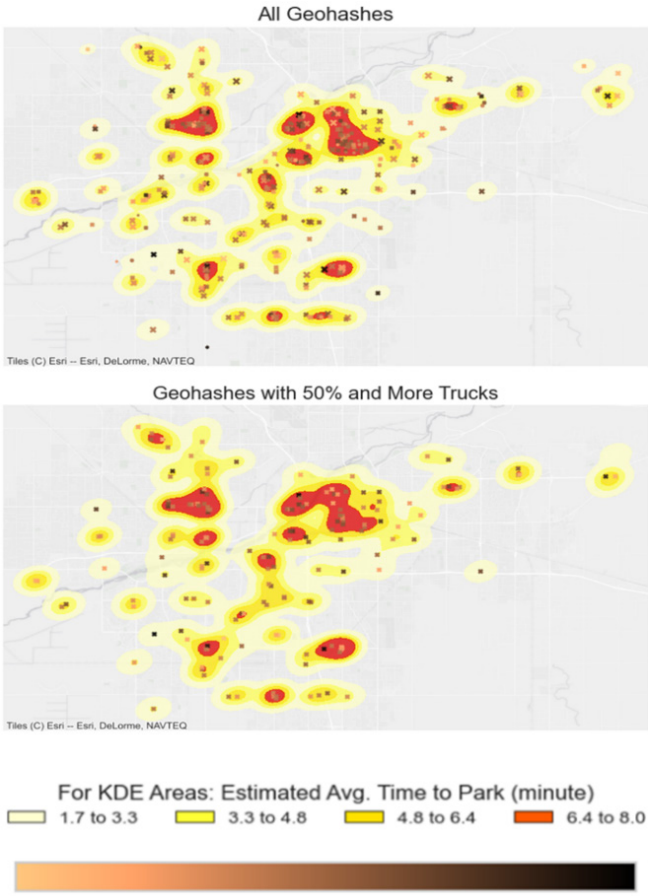

Figure 2. Hotspots of idling concentrations.

Concluding Remarks

A comprehensive policy framework addressing truck parking facilities, management, and air pollution control is crucial for improving air quality and living conditions in AB 617 communities. There are a number of initiatives that could contribute to improving the conditions on these communities:

- Improve truck parking facilities: Develop designated truck parking areas with appropriate amenities to reduce the time trucks spend searching for parking, thereby minimizing emissions associated with idling and congestion. Additionally, encourage the use of intelligent parking systems that provide real-time information on parking availability to further reduce truck parking search times.
- Enhance truck routing efficiency: Implement intelligent transportation systems and use real-time traffic data to optimize truck routing, avoid congested areas, and promote off-peak delivery schedules. This will help reduce emissions caused by congestion and idling, improving overall air quality.
- Implement stricter emission standards: Promote the adoption of cleaner fuels, electric trucks, and advanced emission control technologies to reduce the environmental impact of truck activities. Provide incentives and financial support for the transition to cleaner vehicles, accelerating the shift towards more sustainable transportation systems.
- Strengthen land-use planning and zoning regulations: Create buffer zones between industrial, commercial, and residential areas, and promote mixed-use developments that encourage walking, cycling, and public transportation use. This will help reduce the exposure of vulnerable communities to air pollution and improve overall living conditions.

More Information

This policy brief is drawn from "The Effects of Truck Idling and Searching for Parking on Disadvantaged Communities" a report by Miguel Jaller and Ivan Xiao at the University of California, Davis. The report can be found at https://www.ucits.org/research-project/2022-02/. For more information about the findings presented in this brief, please get in touch with Miguel Jaller at mjaller@ucdavis.edu.

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