Most household appliances, like furnaces and water heaters, are powered by fossil fuels and emit nitrogen oxides (NOx)—toxic and highly reactive gases that endanger human health and the environment. To address this problem, air districts have adopted policies to reduce NOx pollution from appliances, and others across California are considering similar proposals.

In a new policy brief released today, my colleagues Cara Horowitz, Julia Stein, and I argue that air districts have authority to go even further under state and federal law by adopting zero-NOx appliance standards—and that air districts should design such standards with the goals of equity and affordability in mind.

Zero-NOx appliance standards would benefit public health, cut greenhouse gas pollution, and create jobs. If all residential gas appliances in California were replaced with electric, zero-NOx alternatives, the reduction in outdoor air pollution alone would avoid about 350 deaths, 600 cases of acute bronchitis, and 300 cases of chronic bronchitis each year, translating to about $3.5 billion in annual monetized health benefits.

Further, establishing zero-NOx emissions standards could spur mass electrification retrofits, ensuring greater access to all-electric homes and creating most of the roughly 64,000-104,000 net jobs that building electrification could add annually across the state.

However, the policies also raise questions about air districts' legal authority and the potential financial impacts on low-income households. We assess those questions in our report, the latest Pritzker Environmental Law and Policy Brief published by the Emmett Institute. The Pritzker Brief series provides expert analysis to further public dialogue on important issues impacting the environment.

The brief outlines the harmful effects of fossil fuel appliances on human health, air quality, and climate change. Currently, fossil fuel appliances emit about 65 tons of NOx statewide per day—about 4.9 times as much as power plants. As a result of this appliance pollution, buildings in California are responsible for about 515 premature deaths and over $17 billion in health impact costs per year.

Appliance emissions disproportionately impact communities of color and children and exacerbate the health disparities these vulnerable groups already face. Californians of color are exposed to 32% more outdoor particulate matter formed from residential gas appliance emissions than White Californians, with Black Californians experiencing exposures 46% higher than White Californians. And children who live in homes with gas stoves are 42%

more likely to experience asthma symptoms and 24% more likely to develop asthma.

Appliance emissions also hinder climate progress. Direct emissions from the combustion of fossil fuels in buildings, primarily for space and water heating, account for 10 percent of all GHG emissions in the state—more than the emissions from heavy duty vehicles, in-state electricity generation, agriculture, waste and recycling, or oil and gas extraction. For this reason, eliminating emissions from fossil fuel appliances would bring the state closer to its climate targets.

The brief examines air districts' authority to require zero-NOx appliances, finding that such standards are appropriate under both federal and state law. It also addresses how zero-NOx standards can be designed to assist low-income communities in the shift to cleaner appliances. The escalating cost of safely maintaining the gas system in California is causing customer gas rates to rise, prompting an increasing number of wealthy households to convert to all-electric appliances and leaving substantially fewer customers to pay for system repairs and upgrades. Because zero-emission standards can apply to existing buildings, they can help to ensure that electrification (and its health benefits) reaches all communities, not just the wealthiest. This outcome can only be achieved, however, with strong financial and other support for low-income households.

Read the full brief here.