



COOKING WITH SMOKE: HOW THE GAS INDUSTRY USED TOBACCO TACTICS TO COVER UP HARMS FROM GAS STOVES



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Introduction

The Public Health Law Center (“PHLC”) was founded over 20 years ago to confront the staggering toll in global mortality and health care costs caused by the commercial tobacco¹ epidemic. Over the course of two decades supporting state and local governments, Tribes, federal agencies, and health advocacy organizations, we have developed a deep understanding of the tobacco industry’s history of intentionally misleading the public about the known health harms their products were causing.

In recent years, our staff has been astonished to discover the parallels between methane gas and commercial tobacco, including surprising similarities between the pollutants released by both gas stoves and tobacco, the similarities of health harms from secondhand smoke and gas stoves, and the two industries’ mirror-image deception campaigns designed to conceal those health harms and prevent public awareness and government regulation.

While the public is familiar with the health dangers of tobacco and the long and sordid history to mask these dangers by the tobacco industry, we are just starting to become aware of the full range of impacts of burning methane gas indoors, and the gas industry’s misdeeds to disguise and deny those impacts. The health research showing the harm from gas stove indoor air pollution dates back decades, but is only now

earning the attention it merits, in part because new research is revealing shocking similarities between the pollutants in tobacco and gas stoves, and the health harms from secondhand smoke and gas stoves.

Research from organizations like the Climate Investigations Center and investigative journalists is illustrating in vivid detail how long the gas industry was aware of these harms and how hard it worked to sweep them under the rug. Again and again, the gas industry directly replicated the tobacco industry's tactics. From preempting local governments from taking policy action to protect public health, to forming front groups, launching deceptive public relations campaigns, suing government leaders taking action, and funding and promoting biased research, the parallels are everywhere.

This publication documents the intertwined paths of the tobacco and gas misinformation campaigns, and the similar health detriments of their products, concluding with ways state and local governments and public health advocates can come together to address the harms from indoor gas just as we have from indoor smoke.

Health Harms from Burning Tobacco and Gas

The Harms

Burning tobacco and gas produce surprisingly similar pollutants. Nitrogen dioxide, carbon monoxide, benzene, particulate matter, and formaldehyde are all harmful byproducts of both cigarettes and gas stoves.

Nitrogen Dioxide (“NO₂”)

NO₂ is a byproduct of combustion that, according to the American Lung Association, contributes to increased asthma attacks, inflammation of the airways, worsened cough and wheezing, reduced lung function, and greater likelihood of emergency department and hospital admissions.² Research dating back to at least 1970 also shows that NO₂ exposure can cause asthma in children.³ The Environmental Protection Agency (“EPA”) identifies both gas stoves and tobacco smoke as among the primary sources of indoor NO₂ exposure.⁴

Studies identifying the connection between gas stoves and health harms from NO₂ are not new. The New York Times featured an article in 1973 discussing an EPA study under the headline: “Study Links Respiratory Illness to Use of Gas Stoves in Homes.”⁵ In a 1977 study, children in the UK from homes with gas stoves were found to have more respiratory illness than those with electric stoves, which the authors credited to “elevated levels of oxides of nitrogen arising from the combustion of gas.”⁶

Recent research is even more alarming. A 2013 peer reviewed study found a 42% increased risk of asthma for kids due to NO₂ exposure from gas stoves.⁷ A 2017 study found an association between NO₂ levels from gas stoves and nighttime inhaler use among children with asthma.⁸ Similarly, a 2008 study of children living in Baltimore found a correlation between increased inhaler use to treat asthma and cooking using a gas stove.⁹ A 2022 study examining the full impact of gas stoves on kids in the U.S. estimated that 12.7% of childhood asthma cases can be attributed to gas stove use.¹⁰

EPA regulates NO₂ outdoors, but there is no federal limit for indoor exposure. Ventilation can help to reduce health risk from NO₂, but there are no universal requirements to vent outside and there are significant inequities in which households have access to good ventilation. In homes with poor ventilation, research shows that outdoor NO₂ standards can be exceeded within a few minutes of stove usage, particularly in smaller kitchens.¹¹ Ventilation also reduces but does not eliminate health impacts.¹²

Carbon monoxide (“CO”)

Carbon monoxide is an odorless, colorless gas that is highly dangerous. Gas appliances are the first listed source of CO by the American Lung Association,¹³ but cigarettes also produce CO as a byproduct.¹⁴ About 170 people in the U.S. die every year from CO poisoning from sources like gas stoves and ovens and gas heating equipment.¹⁵

Carbon monoxide poisoning can be deadly, yet 95% of CO poisonings are nonfatal.¹⁶ These lower level, chronic exposures are harmful to human health, and will not always be captured by a standard CO detector, which are designed as “lifesaving devices.”¹⁷

Benzene

Benzene is a volatile organic compound and a known carcinogen. The American Lung Association cites both tobacco smoke and gas stoves as sources of benzene.¹⁸ According to the World Health Organization, there is no safe level of benzene exposure.¹⁹

Two recent studies have examined benzene in gas stoves, with troubling results. A 2023 study out of Stanford University found benzene emissions from all 87 stoves they tested across California and Colorado, exceeding secondhand smoke levels in some cases.²⁰ They noted that benzene migrated throughout the home and, in some cases, found elevated concentrations of benzene in bedrooms above chronic health levels hours after the stove was turned off.²¹ A 2022 study calculated that gas leakage from stoves and ovens not in use can result in indoor benzene concentrations comparable to secondhand tobacco smoke, and exceeding health standards.²²

Particulate Matter

Particulate matter is produced both by burning fossil fuels and by burning tobacco, and contributes to serious health harms including cardiovascular disease, respiratory disease, and lung cancer.²³ While cooking food itself produces some particulate matter emissions – a fact the gas industry often raises – gas stoves emit particulate pollution even without cooking food and particulate matter pollution from cooking food on gas stoves can be twice as high as from electric stoves.²⁴

Formaldehyde

Formaldehyde is a volatile organic compound and a known carcinogen. The American Lung Association cites both smoking indoors and burning fuels as sources of formaldehyde.²⁵

Air Pollution Comparison

Gas Appliances

- Nitrogen Dioxide (“NO₂”)
- Carbon monoxide
- Benzene
- Particulate matter
- Formaldehyde



Cigarette Smoke

- Nitrogen Dioxide (“NO₂”)
- Carbon monoxide
- Benzene
- Particulate matter
- Formaldehyde
- Lead
- Cadmium



What Health Associations Say

The abundant evidence of the health impacts from gas appliances has led to several major medical associations issuing warnings to the public in recent years.

The American Medical Association adopted a formal resolution in 2022 recognizing that “use of a gas stove increases household air pollution and the risk of childhood asthma and asthma severity.”²⁶ The resolution also called on the association to inform its members, health care providers, and the public of these risks.²⁷

The American Lung Association released a literature review of the impacts of residential gas combustion, concluding: “evidence is strong that long-term exposure to ambient [particulate matter], ambient ozone, and household air pollution contributes to premature mortality and increased risk of illness.”²⁸

The American Public Health Association noted in a policy statement in 2022 that “burning gas (i.e., combustion) creates harmful nitrogen dioxide (NO₂), particulate matter (PM_{2.5}), carbon monoxide (CO), formaldehyde (CH₂O), and methane (CH₄) pollution and has been increasingly linked to poor health outcomes at lower concentrations over the past 10 years.”²⁹

International Evidence

Evidence of health harm is mounting around the globe as well. Asthma Australia noted: “Gas stoves and heaters are a major source of indoor air pollution that impacts the human body including the respiratory system” and cited a report from the Climate Council of Australia finding that the use of gas in homes is responsible for up to 12% of childhood asthma in Australia.³⁰

In Ecuador, a large stove electrification program installed 750,000 electric stoves – one in every ten Ecuadorian homes. Researchers analyzed the program and found that both greenhouse gas emissions and hospitalization rates fell “in lockstep” with induction stove adoption and use.³¹

What the Industries Knew

The linkages between tobacco or gas appliances and harmful health outcomes date back decades. As early as 1928, researchers conducting a large field study associated heavy smoking with cancer.³² In the 1940s, British researchers found that cigarettes were a crucial factor in the rise of lung cancer – of 647 lung cancer patients in their study, all 647 were smokers.³³

The data for gas appliances is not quite as lengthy, but dates back at least to the 1970s. A New York Times article in June of 1977 titled “Air Pollution: It’s Inside, Too” documented that researchers had found “extremely high levels of nitrogen gasses” in kitchens and that their “primary concern is gas appliances.”³⁴ A 1982 Consumer Reports article read: “children from gas-stove homes have a greater incidence of respiratory illness and impaired lung function than those from homes with electric stoves.”³⁵

Both the tobacco and gas industries have been well aware of the diseases and deaths caused by their products. The tobacco industry was forced to disclose decades of internal documents as part of the federal government's racketeering case in *United States v. Philip Morris*. The 1,700 page court ruling chronicles the tobacco industry's fifty-year conspiracy to defraud Americans and the world. Documented in the opinion is a quote from an R.J. Reynolds scientist in 1962: "The results of 34 different statistical studies show that cigarette smoking increases the risk of developing lung cancer. Many authorities believe the relationship to be one of cause-and-effect."³⁶

The gas industry's knowledge of its health harms stretches back to at least the 1970s. In September 1970, a government advisory panel made up of high-level gas and utility company executives was requested to "take a look" at the gas industry's NO_x problem.³⁷ By 1972, the gas industry was researching indoor air quality controls that could limit "the levels of carbon monoxide and nitrogen oxides in household air."³⁸

In 1984, the Senior Vice President and General Counsel of Northern States Power Company, a Minnesota-based gas and electric utility, wrote a legal article titled "The Impact of Indoor Air Quality on the Gas Industry."³⁹ The article cited 1981 research from the National Academies of Science finding that "moderately severe exposures to carbon monoxide ... can occur in kitchens as a result of ordinary use of a gas range" but that because carbon monoxide is both "a pollutant common to cigarette-smoke and fossil-fuel combustion" the impacts of indoor cigarette smoke also need to be considered.⁴⁰ The authors found the report's conclusions that "exposures to nitrogen dioxide and carbon monoxide can occur indoors and may constitute a sufficient threat to the general public health to justify remedial action" to be "troublesome for the gas industry."⁴¹

Despite its public obfuscation, today's gas industry is fully aware of the health impacts of its products. In a 2020 webinar obtained by NPR, a senior director with the American Gas Association said: "[G]as cooking does generate indoor air emissions of contaminants, including carbon monoxide, oxides of nitrogen, trace amounts of materials such as formaldehyde and so forth ... [I]t's not an issue that's going to be easy to paper over, because... these products do have emissions."⁴²

The Coverups and Deceptive Campaigns

The tobacco industry is notorious for misleading the public and covering up the harm their products cause, and deservedly so. Unfortunately, until recently, the same scrutiny has not been applied to the health impacts of gas stove pollution or the gas industry's attempts to suppress such info. But that is changing, as new documents and investigations reveal the extent of industry actions undertaken to prevent the harm from gas appliances from gaining public attention that could lead to consumer health concern or regulation.

Deceptive Practice	Tobacco Industry	Gas Industry
Misleading PR campaigns	✓	✓
Funding biased research	✓	✓
Avoiding safer product design	✓	✓
Front groups and astroturfing	✓	✓
Driving racial wedges	✓	✓
Preempting local public health efforts	✓	✓
Suing local governments	✓	✓

PR Campaigns

Both industries have used public relations campaigns to make their products seem safe, to market to children, and to use influencers to make their products seem attractive. The hit television show *Mad Men* features a fictional ad agency advising tobacco companies on how to combat bad press that cigarettes may cause cancer. The real-life tobacco industry engaged in reprehensible advertising in the national print media and on television representing that neither smoking nor nicotine is addictive.⁴³

One of the real ad agencies that may have inspired *Mad Men* was Hill & Knowlton, which represented both tobacco and gas companies. As uncovered by the Climate Investigations Center, Hill & Knowlton executives who had formerly worked for tobacco accounts were also on contract with the American Gas Association.⁴⁴ Addressing a gas industry public relations workshop in 1973, a Hill & Knowlton executive pointed to recent reports that “gas appliances” were “major indoor polluters,” and offered as a solution “quieting” consumer concern, posing: “Do we know enough about pollution within the home? And can we say something useful about this problem?”⁴⁵

Marketing to Kids

The tobacco industry has a sordid history of marketing to children, from Joe Camel to attempts to lure youth to vaping.⁴⁶ For Juul’s launch in 2015, they engaged in a massive social media “influencer” campaign to promote its products to youth.⁴⁷ These efforts in fact succeeded, leading the U.S. Surgeon General to declare youth e-cigarette use a health epidemic.⁴⁸

The gas industry has also marketed to children, from “cooking with gas”⁴⁹ rap videos in the 1980s to coloring books sent to schools just in the last two years called “Natural Gas: Your Invisible Friend.”⁵⁰ They

too have used influencers to try to persuade cooks to use gas, paying Food Network Star Kids winners and other young chefs to promote gas stoves on Instagram.⁵¹

Funding Biased Research

The tobacco industry spent decades funding biased research to attempt to throw doubt on everything from the cancer impacts of smoking to the addictiveness of nicotine.⁵² So too has the gas industry worked to spread doubt through manipulating research.

According to research from the Climate Investigations Center, starting in 1972 the American Gas Association sponsored research into gas stove health impacts with Battelle Laboratories, which had also worked for tobacco companies and the Council for Tobacco Research.⁵³ In 1980, a gas industry funded “research” organization paid for literature reviews attacking studies linking gas stove emissions with respiratory health impacts.⁵⁴

These efforts aren’t limited to the past. According to a 2023 New York Times exposé, the American Gas Association and gas utilities have used toxicologist hired gun Julie Goodman to cast doubt on health concerns linked to gas.⁵⁵ For instance, Dr. Goodman appeared at a public hearing on regulating gas stoves in Multnomah County, Oregon to downplay health concerns from gas use – without disclosing she was paid to testify by the local gas utility.⁵⁶ Dr. Goodman also was hired by the American Gas Association to go after the American Medical Association over its 2022 resolution finding gas stoves to be a health hazard.⁵⁷ Prior to this work for the gas industry, Dr. Goodman provided expert testimony to Philip Morris in a 2015 class action lawsuit against Marlboro Lights for portraying them as safer to smoke – testimony the judge found “inconsistent and contrary to the consensus of the scientific community.”⁵⁸

Avoiding Safer Product Design

The tobacco industry knows that reducing nicotine content in its cigarettes would make them less addictive, and therefore less likely to kill tobacco users. But it has intentionally manipulated the nicotine content in its cigarettes to create and sustain addiction with “replacement smokers.”⁵⁹ The tobacco industry also falsely advertised cigarette filters and “light cigarettes” as safer products, when they knew neither made the products safer and could instead lead to greater inhalation, addiction, and resulting health consequences.⁶⁰

The gas industry too knows how to make safer products but has chosen not to. In the 1980s, it developed an infrared stove that would burn cleaner and more efficiently.⁶¹ A 1984 article highlighting the safer stove in Science News found that the infrared burner consumed 40% or so less natural gas and emitted 40% less nitrogen oxides.⁶² But the stoves were never manufactured, potentially due to cost, and because the stoves dramatically reduced the blue flame, which the industry had spent considerable time and money

marketing as a signature visual. Another factor could be that early tests of the stove showed it could lead carbon monoxide emissions to substantially increase.⁶³ Today, infrared burner technology has been developed for charbroilers and griddles, but not gas stoves.⁶⁴

Front Groups and Astroturfing

Both industries have used front groups and “astroturfing” – pretend grassroots organizations – to fake public opposition to health regulation targeting their products. In the 1990s, Philip Morris hired a PR company to create the “National Smokers Alliance,” deploying full-page newspaper ads, direct telemarketing, and paid canvassers to try to oppose indoor smoking regulations.⁶⁵ More recently, Philip Morris has funded the so-called ‘Foundation for a Smoke-Free World,’ which claims to support eliminating smoking while promoting new tobacco products around the world.⁶⁶

Gas industry front groups include Californians for Balanced Energy Solutions (“C4BES”), created and funded by SoCalGas, the largest gas utility in the U.S. When local governments in its territory pursue policies to move away from gas, C4BES has launched into action. In San Luis Obispo, the group threatened to bus in protestors for a “no social distancing” protest in the middle of the pandemic.⁶⁷ When Santa Barbara pursued a policy to phase out gas from new construction, C4BES sent thousands of text messages to Santa Barbara residents, not disclosing that they were from a gas utility affiliated group.⁶⁸ Another front group from the Pacific Northwest – Partnership for Energy Progress – was funded in part by Washington state’s largest gas utility and spent over \$1 million opposing electrification efforts in Seattle and other cities.⁶⁹

Driving Racial Wedges

The tobacco industry has attempted to use racial politics to drive cultural wedges in support of its products. After spending decades disproportionately targeting and addicting the Black community to menthol cigarettes, the tobacco industry has shamelessly paid Black organizations and made “civil rights” style appeals to try to prevent the regulation of harmful flavored products like menthol.⁷⁰ For instance, the tobacco industry has funded Al Sharpton’s organization National Action Network, which in turn has taken public positions opposing menthol regulation.⁷¹

The gas industry is attempting a similar tactic, trying to use people of color as the public face of opposition to health-protective gas regulations. In San Luis Obispo, a PR company affiliated with gas companies sent an email to thousands of reporters and influencers claiming the local mayor was “getting a lot of heat” from the NAACP to oppose limiting gas hookups in new buildings. This statement was patently false, prompting the local NAACP chapter to release a statement confirming it supported the policy.⁷² Internal emails show that the C4BES gas industry front group has also actively tried to seek out and recruit Latino leaders to support its organization and specifically targeted and recruited Asian-American chefs and restaurant owners to fight against health and safety building codes that would discourage gas in new buildings.⁷³

People of color are more likely to be disproportionately harmed by use of gas stoves due to poor ventilation, smaller living quarters, higher occupant density, and a higher use of gas stoves for supplemental heat.⁷⁴ Yet the gas industry is cynically and falsely attempting to argue, as one political scientist summarized: “If we do the [clean energy] transition, it’s going to harm front-line Black, Hispanic and Indigenous communities.”⁷⁵

Preemption Efforts

As local governments have attempted to confront the health epidemic of tobacco use, the tobacco industry has fought back with efforts to preempt local jurisdictions by passing state laws prohibiting local action. As a government affairs director with Philip Morris put it bluntly: “While we’re not married to any particular form of preemption language, we’re dead serious about achieving preemption in all 50 states.”⁷⁶ The tobacco industry has had some success in enacting tobacco-targeted preemption through state legislatures, but public health advocates have fought back and succeeded in repealing some of these efforts as well as finding ways to work around them at the local level.⁷⁷

Taking a page from tobacco’s playbook, once local governments started restricting gas in new construction, the gas industry launched into action to try to ban these healthy building codes.⁷⁸ Arizona became the first state to outlaw local gas restrictions in 2020, and through the orchestration of the gas lobby, nearly half of all U.S. states have unfortunately followed since then.⁷⁹

Anti-Health Protection Lawsuits

Failing in the court of public opinion, the tobacco industry has often tried to use courts of law to attack local public health efforts. For instance, local governments concerned about the youth vaping epidemic have taken steps to prohibit the sale of flavored tobacco products. This has prompted lawsuits from the tobacco industry trying to overturn the local laws, usually making a federal preemption argument.⁸⁰

In the gas context, local governments too have sought to protect their residents by limiting the use of gas in new construction or strengthening building codes to encourage electrification. The gas industry has responded with lawsuits in California, New York, and Washington state challenging these local public health efforts.⁸¹

Policy Solutions

While the path has not been easy, local organizers and elected officials have begun to turn the tide on the health scourge of tobacco use. Recent wins have included a federal minimum sales age of 21, state and local restrictions on the sale of flavored tobacco products, and successful lawsuits holding vaping companies accountable for targeting youth.

Faced with the gas industry's attempts to follow in the tobacco industry's footsteps, public health and environmental advocates can find hope in the successes in combating the tobacco industry. A strategy of starting at the local and state level to enact public health focused policies has succeeded in the tobacco context and can also succeed for efforts to rein in the gas industry.

There is an array of policies that governments and advocates can pursue to limit the health impacts of gas stoves and other appliances. This publication will only provide a brief overview of policy options and will not go into depth on the legal landscape for these policy options. The Public Health Law Center is happy to provide legal technical assistance for questions on policy choices or questions around legal preemption in particular jurisdictions.

Building Performance Standards

Building performance standards are a building-wide approach that mandate levels of performance to reduce utility consumption and improve health outcomes for existing buildings.⁸² Broadly, building performance standards set targets that buildings must meet by a date certain and specify performance metrics to measure compliance with those targets. Four states so far have adopted building performance standards, as well as at least eight local governments.

Building Codes

Building energy codes for new construction form an important decarbonization pathway because upfront electrification is often less expensive and more straightforward than electrifying an existing building. Although states are the primary authorities on building and energy codes, federal law plays a constraining role. Specifically, the Energy Policy and Conservation Act, a statute that sets energy efficiency standards for certain consumer products, includes a preemption clause that limits how states regulate energy efficiency requirements for listed household appliances. Discussing the status of court decisions in this area is beyond the scope of this publication, but the Public Health Law Center has additional resources on this topic online.⁸³

All-Electric New Construction

Nearly 100 cities so far have proposed, required or incentivized all-electric new construction as a way to move off of gas, including Los Angeles, New York City, Denver, San Francisco, Chicago, and Washington D.C. This has been a subject of litigation in California and New York, including an unfavorable decision in the Ninth Circuit that covers several western states. But as of this writing all-electric new construction is still an option in jurisdictions outside of the Ninth Circuit and many options remain available for jurisdictions in the West.⁸⁴

Emissions Standards

Some cities have restricted fuels based on their emissions rather than prohibiting natural-gas hookups. For example, New York City banned in new buildings “the combustion of any substance that emits 25 kilograms or more of carbon dioxide per million British thermal units of energy,” with some exceptions.⁸⁵

Clean Heat Standards

Clean heat standards are a type of cap-and-trade mechanism for building heating, for example counting carbon reducing technologies such as district energy or electrification. Massachusetts and Vermont have adopted such a standard and eight other states recently committed to exploring the use of a clean heat standard.⁸⁶ Colorado also requires its gas distribution utilities to achieve specified greenhouse gas emission reductions.⁸⁷

Gas Distribution

Local governments could choose to simply restrict or even remove gas service lines (the pipes running from distribution mains to the meter). This would effectively prevent gas use within the buildings affected. An alternative approach could be to stop extensions of, or remove, gas service at the block level or higher. This also comes with higher cost savings, since the physical infrastructure necessary to make gas available at the level of individual property can be removed.

Zoning

Zoning laws restrict how owners may use and develop real property. Like other laws pertaining to health and safety, zoning is a traditional police power reserved to the states by the Tenth Amendment to the U.S. Constitution. Although zoning has not been widely used to promote full decarbonization thus far, some jurisdictions have included incentives for sustainable development in their zoning codes.

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The Public Health Law Center provides information and legal technical assistance on issues related to public health. The Center does not provide legal representation or advice. This document should not be considered legal advice.

Endnotes

- 1 The Public Health Law Center recognizes that traditional and commercial tobacco are different in the ways they are planted, grown, harvested, and used. Traditional tobacco is and has been used in sacred ways by Indigenous communities and tribes for centuries. In comparison, commercial tobacco is manufactured with chemical additives for recreational use and profit, resulting in disease and death. For more information, visit <http://keepitsacred.itcml.org>. When the word “tobacco” is used throughout this digest, a commercial context is implied and intended.
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