

**Taking On “Now We’re Cooking with Gas”:  
How a Health-First Approach to Gas Stove Pollution Could Unlock Building Electrification**

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## **Taking On “Now We’re Cooking with Gas”: How a Health-First Approach to Gas Stove Pollution Could Unlock Building Electrification**

It is no secret that segments of the climate and environmental justice movements sometimes find themselves in tension. Some climate advocates argue for prioritizing big-picture emissions reductions above all else. Many environmental justice groups have criticized “Big Green” organizations—such as Natural Resources Defense Council, the Nature Conservancy, and Sierra Club—for backing policies that may (theoretically, at least) lower greenhouse gas emissions while leaving vulnerable communities exposed to dangerous pollution.<sup>1</sup> Such tensions have engulfed a number of landmark climate policies, particularly market-based programs like California’s AB 32 cap-and-trade system,<sup>2</sup> the Regional Greenhouse Gas Initiative (“RGGI”),<sup>3</sup> and the Transportation and Climate Initiative.<sup>4</sup> They have also sparked criticism of certain clean energy pushes—like rooftop solar—that have historically provided disproportionate benefits to higher-income communities<sup>5</sup>

Much of this conflict is rooted in the reality that climate and environmental justice movements have limited political capital with which they can support their policy priorities. But not all campaigns are zero-sum. Some issues that implicate both climate and environmental justice offer opportunities—relating both to policy and politics—are mutually reinforcing, giving

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<sup>1</sup> See Zack Colman, *Environmental Groups’ Greatest Obstacle May Not Be Republican Opposition*, POLITICO (Feb. 5, 2021), <https://perma.cc/GY4A-AQLA>.

<sup>2</sup> See Alex Brown, *Landmark Climate Policy Faces Growing Claims of Environmental Racism*, THE PEW CHARITABLE TRUSTS (Dec. 23, 2020), <https://perma.cc/3KGG-PGTR>.

<sup>3</sup> See MIKE CAMPTON ET AL., ENVIRONMENTAL JUSTICE CONSIDERATIONS FOR THE IMPLEMENTATION OF THE REGIONAL GREENHOUSE GAS INITIATIVE IN NORTH CAROLINA, (April 30, 2021) (Master’s project, Duke University), <https://perma.cc/QKG8-ST4C>.

<sup>4</sup> See Press Release, Climate Justice Alliance, *Climate Justice Alliance Demands States Step Back From the Inequitable Transportation & Climate Initiative Due to Its Policy of Sacrificing Environmental Justice Communities* (Oct. 7, 2020), <https://perma.cc/4PPW-HD5B>.

<sup>5</sup> See Deborah A. Sunter et al., *Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity*, 2 NATURE SUSTAINABILITY 71, 71–76 (Jan. 10, 2019), <https://go.nature.com/3E10LS3>.

these fights an added utility that merits strategic consideration. This paper argues that gas stoves present just such a symbiotic opportunity—an issue for which the best way to achieve climate action is by prioritizing health and environmental justice, and vice versa.

To that end, Section I explores the role that gas stoves play in the climate crisis, and particularly in campaigns to phase out fossil gas in buildings. While momentum around building electrification is growing in localities across the country, the gas industry is deploying preemption policies to block these decarbonization efforts, aided by a consumer choice message that disproportionately focuses on gas stoves—the gas-powered appliance that consumers are most likely to feel an emotional connection to, thanks to a long history of industry propaganda that continues to this day. In order to accelerate building electrification efforts, then, it is imperative that the climate movement neutralize this framing with its own narrative on gas stoves.

Section II suggests such a narrative, based on the growing body of evidence that gas stoves are, in many cases, literally poisoning vulnerable consumers in their own homes. Despite this health threat, the regulatory gap that exists on issues of indoor air pollution means that solutions to this hazard will likely not be coming from the federal government. Responses, particularly those necessary to protect environmental justice communities, will have to be won at the state and local levels, where climate concerns are already motivating many policymakers to take action related to fossil gas as part of their efforts on building electrification. In this context, the chances for cooperative campaigning are significant.

Finally, Section III brings these threads together. It argues that the health hazards of indoor combustion can offer an essential antidote to the gas industry's climate obstruction strategies, while the climate implications of gas stoves can provide motivation for state and local

governments to take action on indoor air pollution. And it concludes with a discussion of general principles, existing policy models, and potential litigation strategies that could aid the climate and environmental justice movements in moving forward on these critical issues together.

## I. Gas Stoves and Climate Change

The gas stove may not seem a likely candidate to be at the center of the fight for a livable future. But as the following section details, this kitchen appliance has come to occupy a make-or-break position in a critical climate battle—the push to electrify the U.S. building sector.

### A. *Building Electrification is Critical to Winning a Livable Future*

Building electrification is a vital component of the decarbonization necessary to prevent the most catastrophic climate scenarios. According to the Environmental Protection Agency (“EPA”), U.S. buildings’ use of fossil fuels, and primarily fossil gas,<sup>6</sup> accounts for 13 percent of the nation’s total greenhouse gas emissions.<sup>7</sup> The vast majority of these emissions come from space and water heating, although cooking contributes emissions, as well.<sup>8</sup> A 2022 study found that methane leaks from gas-burning stoves in U.S. homes have a climate impact comparable to the carbon dioxide emissions from 500,000 gasoline-powered cars, while emissions from gas stove combustion have about three times that impact.<sup>9</sup>

While the gas industry and its allies have been enormously successful in promoting gas as a cleaner alternative to fuels like coal, the reality is that greenhouse gas emissions from fossil gas are at least as dangerous as those from coal. Indeed, when it comes to their climate impact, the emissions from gas combustion may actually be worse. The primary chemical constituent of

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<sup>6</sup> This paper will be using the term “fossil gas” rather than the euphemistic industry term “natural gas.”

<sup>7</sup> *Sources of Greenhouse Gas Emissions*, ENV’T PROT. AGENCY, <https://perma.cc/9BXQ-DLRK>; *Id.*

<sup>8</sup> Rob Jordan, *Stanford Scientists Find the Climate and Health Impacts of Natural Gas Stoves are Greater than Previously Thought*, STANFORD WOODS INSTITUTE FOR THE ENVIRONMENT (Jan. 27, 2022), <https://perma.cc/C5R5-UK5J>.

<sup>9</sup> *Id.*

fossil gas is methane, a molecule with a configuration of carbon and hydrogen that makes it an extremely potent absorber of heat.<sup>10</sup> Over the first 20 years it is in the atmosphere, methane has a warming effect almost 80 times greater than carbon dioxide, the primary greenhouse gas produced by coal combustion.<sup>11</sup> And evidence continues to grow that these numbers may represent a significant underestimation of the true heating impact of methane.<sup>12</sup>

While fossil gas may be only around half as carbon-intensive as coal at the point of combustion, that assessment fails to incorporate the massive climate effects of upstream fugitive emissions. Methane leakage occurs in every part of the fossil gas production, storage, and supply processes.<sup>13</sup> If these fugitive emissions exceed three percent of total fossil gas production, gas' advantage over coal disappears.<sup>14</sup> Studies have found that government estimates of fugitive emissions from fossil gas distribution vastly downplay the scope of the problem, with methane leakage representing as much as nine percent of total production.<sup>15</sup> Indeed, significant evidence exists that increases in gas production are “the prime source of the rising levels of methane in the global atmosphere over the past decade.”<sup>16</sup>

As such, reducing methane emissions is a critical step on any pathway to meaningful climate action. Alongside decarbonizing the power sector, that requires building electrification—

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<sup>10</sup> See Alejandra Borunda, *Natural Gas is a Much 'Dirtier' Energy Source than we Thought*, NAT'L GEOGRAPHIC (Feb. 19, 2020), <https://perma.cc/QS82-47WE>.

<sup>11</sup> *Methane: A Crucial Opportunity in the Climate Fight*, ENV'T DEF. FUND, <https://perma.cc/9Y4E-7L6C>.

<sup>12</sup> See M. Etminan et al., *Radiative Forcing of Carbon Dioxide, Methane, and Nitrous Oxide: A Significant Revision of the Methane Radiative Forcing*, 43 GEOPHYS. RES. LETT., 12614-12623 (Dec. 28, 2016), <https://bit.ly/3Kobys1>.

<sup>13</sup> See Borunda, *supra* note 10.

<sup>14</sup> See James Bradbury & Michael Obeiter, *A Closer Look at Fugitive Methane Emissions from Natural Gas*, WORLD RES. INST. (Apr. 2, 2013), <https://perma.cc/3GE8-PJP6>; see also Ramón A. Alvarez et al., *Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure*, 109 PNAS 6435–6440 (Apr. 9, 2012), <https://bit.ly/3uvULxL>.

<sup>15</sup> See, e.g., Jeff Tollefson, *Methane Leaks Erode Green Credentials of Natural Gas*, 493 NATURE 12 (Jan. 2, 2013), <https://perma.cc/5W3H-VFGA>.

<sup>16</sup> OIL CHANGE INTERNATIONAL, BURNING THE GAS 'BRIDGE FUEL' MYTH: WHY GAS IS NOT CLEAN, CHEAP, OR NECESSARY 4 (Apr. 2022), <https://perma.cc/43JB-RCAK>; Carol Rasmussen, *NASA-led study solves a methane puzzle*, NASA EARTH SCIENCE NEWS (Jan. 2, 2018), <https://perma.cc/FJ5X-HDF8> (showing methane emissions are rising due to emissions from the oil and gas industry and microbial production in wet tropical environments).

using electricity for heating, cooling, and cooking needs instead of distributing and burning fossil gas. The technology for this transition exists, including heat pumps for space heating and induction stovetops for cooking. And a number of localities across the country have begun taking concrete steps to phase out fossil gas in new buildings. In 2021, New York City approved an ordinance requiring buildings up to seven stories tall to go all-electric by 2023, with larger buildings required to follow suit by 2027.<sup>17</sup> Denver passed an ordinance requiring emissions reductions from all commercial and multifamily buildings via energy efficiency, renewable energy, and building electrification by 2030.<sup>18</sup> In California alone, over 50 jurisdictions have passed building decarbonization ordinances in the last several years.<sup>19</sup> And, in a very exciting recent development, Washington’s State Building Code Council adopted a requirement that most new commercial and large multifamily buildings install all-electric space and water heating systems.<sup>20</sup> Unfortunately, these steps forward have triggered a furious reaction. The gas industry, concerned about losing customers, is fighting back fiercely against building electrification efforts, and has found a useful symbol around which to rally its opposition: the gas stove.

*B. Gas Stoves Are Playing an Outsized Role in the Movement for Building Electrification*

The gas stove has long played an outsized role in gas companies’ strategies for industry growth. As a portion of sales, gas stoves represent less than three percent of residential fossil gas sales, compared to 26 percent from water heating and 69 percent from space heating.<sup>21</sup> Yet for 70

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<sup>17</sup> Brad Plumer & Hiroko Tabuchi, *How Politics Are Determining What Stove You Use*, N.Y. TIMES (Dec. 16, 2021), <https://perma.cc/E6PT-39UG>.

<sup>18</sup> Press Release, City of Denver, *New Ordinance for Building Electrification* (Nov. 23, 2021), <https://perma.cc/DPE6-UCAK>.

<sup>19</sup> Kristiana Faddoul, *California’s Cities Lead the Way on Pollution-Free Homes and Buildings*, SIERRA CLUB (Jul. 22, 2021), <https://perma.cc/P6UT-UMJ5>.

<sup>20</sup> Emily Pontecorvo, *First All-Electric Heating Mandate for Buildings Passes in Washington State*, GRIST (Apr. 26, 2022), <https://perma.cc/6NWY-D5HE>.

<sup>21</sup> *2015 Residential Energy Consumption Survey: Energy Consumption and Expenditures Tables*, U.S. ENERGY INFO. ADMIN., tbl. CE5.2 (May 2018), <https://perma.cc/3EBJ-4KZX>.

years the gas industry has focused an enormous proportion of its marketing on this small slice of its business,<sup>22</sup> and it's easy to understand why. Unlike furnaces or water boilers, consumers see their stoves every time they enter their kitchens; they use them every day to cook their meals. It makes sense, then, that marketing campaigns would have an easier time persuading consumers to feel an emotional connection to their stove than to other fossil gas appliances. But all gas comes into a home or building through the same pipe, so when a consumer invests in a gas hookup for a stove, it makes it much more likely that gas-powered space and water heating—the industry's real income-generators—will follow.

This may help to explain why the gas industry has spent many decades, and countless millions, convincing Americans that gas stoves are the superior option. In the 1930s the phrase “now we're cooking with gas” was coined by the American Gas Association (“AGA”) and planted with writers for Bob Hope, who began using the exclamation in his radio comedy routines.<sup>23</sup> It spread from there, from *The Jack Benny Program* to Looney Tunes cartoons and into common usage.<sup>24</sup> In the 1950s the gas industry began targeting housewives as a key demographic; one emblematic 1964 ad from a Pennsylvania gas utility featured the film star Marlene Dietrich saying, “Every recipe I give is closely related to cooking with gas. If forced, I can cook on an electric stove but it is not a happy union.”<sup>25</sup> And while it may not have been the industry's most effective strategy, a 1980s promotional rap video from the National Fuel Gas Distribution Corporation included lyrics like:

Cookin' with gas, cookin' with gas / We all cook better when we're cookin' with gas  
Gas is so hot it's not on when it's off / It's the only way to cook, that's what I was taught

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<sup>22</sup> See Rebecca Leber, *How the Fossil Fuel Industry Convinced Americans to Love Gas Stoves*, MOTHER JONES (June 17, 2021), <https://bit.ly/3jku6gO>.

<sup>23</sup> Alisa Barba, *IE Questions: Now We're "Cooking With Gas"*, INSIDE ENERGY (June 26, 2014), <https://perma.cc/G48J-VF25>.

<sup>24</sup> *Id.*

<sup>25</sup> See Leber, *supra* note 22.



Here’s a fact you should have to know to pass / Nine out of 10 chefs only cook with gas<sup>26</sup>

These stove-focused marketing strategies have continued to this day, and have escalated more recently in response to the increasing resonance of climate change. In 2017 the American Public Gas Association (“APGA”) paid major public relations firm Porter Novelli more than half a million dollars to develop a campaign using social media influencers to target prospective millennial homebuyers—who might be choosing between gas or electric appliances—with posts featuring beautiful culinary scenes and the hashtag #CookingWithGas.<sup>27</sup> This campaign saw 5.9 million paid media impressions in 2019 alone.<sup>28</sup>

And the symbol of the gas stove is being deployed even more forcefully—and, unfortunately, to devastating effect—as a wedge issue in the industry’s political response to the growing push for building electrification. In March 2020 an AGA lobbyist warned a meeting of utility executives that the campaign against fossil gas was gaining momentum and that the industry needed “to really change the narrative.”<sup>29</sup> The lobbyist outlined a plan to pass state legislation preempting municipalities from adopting ordinances restricting fossil gas, but emphasized that “industry talking about industry isn’t effective.”<sup>30</sup> The framing, instead, had to be about protecting consumer choice in order “to really get ahead of the localities, the big cities and counties and say we are allowing our customers the right to have, to be hooked up, to any kind of energy they would like.”<sup>31</sup> This strategy was also evident in a training document for the 2018 “Speak up for Natural Gas Advocacy Training Workshop,” an event sponsored by AGA,

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<sup>26</sup> Noel D, *Rappin’ with Gas*, YOUTUBE (Nov. 26, 2008), <https://perma.cc/J9PF-MGD9>.

<sup>27</sup> *American Public Gas Association*, CLIMATE INVESTIGATIONS CENTER, <https://perma.cc/N694-PRDU>; See Rebecca Leber, *The Gas Industry Is Paying Instagram Influencers to Gush Over Gas Stoves*, MOTHER JONES (June 17, 2020), <https://perma.cc/9W6U-2MTW>.

<sup>28</sup> Geoff Dembicki, *This Woke PR Firm Is Quietly Running an Influencer Campaign for Fossil Fuels*, VICE NEWS (Oct. 2, 2020), <https://perma.cc/Q4FG-E4VG>.

<sup>29</sup> See Plumer, *supra* note 17.

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

APGA, and the Interstate Natural Gas Association of America (“INGAA”) which featured guidance like “emotional arguments can shape the public narrative even when the facts don’t support them.”<sup>32</sup>

The problem for the gas industry is that consumers do not feel very emotional about the fuel that powers their furnace or their water boiler (a 2020 poll from the Yale Program on Climate Change Communication found virtually no differences in how respondents viewed gas and electric appliances in general).<sup>33</sup> However, thanks to the decades of corporate marketing described above, many people do care about their gas stoves—which is why the industry has made the stove a centerpiece of its campaigns to block climate action. This messaging has come in many forms. A public relations firm working for Californians for Balanced Energy Solutions—a front group formed by the gas utility SoCalGas to block building electrification initiatives in California—experimented with one novel but easily replicable approach in which account managers posed as local residents on the neighborhood social media platform Nextdoor to post messages like:

[Our city] banning gas stoves? First time I heard about it I thought it was bogus, but I received a newsletter from the city about public hearings to discuss it... Will it pass????!! I used an electric stove but it never cooked as well as a gas stove so I ended up switching back.<sup>34</sup>

Partnership for Energy Progress—a similar front group for Washington state’s largest gas utility, Puget Sound Energy—spent over \$1 million on efforts to block electrification ordinances in

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<sup>32</sup> See AMERICAN GAS ASSOCIATION, INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA, & AMERICAN PUBLIC GAS ASSOCIATION, SPEAK UP FOR NATURAL GAS ADVOCACY TRAINING WORKSHOP: TRAINER GUIDE 12 (2018), <https://perma.cc/MBR4-XRFY>.

<sup>33</sup> See *PR2016 National Poll Toplines*, CLIMATE NEXUS POLLING (Oct. 2020), <https://perma.cc/6CZS-YCK9>.

<sup>34</sup> See Leber, *supra* note 22.

Bellingham and Seattle, which included bus ads showing a mother and two laughing children cooking on a gas stove with the slogan “Reliable. Affordable. Natural Gas. Here for You.”<sup>35</sup>

This messaging has proven highly effective, and to date 20 states have passed preemption laws prohibiting cities from restricting fossil gas.<sup>36</sup> In all of these legislative fights, gas stoves were given top billing. As one Democratic state senator in Oklahoma who voted against that state’s preemption bill put it, “The message was, ‘You don’t want those California liberals telling you that you can’t have a gas stove.’”<sup>37</sup>

The fossil gas advocacy training document mentioned above stressed a key point. “It all boils down to how the natural gas industry chooses to tell its story.”<sup>38</sup> The industry has chosen to center its story, thus far successfully, on an appliance it has spent close to a century propagandizing to the American public. But this story has a major vulnerability: it turns out that openly combusting a fossil fuel inside one’s kitchen is not such a clean alternative, after all, as a robust and growing body of evidence shows that “cooking with gas” actually poses a very real threat to human health. By tackling that health threat, climate and environmental justice advocates have the opportunity to tell a new story about the gas industry’s favorite symbol of consumer choice.

## II. Gas Stoves, Health, and Environmental Justice

In addition to their climate impacts, gas stoves also represent a significant hazard to human health. The following section describes the negative health effects caused by gas stove

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<sup>35</sup> Mike Lindblom, *Natural-gas ads shouldn’t have gone on buses, County Metro Transit says*, SEATTLE TIMES (Dec. 11, 2020), <https://perma.cc/SVR2-B5HP>; Hal Bernton & Daniel Beekman, *Natural Gas Industry’s \$1 Million PR Campaign Sets Up Fight Over Northwest’s Energy Future*, SEATTLE TIMES (Dec. 22, 2019), <https://perma.cc/53CU-ZEVS>.

<sup>36</sup> Ella Nilsen, *Cities Tried to Cut Natural Gas from New Homes. The GOP and Gas Lobby Preemptively Quashed their Effort*, CNN (Feb. 17, 2022), <https://perma.cc/7HZM-MZ6Z>.

<sup>37</sup> See Plumer, *supra* note 17.

<sup>38</sup> See AMERICAN GAS ASSOCIATION, INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA, & AMERICAN PUBLIC GAS ASSOCIATION, *supra* note 32 at 12.

emissions, explores the environmental justice implications they present, and analyzes the obstacles to regulating this threat at the federal level.

### *A. Gas Stoves Are a Serious Health Hazard*

The combustion of fossil gas that makes gas stoves such a significant target for climate action also poses a more immediate and concrete threat to human health. The passages below provide an overview of the often-overlooked importance of indoor air quality, the hazardous chemicals emitted by gas stoves, the health implications of these emissions, and the disproportionate impact that this pollution has on environmental justice communities.

#### 1. Indoor Air Quality Matters

The discourse around air pollution in the U.S. is overwhelmingly focused on ambient, or outdoor, air quality. Yet Americans, on average, spend close to 90 percent of their time indoors.<sup>39</sup> As such, indoor air quality matters greatly, and there is a growing body of scientific evidence indicating that the air within U.S. homes and other buildings can often be more seriously polluted than outdoor air in even the most industrialized cities.<sup>40</sup> Comparative risk studies performed by EPA's Science Advisory Board have consistently ranked indoor air pollution among the top five environmental risks to public health.<sup>41</sup> Other EPA studies of air pollution exposure have shown “that indoor levels of pollutants may be two to five times—and occasionally more than 100 times—higher than outdoor levels.”<sup>42</sup> And, as will be discussed at greater length below, indoor air pollution may be particularly concerning from an environmental

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<sup>39</sup> Neil E. Klepeis et al., *The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants*, 11 JOURNAL OF EXPOSURE SCIENCE & ENV'T EPIDEMIOLOGY 231, 239 (2001), <https://perma.cc/5BZZ-X98J>.

<sup>40</sup> *The Inside Story: A Guide to Indoor Air Quality*, ENV'T PROT. AGENCY, <https://perma.cc/U867-4KHK>.

<sup>41</sup> *Why Indoor Air Quality is Important to Schools*, ENVIRONMENTAL PROTECTION AGENCY, <https://bit.ly/3xeusOj> <https://perma.cc/KYQ4-Y9YZ>.

<sup>42</sup> *Id.*, citing Lance A. Wallace et al., *Total Exposure Assessment Methodology (TEAM) Study: Personal exposures, indoor-outdoor relationships, and breath levels of volatile organic compounds in New Jersey*, 12 ENVIRON. INT. 369 (1986).

justice lens, considering that the people most susceptible to air pollutants—children, the elderly, the chronically ill, and those suffering from respiratory or cardiovascular disease—are, by their nature, also likely to spend the most time indoors and therefore experience the longest periods of exposure to indoor air pollution.<sup>43</sup> For all these reasons, “a pound of pollution released indoors is usually more damaging to health than that amount released outdoors.”<sup>44</sup>

## 2. Gas Stoves Significantly Impact Indoor Air Quality

Though decades of industry marketing have framed “cooking with gas” as clean and healthy, the research shows quite the opposite. To use a gas stove is to maintain an open flame with an ongoing combustion process for significant periods of time indoors. Just as when a car burns gasoline, when a stove burns fossil gas the combustion reaction oxidizes molecules in the air to create a host of dangerous pollutants, including particulate matter, formaldehyde, carbon monoxide, and nitrogen dioxide.<sup>45</sup> A 2015 study found that homes without gas stoves had average carbon monoxide levels between 0.5 and 5 parts per million (“ppm”), while homes with properly adjusted and ventilated stoves had levels between 5 and 15 ppm.<sup>46</sup> The study also found that homes without adequate ventilation contained carbon monoxide levels of 30 ppm or higher, indicating that residents of these homes may experience the kind of ongoing carbon monoxide levels that, even at low levels of exposure, can put vulnerable populations at risk.<sup>47</sup>

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<sup>43</sup> See ENVIRONMENTAL PROTECTION AGENCY, *supra* note 40.

<sup>44</sup> Arnold Reitze, Jr. & Sheryl-Lynn Carof, *The Legal Control of Indoor Air Pollution*, 25 B.C. ENVIRONMENTAL AFFAIRS L. REV. 247, 249 (1998), <https://perma.cc/FEQ5-58GC>.

<sup>45</sup> See Leber, *supra* note 22.

<sup>46</sup> David Roberts, *Gas Stoves Can Generate Unsafe Levels of Indoor Air Pollution*, VOX (May 11, 2020), <https://www.vox.com/energy-and-environment/2020/5/7/21247602/gas-stove-cooking-indoor-air-pollution-health-risks> (citing N.A. Mullen et al., *Results of the California Healthy Homes Indoor Air Quality Study of 2011–2013: Impact of Natural Gas Appliances on Air Pollutant Concentrations*, 26 INDOOR AIR 231 (Feb. 2015), <https://onlinelibrary.wiley.com/doi/abs/10.1111/ina.12190>).

<sup>47</sup> *Id.*

One particularly dangerous pollutant, nitrogen dioxide, can be traced directly to gas stove use: “unvented combustion appliances, e.g. gas stoves” is the first item on the EPA’s list of primary sources of nitrogen dioxide indoors.<sup>48</sup> A literature review from the Rocky Mountain Institute found that “[n]itrogen dioxide levels are consistently higher in homes that cook with gas rather than electric stoves, and cook for longer periods of time.”<sup>49</sup> Indeed, homes with gas stoves were found to have “approximately 50 percent to over 400 percent higher average [nitrogen dioxide] concentrations than homes with electric stoves.”<sup>50</sup> And a 2014 study of indoor air quality in Southern California found that 62 percent of homes with gas stoves and no venting range hoods routinely had short-term and long-term nitrogen dioxide levels significantly exceeding the EPA’s ambient air quality standards,<sup>51</sup> which themselves are less stringent than the guidelines for indoor air quality issued by the World Health Organization.<sup>52</sup>

### 3. Pollution from Gas Stoves Can Cause Serious Health Problems

The emissions described above have been linked to a number of negative health outcomes. Particularly concerning is the connection between nitrogen dioxide and asthma. According to the EPA, “strong evidence exists for a relationship between long-term exposure to NO<sub>2</sub> and the development of asthma in children.”<sup>53</sup> A meta-analysis of studies on this topic found that “children living in a home with gas cooking have a 42% increased risk of having current asthma, a 24% increased risk of lifetime asthma and an overall 32% increased risk of

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<sup>48</sup> *Nitrogen Dioxide’s Impact on Indoor Air Quality*, ENVIRONMENTAL PROTECTION AGENCY, <https://perma.cc/48XL-U4SV>.

<sup>49</sup> Brady Seals & Andee Krasner, *Health Effects from Gas Stove Pollution*, ROCKY MOUNTAIN INSTITUTE 7 (2020), <https://perma.cc/CSW8-GUCF>.

<sup>50</sup> *Id.* at 11 (citing ENV’T PROTECTION AGENCY, EPA/600/R-08/071, INTEGRATED SCIENCE ASSESSMENT FOR OXIDES OF NITROGEN - HEALTH CRITERIA (2008)).

<sup>51</sup> Jennifer M. Logue et al., *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, 122 ENVIRONMENTAL HEALTH PERSPECTIVES 43, 49 (Jan. 2014).

<sup>52</sup> See World Health Organization, *WHO Guidelines for Indoor Air Quality: Selected Pollutants* 246–47 (2010), <https://bit.ly/37ubh82>.

<sup>53</sup> See Seals, *supra* note 49, at 12.

having current and lifetime asthma,” and that “children have a 15% increased risk of having current wheeze”<sup>54</sup> per 15 parts per billion (“ppb”) increase in indoor nitrogen dioxide levels.<sup>55</sup> Indeed, there is research showing that even very small increases in short-term exposure can increase asthma risks. For example, a 2013 study of indoor emissions from gas stoves found that, among children with asthma, every 5 ppb increase in nitrogen dioxide exposure led to a measurable increase in the children’s risk of higher asthma severity, wheeze, and rescue medication use.<sup>56</sup> And overall, these effects are a significant driver of the larger childhood asthma crisis. A 2018 study found that, in Australia, more than 12 percent of the total burden of childhood asthma was attributable to gas stove use,<sup>57</sup> and a 2017 report by the Massachusetts Department of Public Health found that gas stoves were the most commonly cited indoor environmental trigger of children’s asthma symptoms.<sup>58</sup>

Of course, it is not just children who are at risk. For adults with asthma, one hour of exposure to nitrogen dioxide levels “not much higher than peak outdoor concentrations” can exacerbate asthma, and in 2016 the EPA reported a “conclusive finding” that short-term exposure to nitrogen dioxide can cause asthma and other respiratory illnesses.<sup>59</sup> Evidence also

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<sup>54</sup> Wheeze refers to a high-pitched sound produced when breathing through narrowed or obstructed airways, and is often used as a proxy marker for the prevalence of asthma in population surveys, as asthma is a highly common cause of childhood wheeze; Lisa Noble Weiss, *The Diagnosis of Wheezing in Children*, 77 AM. FAM PHYSICIAN 1109 (2008), <https://www.aafp.org/pubs/afp/issues/2008/0415/p1109.html#:~:text=The%20most%20common%20causes%20of,body%20aspiration%2C%20and%20cystic%20fibrosis>.

<sup>55</sup> Weiwei Lin et al., *Meta-analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children*, 42 INT’L J. OF EPIDEMIOLOGY 1724 (2013).

<sup>56</sup> Kathleen Belanger et al., *Household Levels of Nitrogen Dioxide and Pediatric Asthma Severity*, 24 EPIDEMIOLOGY 320 (2013), [https://journals.lww.com/epidem/Fulltext/2013/03000/Household\\_Levels\\_of\\_Nitrogen\\_Dioxide\\_and\\_Pediatric.21.aspx](https://journals.lww.com/epidem/Fulltext/2013/03000/Household_Levels_of_Nitrogen_Dioxide_and_Pediatric.21.aspx).

<sup>57</sup> Luke D. Knibbs et al., *Damp Housing, Gas Stoves, and the Burden of Childhood Asthma in Australia*, 208 MED. J. OF AUSTRALIA 299 (2018).

<sup>58</sup> Katie Camero, *Gas Stoves Emit Pollutants. Here’s How They Impact Your Health*, BUZZFEED NEWS (Feb. 18, 2022), <https://bit.ly/3v4pm4j>.

<sup>59</sup> See Seals, *supra* note 49, at 12 (citing *Integrated Science Assessment For Oxides Of Nitrogen – Health Criteria (Final Report, 2016)*, ENVIRONMENTAL PROTECTION AGENCY (Jan. 2016), <https://perma.cc/YHR9-GFT>).

indicates that these exposures can lead to additional risks in the presence of other comorbidities; for example, a 2020 study found that long-term exposure to elevated nitrogen dioxide was correlated with a higher risk of death from COVID-19, and that nitrogen dioxide appeared to be more dangerous than particulate matter or ozone in this regard.<sup>60</sup>

Finally, there is growing evidence of the connection between this kind of indoor air pollution and adverse brain development.<sup>61</sup> A 2009 study found “that early-life exposure to household gas appliances is associated negatively with general cognitive functioning and with a higher risk of developing ADHD symptoms at age 4 years,” particularly in the areas of verbal and executive function.<sup>62</sup> And these effects were found to increase for children exposed to higher levels of indoor nitrogen dioxide.<sup>63</sup>

#### 4. Gas Stove Pollution Is an Environmental Justice Issue

The negative health effects of gas stove pollution disproportionately burden environmental justice communities. First, the exacerbating effects of such emissions on existing ailments will necessarily weigh more heavily among communities of color and low-income communities, given the prevalence of such conditions—particularly asthma—in these populations. Studies have shown that Hispanic and Black Americans are up to twice as likely to develop asthma as White Americans,<sup>64</sup> and Black Americans are five times more likely to visit

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<sup>60</sup> Donghai Liang et al., *Urban Air Pollution May Enhance COVID-19 Case-Fatality and Mortality Rates in the United States*, 1 THE INNOVATION (2020), <https://perma.cc/AS57-YDLJ>.

<sup>61</sup> Devon C. Payne-Sturges et al., *Healthy Air, Healthy Brains: Advancing Air Pollution Policy to Protect Children’s Health*, 109 AM. J. OF PUB. HEALTH 550 (2019).

<sup>62</sup> Eva Morales et al., *Association of Early-life Exposure to Household Gas Appliances and Indoor Nitrogen Dioxide with Cognition and Attention Behavior in Preschoolers*, 169 AM. J. OF EPIDEMIOLOGY 1327, 1331 (June 2009).

<sup>63</sup> *Id.*

<sup>64</sup> Vincent Morelli et al., *Environmental Justice and Underserved Communities*, 44 PRIMARY CARE 155 (Mar. 2017); Audrey Urquhart & Philippa Clarke, *US Racial/Ethnic Disparities in Childhood Asthma Emergent Health Care Use: National Health Interview Survey, 2013–2015*, 57 JOURNAL OF ASTHMA 510 (2020).



the emergency room and three times more likely to die from asthma as White Americans.<sup>65</sup> Poverty is also a major risk factor for the development of asthma in children.<sup>66</sup> And beyond asthma, the cumulative effect of gas stove pollution on communities that are already disproportionately suffering from crises like lead poisoning, cardiovascular disease, and other respiratory problems cannot be overstated.

In addition to interactions with comorbidities, gas stoves can also present a greater danger to users depending on the context in which they are used. Housing factors that are closely linked to socioeconomic status—such as smaller unit sizes and the number of people inside the home—can directly influence the level of exposure that occupants experience and contribute to elevated concentrations of nitrogen dioxide and other pollutants in lower-income, multifamily buildings.<sup>67</sup> Poor ventilation and stove maintenance are also major drivers of these effects. According to the EPA, poorly maintained stoves are more likely to emit elevated levels of carbon monoxide,<sup>68</sup> and a 2014 literature review found that older, poorly ventilated stoves are linked to higher nitrogen dioxide levels.<sup>69</sup> Families struggling to get by are unlikely to be able to afford effective hood vents, while renters might not be allowed to install them.<sup>70</sup> And there are no regulations requiring landlords to do so, as gas stoves—unlike most major household gas appliances—are not required to be vented outdoors.<sup>71</sup> As such, members of vulnerable communities are more likely to cook in

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<sup>65</sup> *Asthma Disparities in America*, ASTHMA AND ALLERGY ASSOCIATION OF AMERICA, <https://perma.cc/CFQ8-U92E>.

<sup>66</sup> *Id.*

<sup>67</sup> Gary Adamkiewicz et al., *Moving Environmental Justice Indoors: Understanding Structural Influences on Residential Exposure Patterns in Low-Income Communities*, 101 AM. J. OF PUB. HEALTH S240 (Dec. 2011).

<sup>68</sup> See Seals, *supra* note 49, at 7 (citing *Indoor Air Quality: Carbon Monoxide's Impact on Indoor Air Quality*, ENVIRONMENTAL PROTECTION AGENCY, <https://perma.cc/6EE2-5QZW>).

<sup>69</sup> Nigel Bruce & Kirk Smith, *WHO IAQ Guidelines: Household Fuel Combustion*, WORLD HEALTH ORGANIZATION (Nov. 2014), <https://perma.cc/2CBW-DWQ8>.

<sup>70</sup> See Leber, *supra* note 22.

<sup>71</sup> *2018 International Fuel Gas Code*, INTERNATIONAL CODE COUNCIL § 501.8 (2018), <https://perma.cc/ZK4L-ZFCE>.

poorly ventilated kitchens in which their only protections are stove fans, most of which “do little more than move the polluted air about.”<sup>72</sup>

The ways in which certain populations are forced to use these appliances likely have additional environmental justice implications. Utilizing a stove for heat has been independently associated with extremely elevated indoor nitrogen dioxide levels, and this practice “is seen almost exclusively in the context of profound poverty.”<sup>73</sup> Some groups may also experience greater occupational risks from gas stoves. For example, professionals in the restaurant industry have expressed concerns with how restaurant workers may be disproportionately affected by gas stove pollution, with one chef commenting in an interview that most restaurant owners he knows fail to consider indoor air quality in their kitchens, largely because they had been “duped by the marketing of the gas industry calling it ‘clean burning gas.’”<sup>74</sup> This chef predicted that when researchers finally do study back-of-house employees who work long hours in kitchens with gas-powered appliances, “[W]e are going to be blown away by the data.”<sup>75</sup> All of these factors, in combination, contribute to making gas stove pollution an environmental justice problem that poses a significant and particularly potent health threat to low-income communities and communities of color.

#### *B. Regulating Gas Stove Pollution as a Health Hazard Is Not Easy*

There are clearly a range of methods to control pollution from gas stoves, including removing the source, setting appliance emissions limits, regulating stove maintenance and operation, and requiring sufficient ventilation, such as exhaust hoods that vent emissions directly

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<sup>72</sup> See Leber, *supra* note 22.

<sup>73</sup> Nadia Hansel et al., *A Longitudinal Study of Indoor Nitrogen Dioxide Levels and Respiratory Symptoms in Inner-City Children with Asthma*, 116 ENV'T HEALTH PERSP. 1428, 1430 (October 2008).

<sup>74</sup> See Camero, *supra* note 58.

<sup>75</sup> *Id.*

outdoors. Unfortunately, despite the significant hazard that pollution from gas stoves presents to millions of Americans, there is almost no politically realistic solution to this problem at the federal level. The following passages explore the obstacles to action on indoor air quality, and in doing so underline the need to link policies addressing gas stove pollution to factors—such as climate change—that are motivating local and state organizing efforts.

#### 1. There is a Federal Regulatory Gap Regarding Indoor Air Quality

Currently, there are no federal standards that apply to air quality in private residences. While there are more than 20 federal agencies with some responsibility for indoor air quality, and an Interagency Committee of Indoor Air Quality (“CIAQ”) coordinates activities, there is no single federal program or administrative unit that has been given clear authority to protect Americans from the hazards of indoor air pollution.<sup>76</sup>

The Clean Air Act (“CAA”) would seem to be the most obvious mechanism for dealing with this issue. But the CAA focuses on the protection of “ambient” air, defining “air pollutant” as “any air pollution agent or combination of such agents...which is emitted into or otherwise enters the ambient air”—a definition that seems to completely foreclose action on pollutants that threaten indoor air.<sup>77</sup> The regulations interpreting the CAA make this even clearer, with EPA’s National Ambient Air Quality Standards (“NAAQS”) defining “ambient air” as “that portion of the atmosphere, external to buildings, to which the general public has access.”<sup>78</sup>

Section 112 of the CAA, which authorizes the EPA to set National Emission Standards for Hazardous Air Pollutants (“NESHAPS”), is also worth consideration. The EPA can issue NESHAPS for hazardous air pollutants (“HAPs”) which “present, or may present, through

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<sup>76</sup> *Federal Interagency Committee on Indoor Air Quality*, ENVIRONMENTAL PROTECTION AGENCY, <https://perma.cc/K2FG-8C7T>.

<sup>77</sup> 42 U.S.C. § 7602(g).

<sup>78</sup> 40 CFR § 50.1(e).

inhalation or other routes of exposure, a threat of adverse human health effects...or adverse environmental effects.”<sup>79</sup> Under this provision, EPA has regulated one aspect of indoor air pollution “by curtailing the spraying of asbestos insulation and decorative materials inside buildings.”<sup>80</sup> But there is no NESHAP for carbon monoxide or nitrogen dioxide, and gas appliances do not clearly fall within the Section 112 definition of a “stationary source” as a “building, structure, facility, or installation.”<sup>81</sup>

EPA’s broadest power to regulate indoor air pollutants is likely found in the Toxic Substances Control Act (“TSCA”), which gives the agency authority to regulate any toxic chemical substance which “presents an unreasonable risk of injury to health or the environment.”<sup>82</sup> However, the statute’s focus is on the “manufacturing, processing, or distribution in commerce of such substance[s] or mixture[s],”<sup>83</sup> phrasing that does not fit well with carbon monoxide or nitrogen dioxide emissions from gas stoves, which are the toxic byproducts of a combustion process that happens after an appliance and its fuel are manufactured and distributed. One could argue that these emissions are comparable to formaldehyde emissions from composite wood products, which the EPA regulated under TSCA in 2016.<sup>84</sup> However, the EPA was statutorily directed to promulgate this rule by the Formaldehyde Standards for Composite Wood Products Act of 2010,<sup>85</sup> and unlike the chemicals emitted by the use of gas appliances, formaldehyde is a toxic substance that is itself manufactured and then used in the

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<sup>79</sup> 42 U.S.C. § 7412(b)(2).

<sup>80</sup> Raymond Haik & Joanne Hinderaker, *The Impact of Indoor Air Quality on the Gas Industry*, 5 ENERGY L. J. 383, 403 (1984).

<sup>81</sup> 42 U.S.C. § 7411(a)(3).

<sup>82</sup> 15 U.S.C. § 2605(a).

<sup>83</sup> *Id.* at § 2605(a)(1)

<sup>84</sup> 40 CFR § 770.

<sup>85</sup> *Formaldehyde Emission Standards for Composite Wood Products*, ENVIRONMENTAL PROTECTION AGENCY, <https://perma.cc/GC3D-KTZQ>.

production of the wood items targeted by EPA’s regulation. In any event, EPA has to date never taken any action related to gas stove emissions under TSCA.

The National Environmental Policy Act (“NEPA”) also fails to provide a platform for action on indoor air quality. Although the purpose of NEPA includes “assur[ing] for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings,”<sup>86</sup> NEPA’s language refers to the ambient environment, and the statute reserves the power to deal with issues of indoor air quality to “other authority.”<sup>87</sup>

The administrative agency that is likely best positioned to regulate the health threats posed by gas stoves is the Consumer Product Safety Commission (“CPSC”). CPSC has the authority, under the Consumer Product Safety Act (“CPSA”), to promulgate performance and labeling standards for consumer products, meaning products “for use in or around a permanent or temporary household or residence, a school, in recreation, or otherwise”—a definition that clearly includes gas stoves.<sup>88</sup> It can also ban a consumer product that “presents an unreasonable risk of injury” when no standard “would adequately protect the public.”<sup>89</sup> Indeed, the commission has a record of taking concrete action on certain gas-burning appliances; for example, in 1978 CPSC proposed an outright ban on unvented gas space heaters,<sup>90</sup> which was later dialed back into a 1980 mandatory standard requiring manufacturers to equip such heaters with an “oxygen depletion safety shut-off system” to inhibit the buildup of life-threatening levels of carbon monoxide.<sup>91</sup>

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<sup>86</sup> 42 U.S.C. § 4331(b)(2).

<sup>87</sup> See Andrew Harrison, *An Analysis of the Health Effects, Economic Consequences and Legal Implications of Human Exposure to Indoor Air Pollutants*, 37 SOUTH DAKOTA L. REV. 289, 331 (1991).

<sup>88</sup> 15 U.S.C. § 2052(a)(5).

<sup>89</sup> 15 U.S.C. § 2057.

<sup>90</sup> Press Release, CONSUMER PRODUCTS SAFETY COMMISSION, *Commission Proposes Ban On Unvented Gas Space Heaters* (Feb. 2, 1978), <https://perma.cc/4GXT-AM4E>.

<sup>91</sup> Press Release, CONSUMER PRODUCTS SAFETY COMMISSION, *Commission Approves Mandatory Standard to Improve Safety of Unvented Gas Space Heaters* (Sep. 8, 1980), <https://perma.cc/AQ6P-A4QS>.

So the Biden administration could pursue regulatory action on gas stove pollution through CPSC, if it wanted to prioritize this issue. However, it would need to overcome a number of obstacles to successfully do so. First, the CPSA requires the commission to “rely upon voluntary consumer product safety standards rather than promulgate a consumer product safety standard... whenever compliance with such voluntary standards would eliminate or adequately reduce the risk of injury addressed and it is likely that there will be substantial compliance with such voluntary standards.”<sup>92</sup> Second, the statute requires a cost-benefit analysis and a determination “that the rule imposes the least burdensome requirement” necessary to prevent or mitigate the potential harm.<sup>93</sup>

This might not be a cause for concern in the context of a reasonably restrained judiciary operating under a normal *Chevron* framework. But the conservative legal movement’s war on the administrative state is ascendant, and its majority on the Supreme Court has spent years pursuing a campaign to undermine *Chevron* deference<sup>94</sup> and weaponize the major questions doctrine to strike down reasonable exercises of administrative authority.<sup>95</sup> In this context, it is easy to imagine the Court striking down a gas stove safety standard, either with one of these theories or with its own ideologically-motivated finding that the health threats posed by gas stove use do not justify CPSC action.

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<sup>92</sup> Grace Guiffrida, *The Proposed Indoor Air Quality Acts of 1993: The Comprehensive Solution to a Far-Reaching Problem?*, 11 PACE ENV. L. REV. 311 (1993), <https://perma.cc/2QG9-DXCD>, citing 15 U.S.C. § 2056(b).

<sup>93</sup> *Id.*, citing U.S.C. § 2058(f)(3)(F).

<sup>94</sup> See Kristin Hickman & Aaron Nielson, *Narrowing Chevron’s Domain*, 70 DUKE L. JOURNAL 931, 934-35 (2021), <https://perma.cc/D2FY-FFLC> (noting suggestions from Justices Clarence Thomas and Neil Gorsuch that *Chevron* violates the separation of powers; describing conceptual criticisms of *Chevron* made by Justice Brett Kavanaugh; and observing that Chief Justice John Roberts, joined by Justice Alito, has urged a narrower version of *Chevron* deference); see Jeff Overley, *Chevron Deference’s Future in Doubt If Barrett Is Confirmed*, LAW360 (Oct. 23, 2020), <https://perma.cc/LYF9-HR62>; see *American Hospital Association v. Becerra*, 596 U.S. \_\_\_\_ (2022) (in which the Court ignored the traditional *Chevron* test entirely).

<sup>95</sup> See *West Virginia v. Environmental Protection Agency*, 597 U.S. \_\_\_\_ (2022) (in which the Court used the major questions doctrine to limit the EPA’s authority to regulate emissions from existing power plants based on generation shifting mechanisms).

Of course, this is not in any way to argue that the Biden administration should not pursue executive action on gas stoves. CPSC regulation on this issue would—regardless of judicial challenges—be impactful. But a realistic political assessment of both the administration’s priorities and the courts makes clear that relying on such action to address the hazards of gas stove pollution in the near term would be unwise.

## 2. Congress Could Fill This Gap, But Congressional Action Is Unlikely

In addition to the administrative channels explored above, U.S. policymakers could also implement a more comprehensive indoor pollution control policy. Such systems are certainly technically feasible, and many countries have established them. To take one example, Portugal created a program in 2006 that set maximum indoor reference concentrations for a series of pollutants, established a system of mandatory monitoring for different types and sizes of buildings, and provided for a range of corrective actions when buildings were found to exceed these limits.<sup>96</sup>

So, it is theoretically possible for Congress to take legislative action on this issue, and over the years there have been various discussions about the possibility of a federal “Clean Indoor Air Act” similar to the CAA. Such legislation could either grant states the primary authority to regulate indoor air quality or require the federal government to develop a new set of indoor ambient air quality standards. Perhaps the most effective approach would be to model the policy on the CAA, with the federal government assisting states in preparing federal standards through programs approved by the EPA, which could then be implemented through state and municipal building codes, among other enforcement strategies.<sup>97</sup> Congress could take such action

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<sup>96</sup> Gaetano Settimo et al., *Indoor Air Quality: A Focus on the European Legislation and State-of-the-Art Research in Italy*, 11 *ATMOSPHERE* 370 (2020), <https://perma.cc/8D45-C39E>.

<sup>97</sup> See *Legislation for Clean Air: An Indoor Front*, 82 *YALE L. JOURNAL* 1040, 1051 (1972), <https://perma.cc/5GFG-2KFZ>.

under its Article 1, Section 8 powers to regulate interstate commerce, which, at the very least, should allow for federal regulation of indoor pollution at all places of public accommodation, businesses, and federally financed buildings.<sup>98</sup> Private residences might be outside the scope of such regulation, though it is possible that private residences whose mortgages were federally insured under the Federal Housing Act could be covered.<sup>99</sup> This limitation could also be significantly remedied through federal subsidies to incentivize states to extend their implementation plans to include private homes.<sup>100</sup>

However, even a cursory understanding of 21st century Congressional dysfunction should caution advocates against waiting for the kind of legislative action described above. The Republican Party, which has made dismantling the CAA a top priority, can be expected to fight tooth and nail against attempts to expand the CAA's regulatory purview to include indoor air.<sup>101</sup> And it is difficult to imagine a pathway by which Democrats will be able to overcome the minoritarian structure of the Senate,<sup>102</sup> the even more minoritarian filibuster, and the distorting effects of partisan gerrymandering to pass such substantial legislation over Republican opposition. As such, it is likely that regulatory action on gas stove pollution will need to come at the state and local levels. And these, of course, are the same battlegrounds on which the climate movement's building electrification efforts are already playing out.

### **III. Bringing Climate and Health Policy Together to Tackle Fossil Gas Pollution**

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<sup>98</sup> *Id.*, citing U.S. Const. Art. I, § 8; *Heart of Atlanta Motel, Inc. v. United States*, 379 U.S. 241 (1964); *NLRB v. Jones & Laughlin Steel Corp.*, 301 U.S. 1 (1937); and *United States v. Jefferson County Bd. of Education*, 372 F.2d 836 (5th Cir. 1966).

<sup>99</sup> *Id.*, citing 12 U.S.C. § 1707.

<sup>100</sup> *Id.* at 1052.

<sup>101</sup> See Jaime Fuller, *Environmental policy is partisan. It wasn't always*, THE WASHINGTON POST (June 2, 2014), <https://perma.cc/U8FL-K2FV> (noting that Congressional Republicans held 95 votes on legislation to dismantle the Clean Air Act between 2011 and 2012).

<sup>102</sup> Ian Millhiser, *America's anti-democratic senate, in one number*, VOX (Jan. 6, 2021), <https://bit.ly/3uuAcQS> (noting that the 50 Republican senators currently elected represent approximately 41.5 million fewer people than the 50 currently elected Democratic senators).



As the preceding two sections have attempted to explain, gas stove regulation exists at the intersection of climate and health policy. What's more, the politics and policy constraints around this issue create an auspiciously non-zero sum dynamic for climate and environmental justice advocates—one in which prioritizing both the health- and climate-related dangers of gas stove usage can strengthen each movement's chances of achieving its goals.

This is not a novel observation. The climate policy organization Rocky Mountain Institute, which has a major program area dedicated to building electrification,<sup>103</sup> has put substantial resources into highlighting the negative health effects of gas stoves, as have other environmental groups.<sup>104</sup> But there are a range of approaches to building electrification that vary greatly in the degree to which they take advantage of this symbiotic opportunity. The following section will discuss general principles and strategies for coordinating these health and climate objectives, exploring both real-world policy examples and as-yet untested proposals.

#### *A. Leading with Health*

While climate change has proven to be a compelling motivating force for policymakers to tackle gas phaseouts, as evidenced by the number of jurisdictions that have taken or are considering steps on building electrification, the gas industry's recent successes in blocking and preempting these proposals show that, in many instances, decarbonization alone does not provide a sufficient narrative to overcome utility lobbying, advertising, and astroturf campaigning. That is why, as a matter of both policy and politics, building electrification advocates and supportive public officials should rhetorically and substantively center their campaigns around the work of improving the health and wellbeing of regular people, rather than simply focusing on reducing

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<sup>103</sup> See *Carbon-Free Buildings*, ROCKY MOUNTAIN INSTITUTE, <https://perma.cc/Z6L4-DSHN>.

<sup>104</sup> See Brady Seals, *Indoor Air Pollution: the Link Between Climate and Health*, ROCKY MOUNTAIN INSTITUTE (May 5, 2020), <https://perma.cc/23TT-G9FD>.

greenhouse gas emissions. One way to accomplish this is by structuring a policy process that centers health first, and only extends its focus to climate once that health framing has been established.

Recent developments in California provide a great example of this type of health-before-climate two-step approach. In November 2020, the California Air Resources Board (“CARB”)—the “clean air agency” of the government of California—passed a resolution proclaiming unequivocally that gas appliances, including gas stoves, create indoor air pollution that can cause “asthma and exacerbation of other respiratory symptoms,” among other problems.<sup>105</sup> The resolution went on to direct CARB staff to work with the California Energy Commission (“CEC”) to “support updates of the California Building Standards Code for stronger kitchen ventilation standards and electrification of appliances...in order to protect public health, improve indoor and outdoor air quality” and “support actions such as building ventilation upgrade projects, to improve indoor air quality.”<sup>106</sup>

Following this first step, in August 2021 the CEC approved a new statewide building code that combined substantially stronger ventilation standards for gas stoves (that become even more stringent for smaller housing units where pollution concentrations can be most dangerous) with significant incentives for builders to choose electric over fossil gas for new residential and small commercial buildings from 2023 onward.<sup>107</sup> These incentives were designed “to make all-electric heating and appliances the default choice for newly built homes.”<sup>108</sup> While this policy

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<sup>105</sup> *California Indoor Air Quality Program Update*, Resolution 20-32, CALIFORNIA AIR RESOURCES BOARD (Nov. 19, 2020), <https://perma.cc/7YHB-9JAL>.

<sup>106</sup> *Id.*

<sup>107</sup> Press Release, California Energy Commission, *Energy Commission Adopts Updated Building Standards to Improve Efficiency, Reduce Emissions From Homes and Businesses* (Aug. 11, 2021), <https://perma.cc/YD73-PVAU>.

<sup>108</sup> Jeff St. John, *California takes bold steps to make electricity the fuel of choice for new buildings*, CANARY MEDIA (Aug. 11, 2021), <https://perma.cc/T9XG-44EQ>.

clearly represents major climate action, the architecture of its passage—from CARB resolution to CEC code update—kept the health-focused narrative of indoor air pollution at the center of the process right from the start.

### *B. Setting Appliance Emissions Limits*

Perhaps the most comprehensive way to combine health and climate goals and directly challenge the fossil gas industry’s consumer choice narrative would be for local or state governments to set nitrogen dioxide emissions limits for home appliances so low as to effectively disallow gas appliances.<sup>109</sup> Such standards could be designed to go into effect by a certain deadline, or could be triggered at particular moments, such as the burnout of an existing appliance, the sale of a property, or a major alteration or renovation. They could also be linked to rebate or grant programs to ensure the affordability of the required conversions.<sup>110</sup> Since most gas equipment would be unable to meet the low combustion emission thresholds, this policy could pave the way for electrification, all while keeping the focus solidly on protecting families from the health effects of indoor emissions. Regulating at the appliance level would also provide “long-term market certainty for manufacturers of advanced electric appliances and the workforce,” while ensuring that “renters are not the last to benefit from electrification.”<sup>111</sup>

Of course, careful consideration would have to be given to the design of a zero-emissions appliance standard. Different states and municipalities govern product safety and indoor air quality differently, and some do not currently do so at all. Federal preemption is also a concern, given that the CPSA expressly provides for preemption over state and local law, stating:

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<sup>109</sup> See Farhad Farahmand, *Existing Building Electrification and Multifamily Electric Vehicle Charging: Policy and Financing Literature Review and Analysis*, TRC 12 (June 2021), <https://perma.cc/3XUF-YGML>.

<sup>110</sup> See, e.g., *Electrify Marin – Natural Gas Appliance Replacement Rebate Program*, COUNTY OF MARIN, <https://perma.cc/Y9UC-EMXJ>.

<sup>111</sup> GREENLINING INSTITUTE, *EQUITABLE BUILDING ELECTRIFICATION: A FRAMEWORK FOR POWERING RESILIENT COMMUNITIES*, <https://perma.cc/P5ZJ-749T>.

Whenever a consumer product safety standard under this Act is in effect and applies to a risk of injury associated with a consumer product, no State or political subdivision of a State shall have any authority either to establish or to continue in effect any provision of a safety standard or regulation which prescribes any requirements as to the performance, composition, contents, design, finish, construction, packaging, or labeling of such product which are designed to deal with the same risk of injury associated with such consumer product.<sup>112</sup>

The other federal product safety laws within the CPSC’s jurisdiction contain similar preemption provisions. However, because federal law has so substantially failed to regulate this area, it would be difficult to argue that a state or local appliance emission standard for nitrogen dioxide would pertain to “the same risk of injury associated with such consumer product” as any existing federal standards. The federal Energy Policy and Conservation Act also preempts state laws that would require certain appliances be more efficient than federal standards mandate.<sup>113</sup> But an appliance emissions standard is not designed to regulate energy efficiency or the amount of energy used by an appliance, so no preemption issue should arise on this front.

While there are no existing examples of zero-emissions appliance standards like those envisioned here, analogous local policies do exist. For example, the Bay Area Air Quality Management District set nitrogen oxides and carbon monoxide emissions limits for fossil gas-fired water heaters and boilers and prohibited sales and installation of equipment above these emissions standards.<sup>114</sup> Gas stove regulations could follow a similar model.

### *C. Prioritizing Existing Buildings Alongside New Construction*

Most of the organizing energy around building electrification has focused on phasing out gas hookups in new construction. From a decarbonization perspective, it makes strategic sense to prioritize these efforts, not only because they require less public investment than electrifying

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<sup>112</sup> 15 U.S.C. § 2075(a).

<sup>113</sup> 42 U.S.C. § 6316(b)(2)(A).

<sup>114</sup> Regulation 9, Rule 6: Nitrogen Oxides Emissions From Natural Gas-Fired Boilers and Water Heaters, BAY AREA AIR QUALITY MANAGEMENT DISTRICT AIR RESOURCES BOARD (Nov. 7, 2007), <https://perma.cc/3XUD-AE28>.

existing buildings, but also because of the big-picture market impacts of such policies. As

University of California, Santa Barbara energy expert Leah Stokes put it:

If we're able to get gas bans in new buildings, then these gas companies are losing their growth, they're losing their new market share, and they're going to start shrinking. That sort of downward spiral becomes very problematic, because then investors start to think this isn't a good company to invest in.<sup>115</sup>

However, it is harder to rhetorically center—and impossible to substantively center—the urgent need to protect people from the health hazards of indoor gas pollution while pushing for a policy that addresses only new construction, as such efforts will not actually shield the most vulnerable communities, who overwhelmingly live in older housing stock.<sup>116</sup> It is critical, then, that alongside new construction requirements, states and localities pursue parallel efforts to lower indoor gas pollution through the electrification of existing buildings. This can be approached in several different ways.

1. Triggered Appliance Conversion

States and localities could use building codes, statutes, and ordinances to require gas-to-electric appliance conversion—or, at least, electrification readiness changes that make fuel-switching easier when the time comes to naturally replace an appliance—at certain logical moments, such as the point of sale or during rental turnover. Such requirements could also be tied to particularly relevant building permits, such as those for the installation of heating equipment or major renovations, when conversion might be more cost effective or less disruptive to a building owner.<sup>117</sup> For example, the City of Piedmont, California passed an ordinance that requires permit applicants pursuing residential renovation projects and electrical panel upgrades

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<sup>115</sup> See Leber, *supra* note 22.

<sup>116</sup> See Na Zhao, *The Aging Housing Stock*, EYE ON HOUSING (Jan. 5, 2017), <https://perma.cc/5YJ2-DPLS>.

<sup>117</sup> See Farahmand, *supra* note 109, at 8.

to install certain appliances from a list of electrification improvements and establish the electrical capacity necessary to accommodate future electrification of all appliances in the residence.<sup>118</sup>

## 2. Building Performance Standards

Another approach to the electrification of existing buildings is to develop greenhouse gas emissions benchmarks with auditing and compliance requirements that require buildings to hit zero-emission targets on a certain timeline. A number of cities, including Los Angeles, San Francisco, and Boston, have already developed energy efficiency benchmarking requirements.<sup>119</sup> And—particularly relevant for reaching environmental justice communities—several jurisdictions have implemented policies specifically targeting rental units. Boulder, Colorado adopted a program requiring rental properties to meet energy efficiency requirements before rental license application approvals, and Gainesville, Florida has a rental unit permit and inspection program that requires rental units to apply for permits annually and demonstrate they meet the city’s energy efficiency requirements.<sup>120</sup> Though these policies currently focus on energy efficiency, this same concept could be adapted to directly target gas emissions.

## 3. Incentive Programs

Of course, for any of the strategies described above to succeed, conversion to electric appliances must be affordable, meaning incentive programs are needed to ensure that everyone—particularly the low-income communities who are most burdened by indoor gas pollution—can participate. Public utility commissions should require utilities to develop and fund fuel-switching programs, which could be modeled on existing programs supporting energy efficiency upgrades. Local governments can administer rebate programs, as well. Marin County, California provides

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<sup>118</sup> *Reach Codes and Home Energy Assessment Policy: Information for Architects, Real Estate Agents, Planners, & Homeowners*, City of Piedmont, <https://perma.cc/48T2-GRBG>.

<sup>119</sup> See Farahmand, *supra* note 109, at 10.

<sup>120</sup> *Id.*, at 11.

standard rebates of \$250 to \$1,000 for a range of appliances like induction cooktops and heat pump water heaters, with larger rebates up to \$2,000 for lower-income residents.<sup>121</sup> And inclusive zero-interest financing strategies using tariffed on-bill investment programs—in which utilities or private organizations cover the upfront costs of improvements and recover the investment on utility bills at a rate less than the estimated savings from those improvements—could also be utilized to increase accessibility.<sup>122</sup>

#### *D. Integrating Electrification Efforts and Health Programs*

This paper has focused on the health effects of indoor gas combustion, but there are many other residential hazards that threaten the health of environmental justice communities, including asbestos, lead, mold, and leaky roofs. As the Greenlining Institute’s “Equitable Electrification Framework” details, existing energy upgrade incentive programs usually “have no requirement for referral or follow-up if the program finds one of these structural barriers.”<sup>123</sup> At the same time, programs focused on residential health or habitability are rarely connected to energy upgrade programs.<sup>124</sup> To substantively and narratively keep human welfare at the center of electrification policies, efforts should be made to establish stronger connections and referral obligations between health and energy programs, while providing a “one-stop shop to help owners manage the complexity of project timelines and requirements.”<sup>125</sup>

#### *E. Exploring Litigation Strategies*

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<sup>121</sup> See COUNTY OF MARIN, *supra* note 110.

<sup>122</sup> See John Farrell, REPORT: INCLUSIVE FINANCING FOR EFFICIENCY AND RENEWABLE ENERGY, INSTITUTE FOR LOCAL SELF-RELIANCE (Nov. 2016), <https://perma.cc/F4XE-L8NG>.

<sup>123</sup> See GREENLINING INSTITUTE, *supra* note 111, at 21.

<sup>124</sup> *Id.*

<sup>125</sup> *Id.*, referencing ENERGY EFFICIENCY FOR ALL, ONE-STOP SHOPS FOR THE MULTIFAMILY SECTOR, <https://perma.cc/X4XJ-LAPK>.

In addition to pushing for policy solutions, climate and environmental justice advocates would benefit from fully exploring the legal options available to challenge the industry actors responsible for gas stove pollution. After all, lawsuits have helped defang once-untouchable industries in the past. Because of litigation during the 1990s, the tobacco industry was held accountable by nearly every U.S. attorney general.<sup>126</sup> The executives of these corporations went from shamelessly lying to Congress to being driven out of the industry following perjury probes.<sup>127</sup> As tobacco lawsuits went to trial, they resulted in the release of millions of damning internal documents, which helped shift public opinion against Big Tobacco and strengthened public officials' willingness to challenge the industry.<sup>128</sup> And the billions of dollars that tobacco companies lost through settlements significantly undermined their political capacity to continue blocking public health measures.<sup>129</sup> Today, climate liability suits are attempting to use consumer protection laws and common law theories—such as public nuisance, trespass, and products liability—to take on Big Oil.<sup>130</sup> Could the fossil gas industry be similarly challenged?

Causation would be one difficult barrier to such litigation. To prove causation in a toxic tort case, a plaintiff must show both “general causation”—that the substance or activity in question is capable of causing the plaintiff’s injury—and “specific causation”—that exposure to the substance in fact caused that plaintiff’s injury.<sup>131</sup> It seems very probable that the existing

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<sup>126</sup> See Patti Lynn, *How AGs held Big Tobacco liable — and what it might mean for big polluters today*, CORPORATE ACCOUNTABILITY, (Nov. 20, 2019), <https://perma.cc/K963-QGQQ>.

<sup>127</sup> Myron Levin, *All 7 Tobacco Executives in Perjury Probe Have Quit the Industry*, LOS ANGELES TIMES, (June 1, 1996), <https://perma.cc/H6QN-JACR>.

<sup>128</sup> See Richard Hurt et al., *Open Doorway to Truth: Legacy of the Minnesota Tobacco Trial*, MAYO CLINIC PROCEEDINGS 84 5 446-456 (May 1, 2009), <https://perma.cc/4H52-Z7H8>.

<sup>129</sup> See Kevin Sack, *For the Nation’s Politicians, Big Tobacco No Longer Bites*, THE NEW YORK TIMES (Apr. 22, 1997), <https://perma.cc/GQ4A-7JNC>; see also Keck, Kristi, *Big Tobacco: A history of its decline*, CNN POLITICS (June 19, 2009), <https://perma.cc/6SEG-P2VF>.

<sup>130</sup> *Climate Liability Litigation: Cases underway to make climate polluters pay*, THE CENTER FOR CLIMATE INTEGRITY, <https://perma.cc/B7Z5-ZDZJ>.

<sup>131</sup> See David Bernstein, *Getting to Causation in Toxic Tort Cases*, 74 BROOKLYN L. REV. 51, 53 (2008), <https://perma.cc/4NBK-E3YF>.



body of evidence linking gas stove use with negative health outcomes such as asthma is substantial enough to meet the standard for general causation. Specific causation, however, would be more challenging, as it requires a preponderance of the evidence standard, meaning plaintiffs must show that “the exposure at issue did not simply slightly raise the hypothetical risk of injury, but in fact more than doubled the risk of the harm.”<sup>132</sup> Whether such a link can be persuasively mapped is unclear, but it is worth noting the studies previously cited in this paper that found that 62 percent of homes with gas stoves have short-term and long-term nitrogen dioxide levels significantly exceeding the EPA’s ambient air quality standards,<sup>133</sup> while children living in homes with gas cooking have a 42 percent increased risk of having current asthma.<sup>134</sup>

A deceptive advertising theory may be easier to prove than toxic tort claims. It is possible that the epidemiological evidence described above, combined with industry marketing campaigns framing gas stoves as healthy and clean,<sup>135</sup> could amount to a legitimate consumer fraud case under state consumer protection statutes. Such litigation might not work initially, but then again, it took tobacco litigators decades before they succeeded. And in the meantime, high-profile lawsuits pitting the victims of gas stove pollution—including asthmatic children—against gas companies could help to advance the broader electrification movement by highlighting the danger of gas stoves and directing greater public attention towards the industry’s dishonesty about the true effects of fossil gas.

## Conclusion

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<sup>132</sup> Albert Lin, *Beyond Tort: Compensating Victims of Environmental Toxic Injury*, 78 S. CAL. L. REV. 1439, 1449 (2005), <https://perma.cc/2U8L-WSHK>.

<sup>133</sup> See Logue, *supra* note 51.

<sup>134</sup> See Lin, *supra* note 51.

<sup>135</sup> See, e.g., Eversource, *Natural Gas from Eversource is Safe and Reliable*, YOUTUBE (Nov. 20, 2018), <https://perma.cc/NL48-7E49>.

The climate crisis is, in so many ways, a public health and environmental justice crisis. But the climate actions needed to avert the most catastrophic warming scenarios are not always developed in ways that prioritize health and environmental justice concerns. Indeed, sometimes these issues are viewed as distractions that threaten to divert limited political capital from urgently-needed decarbonization efforts. This paper argues that when it comes to issues of building electrification and gas stove pollution, this is exactly the wrong approach for the climate movement to take.

The fossil gas industry has made consumer attachment to gas stoves the centerpiece of its anti-electrification messaging. To counter and overcome this strategy, building electrification advocates must tell their own story about gas stoves, and it is hard to imagine any narrative more salient than the reality of an everyday kitchen appliance that is literally poisoning our children in their own homes. At the same time, health and environmental justice advocates concerned with the effects of gas stove pollution on indoor air quality—a notoriously difficult issue to regulate, particularly at the federal level—have everything to gain from aligning themselves with the decarbonization campaigns that have gained momentum among local policymakers across the country. By designing building electrification policies and organizing strategies in ways that put issues of gas stove pollution front and center, members of the climate and environmental justice movements have a chance to create the kind of virtuous cycle that is desperately needed to achieve both their health and climate goals.