



# CLIMATE CHANGE AND HEALTH: Public Health and Legal Strategies to Reduce Reliance on Fossil Fuels, Increase Air Quality, and Improve Human Health

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## Abstract:

Reliance upon fossil fuels and limited greenspace contribute to poor indoor and outdoor air quality and adverse health outcomes, particularly in communities of color. This article describes justice-informed public health and legal interventions to increase access to greenspace and accelerate the transitions to renewable energy and away from gas appliances.

## Introduction

Burning fossil fuels is a key driver of climate change, and the air pollution that results from this combustion is a leading cause of preventable illness and death in the United States.<sup>1</sup> Given the adverse environmental and health outcomes associated with reliance on burning fossil fuels, proactive intervention is imperative to reduce harmful greenhouse gas emissions. By drawing examples from our respective areas of work, we highlight the substantial impact of investing in greenspace as a public health intervention to ameliorate the harms of fossil fuel combustion and related pollution. In addition, we outline crucial legal strategies, such as the implementation of renewable energy standards to accelerate the transition away from fossil fuels and to direct economic and health benefits to front-line communities that have been most affected by fossil fuel emissions and pollution. Furthermore, we illuminate the pivotal role of electrifying appliances, using this to demonstrate how such measures can effectively improve indoor air quality and human health. Implementing public health interventions and legal strategies to address climate change can contribute to numerous environmental and health co-benefits.<sup>2</sup>

## Greenspace as an Equity and Justice Informed Climate Change and Public Health Intervention

U.S. history is marked by a legacy of injustice, spanning from the era of slavery to Jim Crow laws, redlining, and restrictive housing covenants, among many racialized



laws and policies. These injustices have significantly influenced modern neighborhood designs, contributing to disparities, disinvestment, environmental injustice, and long-lasting adverse impacts on climate and public health outcomes for individuals living in neighborhoods that have historically been targeted for marginalization.

Communities that experienced redlining frequently endure the disproportionate burden of environmental injustices. Historically redlined areas may have less adaptive capacity, marked by diminished tree cover compared to historically non-redlined areas.<sup>3</sup> Historically redlined neighborhoods are also more likely to host fossil power plants, exposing residents to elevated air pollutant levels and resulting in poorer respiratory health outcomes and other chronic conditions.<sup>4</sup> A 2023 study, utilizing data from mapping inequality maps and the U.S. Surveillance, Epidemiology and End Results (SEER)-Medicare linked dataset, found that historical redlining is associated with differential treatment and poorer survival for all-cause mortality and breast cancer specific mortality.<sup>5</sup> Multiple studies have shown similar results across numerous other health outcomes.


Addressing this problem requires collaborative efforts to disrupt the cycle of disinvestment, which contributes to negative climate and health outcomes. Equitable and just public health interventions are crucial. One such intervention involves the promotion of equitable urban greenspaces to improve public health outcomes.

There is well-documented evidence highlighting the positive influence of greenspace on health outcomes, including improvement in mental health, socioemotional health, and cancer and cardiovascular health outcomes.<sup>6</sup> Greenspace is increasingly recognized as a dual-purpose intervention with human health and climate change co-benefits. Researchers are now exploring the conceptualization of greenspace as an intervention specifically targeting chronic diseases.<sup>7</sup> This innovative perspective acknowledges the intricate connection between human and environmental well-being, highlighting greenspace as an example of potential comprehensive solutions to address challenges related to chronic diseases while also contributing to broader climate change and health objectives.

Investing in equitable urban greenspace represents a promising avenue for public health interventions aimed at achieving both equity and resilience. Nevertheless, Bikomeye et al., 2021 emphasize the importance of critical considerations and specific strategies in implementing such public health investments.<sup>8</sup> Using Milwaukee, Wisconsin, as a case example, Bikomeye et al. underscore the uniqueness of each climate and public health intervention. Tailoring strategies to the local context is crucial to ensure maximum health and climate benefits for individuals affected by these interventions.<sup>9</sup>

### Renewable Energy Standards

Transitioning away from fossil fuels toward renewable energy is a top priority for preventing and reducing human health impacts related to climate change.<sup>10</sup> Requiring electricity suppliers to transition to renewable energy is an upstream strategy which facilitates the movement of key sectors of our physical and economic



infrastructure, such as buildings, transportation, and health care, away from fossil fuels. If laws and policies require or incentivize electricity suppliers to locate renewable energy projects and infrastructure in front-line communities, this may reduce health disparities, to which previous siting decisions for fossil fuel power facilities contributed.

**Adopting state-wide renewable energy standards is one means to require or encourage electric utilities and other energy suppliers to produce an increasing percentage of the electricity they provide to customers from renewable energy sources by specified benchmark years.<sup>11</sup>**

In 2023, Minnesota and Michigan passed clean energy laws with ambitious targets. In addition to state laws, many cities have committed to reductions in greenhouse gas emissions. For example, in 2021 the city of Des Moines, Iowa, passed a resolution that the city would receive 100% of its energy from non-carbon sources by 2035, and in 2023, the city adopted a Climate Adaptation Plan to support achievement of that goal. A growing number of health care systems and entities in the health care sector have formally pledged to decarbonize.<sup>12</sup>

While it is relatively straightforward to identify which states have adopted or recently updated a renewable energy standard, policy surveillance and legal epidemiology will help develop a deeper analysis by assessing and comparing the terms of the laws and health outcomes in various jurisdictions.<sup>13</sup> For example, whether a state law sets mandatory or voluntary standards may have profound practical implications for the effectiveness of the law. The definition of “renewable energy” itself may vary across jurisdictions. Some states include “clean coal” within the definition of renewable energy, despite evidence that the emissions reductions of “clean coal” have been overestimated, and that policies which include “clean coal” as part of the transition away from fossil fuels reduce social welfare by delaying closure of some coal plants.<sup>14</sup>

State renewable energy standards that incentivize energy efficiency increase the chance that the health benefits of the transition to renewable energy will be equitably distributed.<sup>15</sup> Incentives may also be found in separate laws known as Energy Efficiency Resource Standards. In general, energy efficiency laws benefit the public by lowering energy consumption, waste, and overall emissions, and benefit front-line communities specifically by lowering the cost of energy. Other law and policy strategies to ensure that the economic and health benefits of the transition to renewable energy are fairly distributed and decrease particulate matter in the most heavily polluted communities include: support for job creation and job training in frontline communities; community solar; grant and low interest loan programs for solar installation on affordable housing, multifamily housing, and homes owned by low income families; and equitable engagement compensation programs.<sup>16</sup>



## Transitioning From Gas-Powered Appliances to Electric Alternatives

Research has been available for decades on the health impacts of gas appliances, particularly gas stoves, but public awareness is only now emerging.<sup>17</sup> The pollutant burden from gas stoves has a similar profile for many of the toxins from secondhand tobacco smoke. For instance, nitrogen dioxide is a byproduct of combustion of both natural gas and tobacco smoke that contributes to asthma, particularly in youth.<sup>18</sup> Carbon monoxide, which kills 170 people every year from poisoning from stoves or ovens, is produced by both tobacco smoke and the incomplete burn of gas, as is the known carcinogen benzene.<sup>19</sup>

From a climate perspective, burning fossil fuels in U.S. homes and businesses accounts for roughly onetenth of the country's carbon emissions.<sup>20</sup> The good news is that electric options, like induction stoves, are often superior in function to gas appliances without the same climate and health impacts.

There are several policy routes that local and state governments can pursue to promote electric stoves and other appliances and transition homes and businesses away from harmful gas appliances. Building performance standards establish targets for existing buildings to reduce energy use or greenhouse gas emissions by set deadlines and have been adopted so far by four states and eight local governments.<sup>21</sup> One of the ways to meet these targets is to switch fuels from gas to electric appliances. Other policy options include all electric new construction requirements which nearly 100 cities now require, updated building codes, clean heat standards, targeting air emissions such as by limiting carbon dioxide emissions from new buildings, and targeting gas infrastructure build out itself.

Many of these policies are relatively new to be adopted and the legal landscape is still in flux. Questions of local and state authority to act in these areas are being actively litigated in court. In one instance, the City of Berkeley's all electric new construction ordinance was found to be preempted by the federal Energy Policy Conservation Act, although that is on appeal as of this writing and only applies within the boundaries of the Ninth Circuit.<sup>22</sup> For local or state governments seeking to pursue building electrification, organizations like the Public Health Law Center stand willing to help provide legal technical assistance.

## Conclusion

By implementing public health interventions and legal strategies to address climate change, we can accrue countless health, environmental, and ethical co-benefits. By focusing on reducing combustion of fossil fuels, increasing reliance on renewable energy, expanding tree canopy and greenspace in historically redlined neighborhoods and other places with less green infrastructure, we can continue to improve indoor and outdoor air quality. When we improve air quality, we improve both human health and planetary health. By illuminating connections between human health impacts such as asthma, cardiovascular health, depression, anxiety, and cancer and larger social and environmental conditions such as siting of energyproduction and other industrial facilities, structural racism, and use of outmoded appliances and building standards, we can demonstrate the direct

relevance of climate change and air quality to many in the public health, health care, and legal fields. As the pool of professionals who connect this global threat to their own work expands, we strengthen the foundation for more authentic collaboration with frontline communities and more persuasive communication with the public.

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This article was originally published in the [Spring 2024 Symposium issue of the Journal of Law, Medicine & Ethics](#), which examines some of the critical topics that were discussed at the October 2023 National Public Health Law Conference: People. Policy. Progress, in Minneapolis, Minnesota. The conference was organized by the Network for Public Health Law with generous support from the Robert Wood Johnson Foundation, Health Forward Foundation, M Health Fairview, and Amazon Web Services.