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## Beneficial Electrification For Low-Income Communities

### What Is Beneficial Electrification?

Beneficial electrification ensures that homes and buildings have energy-efficient, electric appliances and are tightly sealed and well-ventilated. This approach can reduce people's exposures to outdoor and indoor pollution, provide safe and comfortable shelter, and reduce energy load and therefore costs. For the **26 million low-income households** in the United States that burn fossil fuels, beneficial electrification can successfully address disparities in health outcomes associated with environmental racism, persistent poverty, and other social determinants of health.<sup>1</sup>

This fact sheet was developed from RMI's [Decarbonizing Homes](#) report.<sup>2</sup>

### What Are the Health Benefits of Beneficial Electrification?

- **Elimination of in-building fossil fuel combustion.** Fuel-burning appliances are a key source of exposure to **combustion pollution**.<sup>3</sup> The **short- and long-term harms** to respiratory, cardiovascular, neurological, and prenatal health can be prevented through electrification.<sup>4</sup> Notably, **children from homes with gas stoves** are 42 percent more likely to experience asthmatic symptoms and 24 percent more likely to be diagnosed with asthma than those from homes without gas stoves.<sup>5</sup>
- **Reduced infiltration of outdoor pollution.** A tightly sealed building envelope, coupled with an effective whole-home ventilation system, allows for more control over pollution infiltration and improves indoor air quality.
- **Increased air conditioning access.** Air conditioning is **highly protective against extreme heat**.<sup>6</sup> High-performing building envelopes can make cooling more efficient and lower operating costs. Electrification may also include the adoption of heat pumps, a **more efficient and climate-aligned method of cooling and heating**.<sup>7</sup>
- **Improved neighborhood health and safety.** Electrification reduces ambient air pollution from buildings, which are the **largest contributor to combustion emissions leading to premature deaths**.<sup>8</sup> Additionally, electrification encourages the phaseout of aging gas infrastructure, reducing the health hazards posed by **methane leaks, fires, and explosions**.<sup>9</sup>
- **Improved energy security.** **Energy insecurity** is an inability to adequately meet basic household energy needs, which is intrinsically tied to health impacts including **stress, mental health issues, poor sleep, cardiovascular disease, and respiratory diseases**.<sup>10</sup> Beneficial electrification can boost household energy security and reduce health impacts by improving grid reliability and energy affordability.



## Why Will Low-Income Communities Gain the Most?

- **Disparities in Health Outcomes:** Disparities in health burden as a function of socioeconomic status are clear: low-income people have higher rates of **heart disease, asthma,** and other chronic diseases, as well as **lower life expectancy.**<sup>11</sup> Low-income households are also **more likely to be households of color.**<sup>12</sup>
- **Vulnerability to the “Heat or Eat” Dilemma:** The cost of residential energy may sometimes displace spending for other essential needs in these households — known as the **heat-or-eat dilemma.**<sup>13</sup> Low-income communities and communities of color often face ongoing marginalization and have the most to gain from reduced energy consumption and cost through beneficial electrification.
- **Location-Based Exposure to Pollutants and Climate Risks:** Location-based exposures are rooted in **historic segregation and zoning practices.**<sup>14</sup> This results in low-income communities and communities of color being located closer to sources of pollution, like **highways, power plants, toxic waste sites, and landfills,** and disproportionately at risk of **climate change effects.**<sup>15</sup>
- **In-Home Exposure to Pollutants and Allergens:** About half of US rental housing units have health hazards, with about **two-thirds of these substandard units** being rented by low-income households.<sup>16</sup> For example, many homes lack sufficient heating, leading low-income households to be twice as likely as high-income households to use stoves or ovens for supplemental heat. This has been identified as a **main risk factor for pediatric asthma.**<sup>17</sup>

Improving housing quality through beneficial electrification is a way of easing the climate and health burden on resource-constrained households and communities. It is also an opportunity to rectify historic and ongoing inequities.

## How Can Health Professionals Support Beneficial Electrification?

Health professionals can support beneficial electrification efforts by advocating for various policies that are accountable to low-income communities, increase funding for public and affordable housing programs, revise codes and standards, and pursue decarbonization. Visit RMI’s [Health Professional’s Guide to All-Electric Homes](#) to learn more about ways that health professionals can play a role in electrification.

## Endnotes

- 1 Yu Ann Tan and Bomee Jung, *Decarbonizing Homes: Improving Health in Low-Income Communities through Beneficial Electrification*, RMI, 2021, <https://rmi.org/insight/decarbonizing-homes/>.
- 2 Ibid.
- 3 David E. Jacobs and Andrea Baeder, *Housing Interventions and Health: A Review of the Evidence*, National Center for Healthy Housing, 2009, [https://nchh.org/resource-library/report\\_housing-interventions-and-health\\_a-review-of-the-evidence.pdf](https://nchh.org/resource-library/report_housing-interventions-and-health_a-review-of-the-evidence.pdf).
- 4 Tan, *Decarbonizing Homes: Improving Health in Low-Income Communities through Beneficial Electrification*, 2021.
- 5 Weiwei Lin, Bert Brunekreef, and Ulrike Gehring, “Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children,” *International Journal of Epidemiology* 42, no. 6 (August 20, 2013): 1724–37, <https://doi.org/10.1093/ije/dyt150>.
- 6 B. Ostro et al., “The Effects of Temperature and Use of Air Conditioning on Hospitalizations,” *American Journal of Epidemiology* 172, no. 9 (September 9, 2010): 1053–61, <https://doi.org/10.1093/aje/kwq231>.
- 7 Claire McKenna, Amar Shah, and Leah Louis- Prescott, *The New Economics of Electrifying Buildings*, RMI, 2020, <https://rmi.org/insight/the-new-economics-of-electrifying-buildings>.
- 8 I. C. Dedoussi et al., “Premature Mortality Related to United States Cross-State Air Pollution,” *Nature* 578 (2020): 261–265, <https://doi.org/10.1038/s41586-020-1983-8>.
- 9 Ryan E. Emanuel et al., “Natural Gas Gathering and Transmission Pipelines and Social Vulnerability in the United States,” *GeoHealth* (2021): e2021GH000442, <https://doi.org/10.1029/2021GH000442>.
- 10 Diana Hernández, “Understanding ‘Energy Insecurity’ and Why It Matters to Health,” *Social Science & Medicine* 167 (2016): 1–10, <https://doi.org/10.1016/j.socscimed.2016.08.029>; and Sonal Jessel, Samantha Sawyer, and Diana Hernández, “Energy, Poverty, and Health in Climate Change: A Comprehensive Review of an Emerging Literature,” *Frontiers in Public Health* (2019): 357, <https://doi.org/10.3389/FPUBH.2019.00357>.
- 11 Mark Lemstra, Marla Rogers, and John Moraros, “Income and Heart Disease: Neglected Risk Factor,” *Canadian Family Physician Medecin de Famille Canadien* 61, no. 8 (2015): 698–704, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4541436/>; Hatice S. Zahran et al., “Vital Signs: Asthma in Children—United States, 2001–2016,” *MMWR Morbidity and Mortality Weekly Report* 67, no. 5 (2018): 149–55, <https://doi.org/10.15585/mmwr.mm6705e1>; and Sarah Simon et al., *How Are Income and Wealth Linked to Health and Longevity?* Center on Society and Health, 2015, <https://www.urban.org/sites/default/files/publication/49116/2000178-How-are-Income-and-Wealth-Linked-to-Health-and-Longevity.pdf>.
- 12 *The State of the Nation’s Housing 2021*, Joint Center for Housing Studies at Harvard University, 2021, <https://www.jchs.harvard.edu/state-nations-housing-2021>.
- 13 Mark Nord and Linda S. Kantor, “Seasonal Variation in Food Insecurity Is Associated with Heating and Cooling Costs among Low-Income Elderly Americans,” *The Journal of Nutrition* 136, no. 11 (2006): 2939–44, <https://doi.org/10.1093/jn/136.11.2939>.
- 14 Christopher W. Tessum et al., “PM2.5 Polluters Disproportionately and Systematically Affect People of Color in the United States,” *Science Advances* 7, no. 18 (2021): eabf4491, <https://doi.org/10.1126/sciadv.abf4491>.
- 15 Gregory Pratt et al., “Traffic, Air Pollution, Minority and Socio-Economic Status: Addressing Inequities in Exposure and Risk,” *International Journal of Environmental Research and Public Health* 12, no. 5 (2015): 5355–72, <https://doi.org/10.3390/ijerph120505355>; Angela Caputo and Sharon Lerner, “Thousands of U.S. Public Housing Residents Live in the Country’s Most Polluted Places,” *The Intercept*, 2021, <https://theintercept.com/2021/01/13/epa-public-housing-lead-superfund/>; and Susanne Amelie Benz and Jennifer Anne Burney, “Widespread Race and Class Disparities in Surface Urban Heat Extremes across the United States,” *Earth’s Future* 9, no. 7 (2021), <https://doi.org/10.1029/2021ef002016>.
- 16 *Rental Housing: As More Households Rent, the Poorest Face Affordability and Housing Quality Challenges*, US Government Accountability Office, 2020, <https://www.gao.gov/products/gao-20-427>.
- 17 Bruce P. Lanphear et al., “Residential Exposures Associated with Asthma in US Children,” *Pediatrics* 107, no. 3 (2001), <https://publications.aap.org/pediatrics/article-abstract/107/3/505/65985/Residential-Exposures-Associated-With-Asthma-in-US>.