

# **Statement on “Examining the Economic Benefits of Electrifying America’s Homes and Buildings”**

Joint Economic Committee

Dr. Leah Stokes

Associate Professor, University of California Santa Barbara

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Vice-Chairman Heinrich, Ranking Member Lee, and distinguished members of the Joint Economic Committee, good afternoon.

Thank you for inviting me to discuss the economic benefits of building electrification. My testimony represents my views only.

My background is in public policy, with a focus on energy and climate change. I received my doctorate in Public Policy from the Massachusetts Institute of Technology, where I also received a master’s from MIT’s Political Science Department. Previously, I received an MPA in Environmental Science & Policy from the School of International & Public Affairs (SIPA) and the Earth Institute at Columbia University. I am currently an Associate Professor at the University of California Santa Barbara. For more than 15 years, my research has focused on energy policy, particularly clean energy and other related solutions to the climate crisis.

## **The Economic Imperative of Acting on the Climate Crisis through Building Electrification**

For decades, climate scientists have warned that climate change poses a dire threat to our economy. The Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has made it clear that to limit global warming to

1.5°C, we must cut carbon pollution by 45% below 2010 levels by 2030.<sup>1</sup> This decade is therefore crucial to avoiding the worst impacts of climate change on the American economy.

Unmitigated climate change is already costing the US economy billions of dollars each year. In 2020, the US experienced a record 22 separate “billion-dollar” weather and climate events, generating almost half a trillion in US economic damages.<sup>2</sup> Scientists have shown how these disasters - from wildfires to hurricanes to flooding events - are made stronger and more frequent by climate change.<sup>3</sup>

To address the climate crisis, and limit warming to 1.5 °C, scientists have also found that no new fossil fuel infrastructure can be built. Existing fossil fuel assets already endanger this target.<sup>4</sup> Hence, installing any new fossil fuel infrastructure at this point is a poor economic decision: Either these assets will be in use for decades, leading to greater warming and associated economic damages; or these assets will need to be retired before they are fully depreciated. Both of these outcomes are suboptimal economically. Hence, at all scales — from gas furnaces, to cars, to gas power plants and fossil fuel pipelines — we need to stop building new fossil fuel infrastructure.

This includes new and existing infrastructure in the US buildings sector such as gas hot water heaters, gas stoves, gas clothes dryers, and gas furnaces. Emissions from direct combustion of these fossil fuels in buildings account for 12 percent of US carbon pollution.<sup>5</sup> Unfortunately, carbon pollution from the building sector has been growing, rather than decreasing, over the past decade: since 2010, carbon pollution from buildings has risen 5%. This only increases the urgency of cleaning up our building sector.

Thankfully, we have the solutions we need to begin cutting carbon pollution from buildings. We can use clean electricity to power our buildings, rather than relying on onsite combustion of fossil fuels. Electrification is a powerful economic pathway that can

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<sup>1</sup> Intergovernmental Panel on Climate Change. 2018. [Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C.](#)

<sup>2</sup> National Oceanic and Atmospheric Administration, National Centers for Environmental Information. [“Billion-Dollar Weather and Climate Disasters: Time Series.”](#)

<sup>3</sup> US Global Change Research Program. 2018. [Fourth National Climate Assessment. Volume II: Impacts, Risks, and Adaptation in the United States.](#)

<sup>4</sup> Tong et al. 2019. [“Committed emissions from existing energy infrastructure jeopardize 1.5 °C climate target.”](#) *Nature.*

<sup>5</sup> U.S. Energy-Related Carbon Dioxide Emissions, 2019, See: <https://www.eia.gov/environment/emissions/carbon/>

solve these challenges while also generating economic growth, reducing health impacts, and protecting Americans from deadly climate change-linked disasters. As the grid continues to become cleaner over the coming decade, it will prove the catalyst for economy-wide decarbonization. Clean electricity combined with electrification of buildings, transportation and around half of heavy industry can cut carbon pollution 75% below current levels. Further, we know what policies are necessary to accelerate this electrification process, delivering economic benefits and climate stability at the same time.

## **The Economic Benefits of Building Electrification**

Building electrification is an economic win-win: it will create jobs while advancing income equality and racial equity.

First, building electrification will create millions of jobs in the United States. From the manufacturing of space and water heaters, kitchen ranges and dryers, to their installation by electricians and plumbers, an aggressive commitment to building electrification would create 1.1 million new direct and indirect jobs over the next ten years.<sup>6</sup> Investing in building electrification here at home will also ensure that the United States remains an innovator within a growing global market.

Second, building electrification is crucial to reducing inequality in America and reducing healthcare costs from indoor air pollution. People of color are exposed to higher-than-average levels of air pollution, with residential gas combustion and commercial cooking among the largest sources of these disparities.<sup>7</sup> Indoor gas pollution in low-income households is compounded by typically smaller housing unit sizes, more family members living and cooking under the same roof, poor air ventilation, and the use of stoves or ovens for additional heating in winter.<sup>8</sup> Perhaps most troubling, children living in a home where gas is used for cooking have a 42% increased risk of having asthma, currently and over their lifetimes, according to a meta-analysis of 41 studies.<sup>9</sup>

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<sup>6</sup> Center for American Progress and Rewiring America, 2021. [To Decarbonize Households, America Needs Incentives for Electric Appliances.](#)

<sup>7</sup> Tessum et al. 2021. "[PM2.5 pollutants disproportionately and systemically affect people of color in the United States.](#)" *Science Advances.*

<sup>8</sup> Sivarajan, D. 2020. "[Pollution is coming... from inside the house.](#)" *Climate Solutions.*

<sup>9</sup> Lin et al. 2013. "[Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children.](#)" *International Journal of Epidemiology.*

At the same time, energy burden — the amount of a household’s income spent on utility bills — in communities of color can be as much as three times higher than average households in these same communities, a difference that is linked in part to lower energy efficiency.<sup>10</sup>

Building electrification represents a significant opportunity to cut energy bills for American households, and reduce this income and racial inequality. According to modeling by Rewiring America, more than 103 million households (85%) could save money on energy bills by installing a modern electric appliance, saving roughly \$360 per year on average.<sup>11</sup> Forty-five million of these households are low-to-moderate income, for which energy bills represent a significant portion of household spending. Overall, the average US household could save \$2500 if an appropriate policy mix is put in place to support electrification, with some households saving as much as \$4000.<sup>12</sup>

## **Federal Investments and Policy to Support Building Electrification**

To accelerate building electrification, Congress should make key investments. The primary goal of federal policy should be to make zero-emission appliances the default purchase for all Americans.

Key investments include federal support for zero-emission appliances and whole home retrofits, which can speed up the deployment of heat pumps while increasing energy efficiency. Zero-emission appliance rebates are particularly important for making clean appliances accessible to low income Americans, who otherwise may not be able to afford crucial upgrades. These policies will help catalyze a market for clean, efficient appliances, which as deployment grows, will lead to lower costs through learning-by-doing. They will also help avoid locking in carbon pollution, as appliances installed today may still be operating 20 years from now, in the 2040s.

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<sup>10</sup> American Council for an Energy-Efficient Economy. 2016. [Lifting the High Energy Burden in America’s Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities](#).

<sup>11</sup> Rewiring America. 2021. [Bringing Infrastructure Home: A 50-State Report on US Home Electrification](#).

<sup>12</sup> Rewiring America. 2021. [Household Savings Report](#).

Additional federal dollars should also flow to the Weatherization Assistance Program (WAP) to ensure low income Americans can also enjoy a safer, healthier home environment free of indoor air pollutants and other health concerns. WAP also deploys proven weatherization measures that help households reduce their heating and cooling needs while bolstering the home infrastructure necessary to electrify. All told, WAP can help reduce low-income households' energy bills and make sure they are not left behind in the energy transition.

The federal government should also invest to help catalyze the domestic manufacturing of zero-emissions appliances. This could involve paying manufacturers for every appliance they manufacture, with additional support for those made with unionized labor. Furthermore, federal incentives should encourage distributors to carry these appliances and contractors to offer them to customers. Every part of the industry needs to be engaged to unlock key barriers to market adoption.

Tax credits are another important tool that Congress can use to accelerate adoption of zero-emissions appliances, particularly for higher-income Americans. Overall, these federal investments will be multiplied through additional economic activity and job creation.

In addition, clean electricity investments are complementary to building electrification investments. Legislation introduced in the House of Representatives focuses on investing in growing clean electricity through both tax credits for power producers and grants for utilities that increase their share of clean power. These efforts will help building electrification deliver even greater benefits over time. Notably, given the electricity mix we currently have, residential building electrification would reduce 180 million metric tons of carbon emissions today; this figure more than doubles on a 100% clean grid.<sup>13</sup>

Federal investments can also help amplify state and local leadership on building electrification. Already, more than fifty cities have adopted building codes that aim to reduce fossil gas. For example, numerous cities in California have adopted building code policies that limit or prohibit gas in new buildings.<sup>14</sup> Lawmakers in New York City have introduced a bill to ban gas in new and significantly renovated

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<sup>13</sup> Zurofsky et al. "[Rewiring Communities](#)."

<sup>14</sup> Sierra Club. 2021. "[California's Cities Lead the Way to a Gas-Free Future](#)."

buildings.<sup>15</sup> In line with the state’s climate emissions reductions goals, Colorado plans for 90 percent of its buildings’ water and space heating needs to be met by electricity in 2050.<sup>16</sup> Massachusetts has committed to electrifying 1 million of 2.5 million homes — 40% of the state’s total homes — by 2030.<sup>17</sup> In 2020, Maine set a target to have high-performance heat pumps installed in 245,000 homes (totalling 48% of the housing stock) by 2030--demonstrating the promise of electrified home heating systems, even in colder climates.<sup>18</sup>

In sum, we have the policy and technology solutions at the ready--today. It is a matter of deployment and market adoption. It is a matter of levelizing the costs of the technology as the market catches up to the enormous demand needed to meet the climate crisis. It is a matter of smart policy solutions that support the market -- and in doing so, create economic opportunity for households to save money, invest in their communities, and create jobs.

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<sup>15</sup> New York City Council. 2021. [Int. No. 2317](#).

<sup>16</sup> Colorado Energy Office. 2021. [“Greenhouse Gas Pollution Reduction Roadmap”](#)

<sup>17</sup> Massachusetts. 2021. [Clean Energy and Climate Plan for 2030](#).

<sup>18</sup> Maine Climate Council. 2020. [Maine Won’t Wait: A Four-Year Plan for Climate Action](#).