



AT-A-GLANCE

Reducing Greenhouse Gases in Buildings for Climate, Health, and Well-Being

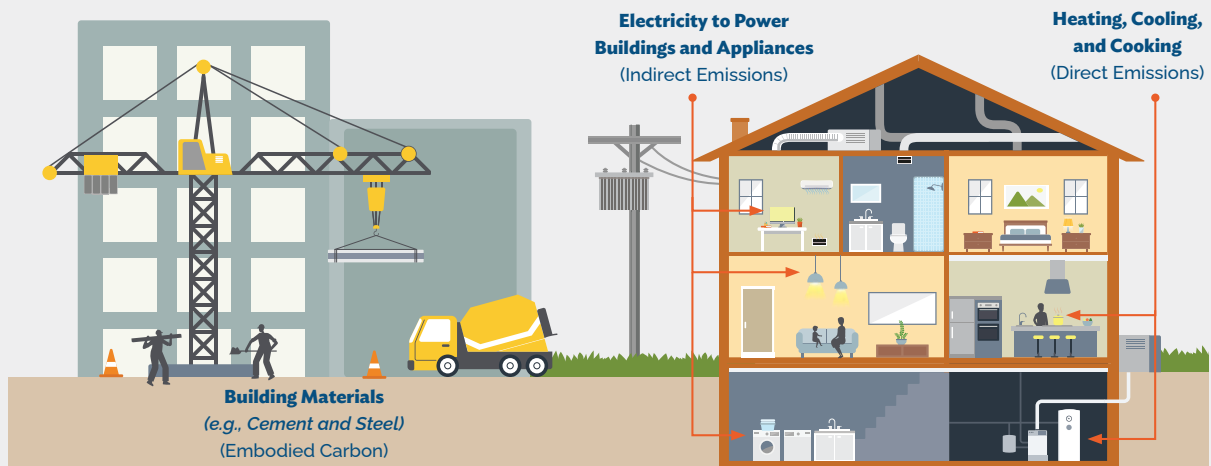
AN INTRODUCTION FOR PHILANTHROPISTS

Buildings — from glassy structures in Singapore to adobe huts in Johannesburg — surround us and are integral to health, quality of life, and livelihoods. This comes at a cost to the climate: Buildings account for a significant share of global greenhouse gas emissions. With an explosion of building stock forecasted over the next three decades — the equivalent of a Paris being built around the world every week¹ — emissions will rise without immediate action. The path to decarbonization begins with scalable interventions that will reduce emissions from the buildings sector while addressing equity, promoting public health, and creating the resilient built environment of our future. Philanthropy is poised to bend the curve on the sector's environmental footprint through proven strategies in policy advocacy, awareness raising, and market development.

THE OPPORTUNITY

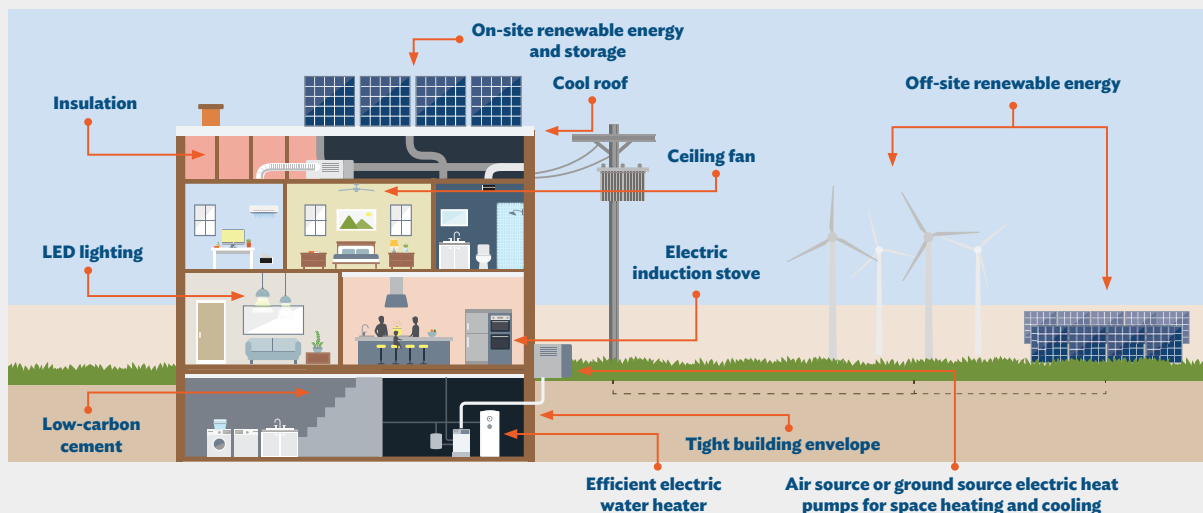
Buildings are a major contributor to climate change, and dealing with the challenges they pose requires a holistic approach that systematically addresses the multiple sources of harmful emissions related to buildings and associated processes — for both new construction and existing buildings. Fortunately, many of the solutions to decarbonize buildings are well known, and can be scaled up with the right policy and stakeholder support. Buildings emissions can be broken into three main categories: direct emissions, indirect emissions, and embodied carbon, which together account for approximately 27 percent of global emissions.

How Buildings Contribute to Climate Change

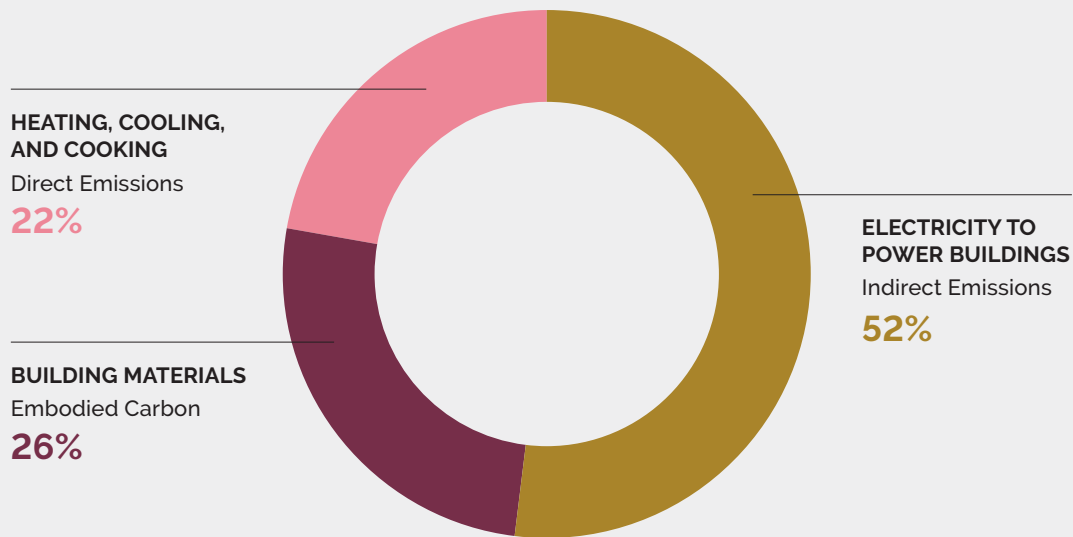


Characteristics of a Fully Decarbonized Building

- Highly energy efficient
- Constructed with low-carbon materials
- Free of direct fossil fuel use
- Powered by clean energy



Sources of Buildings Greenhouse Gas Emissions²



Source: Project Drawdown, United Nations Environment Programme (2020)



HEATING, COOLING, AND COOKING

Direct emissions (~6 percent of global emissions) are greenhouse gases released within buildings from the burning of fossil gas for space heating, water heating, and cooking, and the leakage of highly potent hydrofluorocarbons (HFCs) used in air conditioners and refrigerators. Technologies and building practices to eliminate direct emissions are already available, and with supportive policies, can be scaled. Reducing direct emissions has the potential to eliminate **17.5–33.4 billion tonnes** of carbon dioxide equivalent between 2020 and 2050.³



ELECTRICITY TO POWER BUILDINGS

Indirect emissions (~14 percent of global emissions) are attributable to the production of electricity to power buildings for air conditioning, lighting, refrigeration, and other appliances. While they are very real emissions in the everyday operations of a building, we call them “indirect” because they result from generating the power needed to run buildings (vs. those emissions created within the building).⁴ Renewable energy technologies are mature but need greater scale, and battery storage is a newer technology with growing deployment. Reducing indirect emissions has the potential to eliminate **36.9–70.6 billion tonnes** of carbon dioxide equivalent between 2020 and 2050.



BUILDING MATERIALS

Embodied carbon (7 percent of global emissions) are the emissions from the manufacturing, transportation, and use of all construction materials used to make buildings and homes — primarily cement and steel.⁵ These emissions are significant, and this area requires additional innovation and research to achieve the substantive reductions that are needed. Reducing embodied carbon has the potential to eliminate **19.4–37.2 billion tonnes** of carbon dioxide equivalent between 2020 and 2050.

Historically, the buildings sector has been underfunded from a climate philanthropy perspective and is ripe for attention and investment. Many solutions aimed at decarbonizing buildings and promoting zero-carbon structures (highly energy-efficient buildings that produce on-site or procure enough carbon-free renewable energy to power operations) already exist. The necessary next step is securing philanthropic funding at scale that can generate political will for policies that spur markets to expand climate solutions that also offer a host of additional benefits such as new jobs, improved health and safety, and an equitable and just transition away from fossil fuels.

Philanthropy Spurs Progress in Building Decarbonization



Philanthropic support has led to consequential wins in building decarbonization. The **European Union** has launched a “Renovation Wave” strategy to retrofit 35 million buildings to improve their energy performance, aided in part by a philanthropy-funded advocacy effort that elevated the importance of addressing emissions of existing buildings and alleviating energy burdens of vulnerable populations. The strategy has an equity focus that targets the 34 million Europeans who live in energy poverty and cannot afford to heat their homes.

Philanthropy also funded organizations who provided technical assistance that led to **India** adopting a National Cooling Action Plan to bring equitable, climate-friendly cooling to tens of millions of people. This is the first national plan to address increased cooling needs while working to reduce demand for air conditioning.

In the **United States**, two states and six jurisdictions have adopted building performance standards—ambitious policies that require buildings to meet carbon or energy performance targets by specific deadlines. Philanthropic support enabled climate organizations and community groups to advocate at the state and local levels for these cutting-edge policies and provide the technical support needed for implementation. In addition, the White House recently launched the National Building Performance Standards Coalition, a first-of-its-kind partnership between 33 state and local governments dedicated to delivering cleaner, healthier, and more affordable buildings, and philanthropic partnership is being sought to replicate and scale the impact of building performance standards.

HOW CHANGE HAPPENS: PHILANTHROPIC STRATEGIES

Decarbonizing buildings requires a broad suite of actors including national and local governments, financial institutions, international organizations, real estate developers, contractors, architects, building owners, tenants, and non-profit groups. Within this ecosystem, philanthropy plays an essential role in the transition to a fully decarbonized building sector by pursuing a diversity of strategies. While emissions sources in the buildings sector sit squarely in the three different buckets of direct, indirect, and embodied carbon, the solutions often do not. Widespread building decarbonization requires philanthropy to focus on solutions within these categories while pushing for cross-cutting policies and regulations for new and existing buildings.

Philanthropy can begin scaling the required technologies, policies, and regulations by raising awareness of the importance of reduced building emissions and to the clean energy transition away from fossil fuels. Philanthropy can enable advocacy, coalition building and convening that ensure broad support for policies, and strategic communications that elevate the benefits of energy-efficient, all-electric, low-carbon buildings to decision makers and local communities. There are many strong regional and global players in this space, as well as local stakeholders who are responsible for much of the important work of implementation and accountability, and who are critical to achieving the goals outlined here.

Centering Equity and Community in Buildings Strategies



Buildings are where we live, work, and play. Most people in the United States and Europe spend more time indoors than some species of whales spend underwater. Addressing the buildings sector must go beyond reductions in greenhouse gases. Otherwise, we risk creating policies and programs that do not truly account for how people use buildings and how policies affect their lives and potentially cause harm. In addition, communities of color and low-income populations are the most heavily impacted by dangerous, unhealthy, and inefficient buildings. We need to be watchful that creating more energy-efficient and net-zero buildings does not, for example, inadvertently lead to gentrification and rising rents that can force out and place greater burden on already-stressed low-income communities.

To avoid this, we must ensure that in addition to supporting ambitious buildings policies addressing greenhouse gases, philanthropy funds technical assistance, advocacy, and other needs to expand low-carbon affordable housing and develop community-driven solutions to gentrification. In this way, buildings offer an entry point for philanthropists interested in intersectional issues like housing, poverty, public health, resilience, and economic development, all of which are connected to buildings. When we center equity and community needs in our strategies, we can develop more holistic and durable solutions that lead to better outcomes for people, communities, and our planet.

Philanthropic Partners

The primary philanthropic actors in the building decarbonization space include:

- Breakthrough Energy
- Bloomberg Philanthropies
- ClimateWorks Foundation
- Climate Imperative Foundation
- Energy Foundation
- European Climate Foundation
- Heising-Simons Foundation
- IKEA Foundation
- Laudes Foundation
- Sea Change Foundation
- Tilia Fund

Other notable multilateral and international organizations working in this space include:

- Global Alliance for Buildings and Construction
- International Energy Agency
- Programme for Energy Efficiency in Buildings
- Sustainable Energy for All



This overview of philanthropy's role in transforming the buildings sector is based on a full landscape analysis conducted by Climate Lead. It reflects input from peer funders, experts, and field partners with decades of collective experience on this issue.

STRATEGIC PATHS

POTENTIAL IMPACT

**PHILANTHROPIC ACTIVITIES,
EXAMPLES OF POTENTIAL SOLUTIONS**

Ensure New Buildings are Low-Carbon

Develop ambitious codes and decarbonize building materials



- Co-Benefits:
- Improve air quality, which will have a positive impact on health.
 - Create new jobs and cleaner industries that support long-term economic growth.

Support the development and enforcement of building energy codes

Advocate for mandatory energy codes in new buildings, strengthen existing codes, and adapt for climate resilience. Philanthropy can fund the development of these codes, encourage their adoption and enforcement, build capacity for implementation, and ensure that the transition to low-carbon buildings centers equity.

[New Buildings Institute \(NBI\) ▶](#)

[Building Decarbonization Coalition ▶](#)

Decarbonize materials used to construct buildings

Cultivate a market for low-carbon building materials and build capacity and awareness for low-carbon building materials.

[BlueGreen Alliance ▶](#)

[ClimateWorks Foundation Industry Program ▶](#)

[Architecture 2030 ▶](#)

Retrofit Existing Buildings

Enact performance standards and stimulate demand for highly efficient, decarbonized homes and commercial buildings.



- Co-Benefits:
- Reduce the financial burden of energy bills, particularly for frontline communities.
 - Improve air quality.
 - Improve comfort.

Catalyze renovations at scale

Speed the rate of retrofits by supporting building performance standards (BPS), policies that require building owners to meet performance targets by actively improving their buildings over time, weatherize homes, and encourage passive cooling and nature-based solutions. Philanthropy can enable local, regional, and national groups to catalyze retrofits at scale. In addition, funding local environmental justice and housing advocates will help create policy solutions that are adapted to local climates and political environments.

[Institute for Market Transformation ▶](#)

Stimulate demand for highly efficient, decarbonized homes

Philanthropy can help generate demand for highly efficient, decarbonized home retrofits by supporting the expansion of creative financing models that lower renovation cost barriers. It can also support increased transparency in the marketplace and education on the benefits of building decarbonization.

[Energiesprong ▶](#)

STRATEGIC PATHS

Change How We Heat, Cool, and Cook in Buildings

Transition from gas to efficient electric heating technologies and eliminate super-polluting refrigerants.



POTENTIAL IMPACT

Co-Benefits:

- Improve health, prevent deaths attributable to household exposure to dirty stoves and appliances, and reduce the incidence of asthma caused by dangerous gas.
- Enhance equity, particularly in health and economic impacts that disproportionately affect marginalized communities, including the rural poor.

PHILANTHROPIC ACTIVITIES, EXAMPLES OF POTENTIAL SOLUTIONS

Phase out high global warming potential (GWP) refrigerants

The Kigali Amendment to the Montreal Protocol has initiated a global phasedown of hydrofluorocarbons (HFCs), potent greenhouse gases widely used in cooling. Philanthropic investment can help accelerate this phasedown by developing ways to finance the transition to low-GWP cooling technologies, advocate for policies that exceed the minimum requirements of Kigali, fund technical assistance, and promote the inclusion of a standard for HFCs for appliances.

[Natural Resources Defense Council \(NRDC\) ▶](#)

[Clean Cooling Collaborative ▶](#)

Get gas out of buildings

Eliminate the need for gas infrastructure by electrifying systems and fossil fuel appliances such as water heaters, furnaces, and stoves. Increased philanthropic support is needed to push back on the fossil fuel industry's fight against electrification, promote building electrification (including elevating the health and climate costs of burning gas in and around buildings), and pressure regulators and policy makers to eliminate such pollution.

[The Greenlining Institute ▶](#)

[Rewiring America ▶](#)

Make and encourage high-efficiency appliances

Secure and enhance ambition of minimum energy performance standards (MEPS) or "appliance standards" that dictate the performance requirements of an appliance, such as an air conditioning unit or a washing machine.

[Collaborative Labeling and Appliance Standards Program \(CLASP\) ▶](#)

[Appliance Standards Awareness Project ▶](#)

STRATEGIC PATHS

POTENTIAL IMPACT

PHILANTHROPIC ACTIVITIES, EXAMPLES OF POTENTIAL SOLUTIONS

Clean Up How We Power Buildings

Decarbonize and increase flexibility of the electricity system that powers buildings.



- Co-Benefits:
- Improve air quality and health.
 - Generate financial savings.

Decarbonize the electricity system

Accelerate the transition of the power sector toward clean and renewable energy resources. Philanthropy can continue to support a number of regulatory, policy reforms, and legal strategies that promote the transition away from gas, grow renewable resources, rate designs that encourage rooftop solar and energy smart energy use, and increase utility funding for energy efficiency and electrification incentive programs.

[Many solutions exist; contact Climate Lead to learn more](#) ▶

Enable demand flexibility

Deploy "demand-side management" to shift energy demand throughout the day and balance demand to maximize use of clean energy resources like wind and solar while minimizing use of dirtier fossil-fueled power plants. Philanthropy can continue to support organizations working to overcome institutional and market barriers to effectively deploy demand response resources and scale adoption of appliances with smart grid-connected controls.

[Regulatory Assistance Project](#) ▶

Invest in Tailored Solutions for Developing Markets

Developing markets offer many opportunities as building floor area increases and emissions are set to follow.



- Co-Benefits:
- Grow local capacity to address buildings in key geographies.

Include building decarbonization in national long-term climate plans

Fund organizations providing technical assistance to governments developing plans to achieve climate commitments.

[World Resources Institute \(WRI\) Zero Carbon Building Accelerator](#) ▶

Build and scale in-country capacity on building decarbonization

Support local efforts in regions like China, India, and Southeast Asia to rapidly scale buildings solutions through regional regrants, in-country capacity, and technical assistance.

[Energy Foundation China](#) ▶

[Council on Energy, Environment, and Water \(India\)](#) ▶

[Alliance for an Energy Efficiency Economy \(India\)](#) ▶

[Tara \(Southeast Asia\)](#) ▶

[Global Buildings Performance Network \(Indonesia\)](#) ▶

SELECTED READING RECOMMENDATIONS

General/Foundational

2021 Global Status Report for Buildings and Construction: Executive Summary ►
Website ►

Direct Emissions

News Article: Stanford scientists find the climate and health impacts of natural gas stoves are greater than previously thought ►

Indirect Emissions

Better Design for Cool Buildings: How Improved Building Design Can Reduce the Massive Need for Space Cooling in Hot Climates ►

Embodied Carbon

Reducing Embodied Carbon in Buildings ►

NOTES

¹ Brian Bienkowski, "We're Building the Equivalent of Paris Every Week. That's a Problem.," *The Daily Climate* (blog), December 11, 2017, <https://www.dailyclimate.org/building-industry-climate-change-carbon-footprint-2516418302/why-it-matters>.

² Project Drawdown and 2020 Global Status Report for Buildings and Construction: Towards a Zero-emission, Efficient and Resilient Buildings and Construction Sector, United Nations Environment Programme (2020).

³ Mitigation estimates by category are estimated by dividing the total Project Drawdown mitigation potential for the building sector of 73.7–141.2 billion tonnes of carbon dioxide (2020–2050) by the relative contribution to global emissions. Note: A "tonne" is equal to 1,000 kg, and in the U.S. may be referred to as a "metric ton."

⁴ In CLI's *Climate Philanthropy: A Guide for Action*, the emissions noted here are represented in the "Electricity Production" sector.

⁵ In CLI's *Climate Philanthropy: A Guide for Action*, the emissions noted here are represented in the "Industry" sector.



ABOUT CLIMATE LEAD

Climate Lead empowers philanthropic leaders everywhere to take immediate and far-reaching climate action. By serving as an impartial and trusted guide, Climate Lead equips new climate philanthropists with the information and insights they need to drive transformative solutions. We cut through the complexity by curating roadmaps, in partnership with a diverse network of experts, to help philanthropists make a bold impact on climate from day one.

Because Climate Lead is fully funded by leading philanthropies, we offer our services free of charge, prioritizing donors' interests and climate impact above all.

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