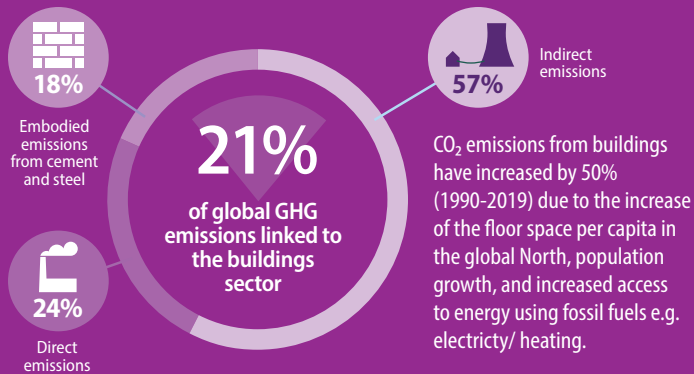


Limiting Global Warming: Buildings

► Action in 2020-2030 is critical to fully capture the mitigation potential of existing and new buildings. In developing countries, the largest potential is in new buildings, while in developed countries the highest potential is within the retrofit of existing buildings.

EMISSIONS SHARE



Approaching net zero emissions in 2050 can be achieved through ambitious policy packages e.g. urban planning, efficient design and use of space, energy, materials, and appliances, and incorporating use of renewables.

61% from demand side measures

29% from the decarbonisation of electricity, heat and cold produced offsite

By 2050, the 61% of demand-side mitigation potential includes:

10% from **Sufficiency interventions**. (Sufficiency policies are a set of measures and daily practices that avoid demand for energy, materials, land and water while delivering human wellbeing for all within planetary boundaries)

42% from **energy efficiency** interventions

9% from **renewable energy** building-integrated renewable energy interventions

WHAT CAN BE DONE

Design stage: → Construction stage: → Use stage: → Disposal stage:

Urban planning that allows for bioclimatic design.

Repurposing unused existing buildings to avoid using emission-intensive materials and additional land.

Employing highly efficient building envelope (e.g. walls, floors, roofing, doors)

Using low-emission construction materials

Energy supply from low-emission energy sources

Considering the building's form and multi-functionality to allow for the evolving needs of their users

Integrating renewable energy, such as solar photovoltaics, small wind turbines, solar thermal collectors, and biomass boilers.

Highly efficient appliances/equipment



Optimising how the building is used e.g. using daylight instead of artificial light

Recycling and re-using construction materials



Building energy codes (e.g. for insulation) are especially effective if compulsory and combined with other regulatory instruments such as minimum energy performance standards for appliances and equipment.

Limiting the **use of land**, property taxes to limit urban sprawl, and prioritising multi-family buildings over single-family homes.

Reduce demand for cooling, heating, ventilation, and artificial lighting through sufficiency measures such as bioclimatic design (considering the expected future climate), nature based solutions (e.g. green roofs), and white walls.



ENABLERS



Building technical and institutional capacity, developing skills, setting appropriate governance structures, and ensuring the flow of finance can help achieve mitigation potential.

BARRIERS



Global investment in the decarbonisation of buildings was estimated at USD164 billion in 2020, which is not enough to close the investment gap. Between 2026-2030 annual investment needs are estimated at USD711 billion.

Increasing size of dwellings despite smaller households, especially in developed countries

Low renovation rates and low ambition for renovation work in developed countries

Reliance on fossil fuels for electricity and heating



Increase in use and size of appliances, especially ICT and cooling, driven by higher incomes.



Inefficiency of new buildings, especially in developing countries



Lack of appropriate governance structures and institutional capacity

CLIMATE IMPACTS AND ADAPTATION

Global warming will lead to changes in temperature and humidity, and sea level rise. This will impact the need for cooling and heating, as well as the performance, durability, and safety of buildings.

Measures to cope with climate change (e.g air conditioning) may increase the demand for energy and materials from buildings leading to an increase in GHG emissions if not mitigated.



Shared cooled spaces with highly efficient cooling solutions can limit the effect of expected heatwaves on people's health.



SUSTAINABLE DEVELOPMENT



Beyond SDG 13, actions in the building sector contribute to meeting fifteen other SDGs. These include health gains through improved indoor air quality and thermal comfort, job creation, reduced poverty (especially energy poverty), and improved energy security.



To read full AR6 Working Group III report, please visit www.ipcc.ch/report/ar6/wg3