

Climate Change: Implications for Buildings

Key Findings from the
Intergovernmental Panel on Climate Change
Fifth Assessment Report

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Climate Change: Key Findings

Climate change impacts are projected to raise **global average surface temperature 2.6–4.8°C** by 2100.

Under business-as-usual projections, **use of energy** in buildings globally could **double or even triple by 2050**.

Drivers include **billions** of people acquiring **adequate housing and access to electricity**.

The buildings sector offers **near-term, highly cost-effective opportunities to curb energy-demand growth rates**, even to reverse them in developed economies.



Reduction potential will require:

- Policies and actions addressing **design, construction, and operation** of buildings
- Changing **user behaviours and attitudes**

Climate Change: Resilience

Options specifically applicable to buildings include **energy efficient technology**:

- High-performance **building envelopes**
- Energy-efficient **appliances, lighting** and **HVAC**
- Evaporative **cooling**
- Solar-powered **desiccant dehumidification**
- Improved building **automation** and **control**
- 'Daylighting' buildings with **adjustable natural light**
- **Smart meters** and **grids**

System or infrastructure efficiency may include:

- Passive building designs
- Individual building retrofits
- Retrofit policies and tighter building codes
- Involvement from Energy Service Companies (ESCOs)



Climate Change: Impacts on Buildings

Buildings have already experienced **a big increase in extreme weather damage in recent decades.**

Buildings face major risks of damage from the projected impacts of climate change.

Impacts and risks include:

- Increased **precipitation**
- Thawing **permafrost**
- **Urban Heat Island** effect
- **Wildfires**
- Stronger **winds and severe storms**
- **Floods**



There is likely to be **significant regional variation** in the intensity and nature of such impacts.



Climate Change: Regional Perspectives (1/2)

Big regional variations exist in **climate change risks** and **capacities to meet them**.

Africa:

- By 2050 **urban population projected to triple**
- **Cities and towns highly vulnerable** to climate change impacts

Europe:

- Likely increase of **heat waves**
- Culturally-valued buildings at risk to **extreme events** and **chronic damage**

Asia:

- Climate change will compound **stress from urbanisation, industrialisation, and economic development**
- **Low-energy mechanical cooling** could reduce pressures to install energy-intensive cooling



Climate Change: Regional Perspectives (2/2)

Oceania:

- For islands, risk drivers include **sea-level rise, tropical cyclones**, rising **air and sea surface temperatures**, and changing **rainfall patterns**
- In Australia, buildings will be affected by **hot extremes, wildfires**, and **flood** risks

North America:

- Costs of adaptation have led some to a **wait-and-see attitude**
- **Leadership in adaptation is more evident municipally** than at other levels of government

Central and South America:

- Central and South American have the **second highest proportion of population in urban areas**
- **High and persistent levels of poverty** translates into high vulnerability to climate change



Building codes and appliance standards, if well designed and implemented, are among **the most environmentally and cost effective** instruments for emission reductions.



Climate Change: **Mitigation**

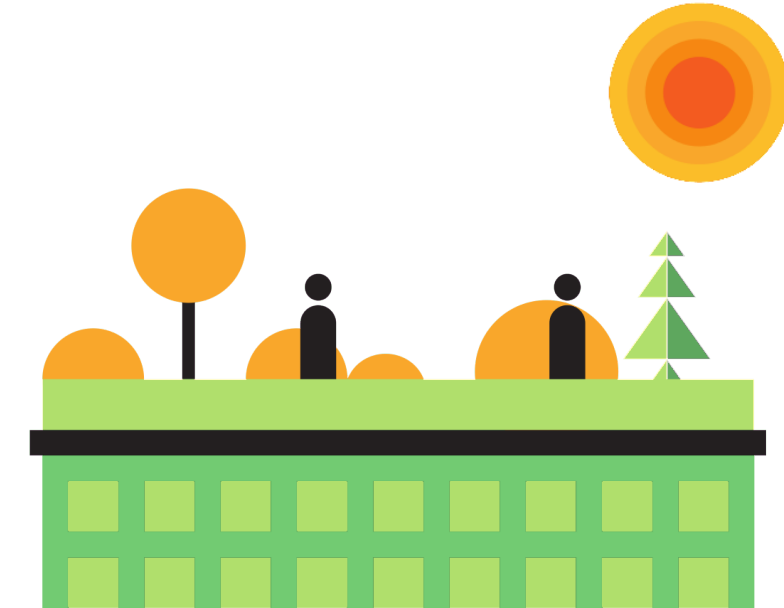
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In 2010, the world's buildings accounted for **32% of global final energy use** and **19% of all greenhouse gas (GHG) emissions**.

Widespread implementation of **best practices and technologies** could see energy use in **buildings stabilise or even fall** by 2050.

Mitigation options offer **multiple co-benefits**:

- Higher **asset values**
- Lower **energy bills**
- More **jobs**
- Improved **energy security**
- Improved **productivity of commercial building occupants**
- Better **living and working conditions** for owners and tenants



Within the buildings sector, both residential and commercial, **early movers towards efficiency** can reap **multiple benefits**.

Climate Change: Energy Use 'Lock-in'

The very long life-cycles of buildings create risks of energy use 'lock-in' with the effects of low ambition today playing out for decades.

Using **state-of-the-art standards** immediately, for both new and retrofit buildings, **would alleviate this hazard.**



'Lock-in'

Today's sluggish ambition conferring a legacy of less than optimal buildings to future generations.



Climate Change: Conclusion

Many barriers exist to greater uptake of energy-saving opportunities:

- Poor market transparency
- Limited access to capital
- Risk aversion

Know-how exists on **retrofitting and how to build very low- and zero-energy buildings**, often at little marginal investment cost.

A broad portfolio of effective policy instruments is available to remove barriers to uptake.





For more information

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