

UNEP Report on Construction Emissions

Why in news?

The new UNEP report “*Building Materials and The Climate: Constructing a New Future*” outlines how developing, developed countries can reduce emissions from constructions.

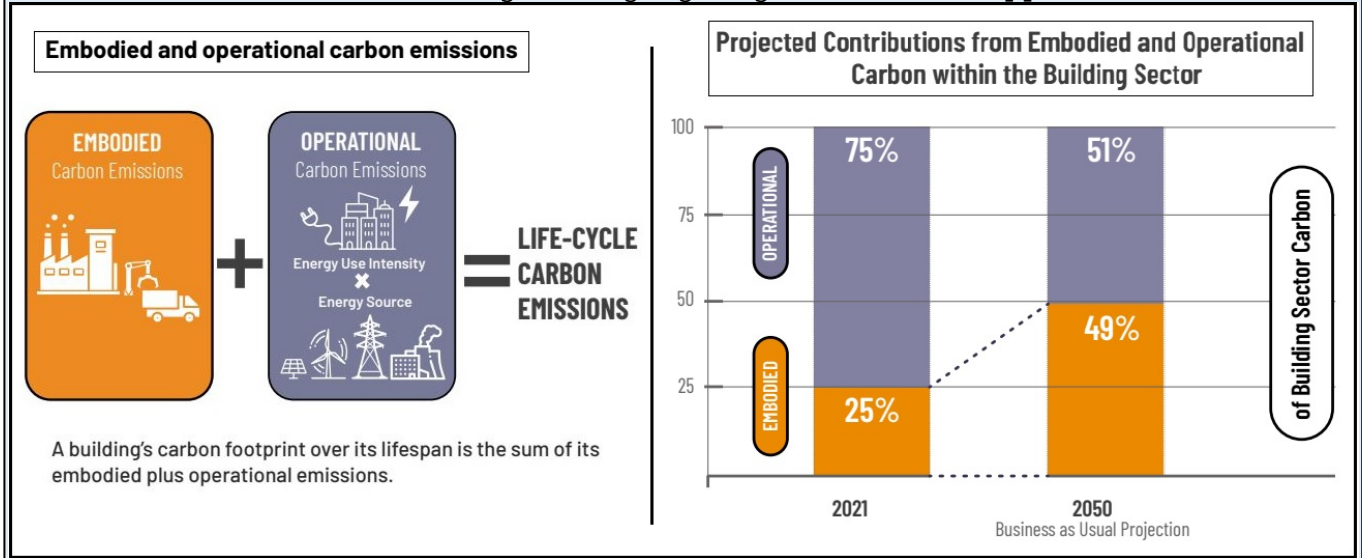
What is the report about?

The buildings and construction sector is by far the largest emitter of greenhouse gases, accounting for a staggering 37% of global emissions.

- **Launch-** The report is launched by UN Environment Program (UNEP) and Yale Centre for ecosystems and architecture.
- It highlighted the pressing need to establish innovative cooperation models to decarbonize building materials.
- These models are critical to achieve the world's ambitious target of net zero emissions from the built environment sector by mid-century.
- The report highlights the overarching strategies which need to be implemented together to decarbonize building materials.
 - **Avoid** unnecessary extraction and production
 - **Shift** to regenerative materials
 - **Improve** decarbonization of conventional materials

Categories of emission

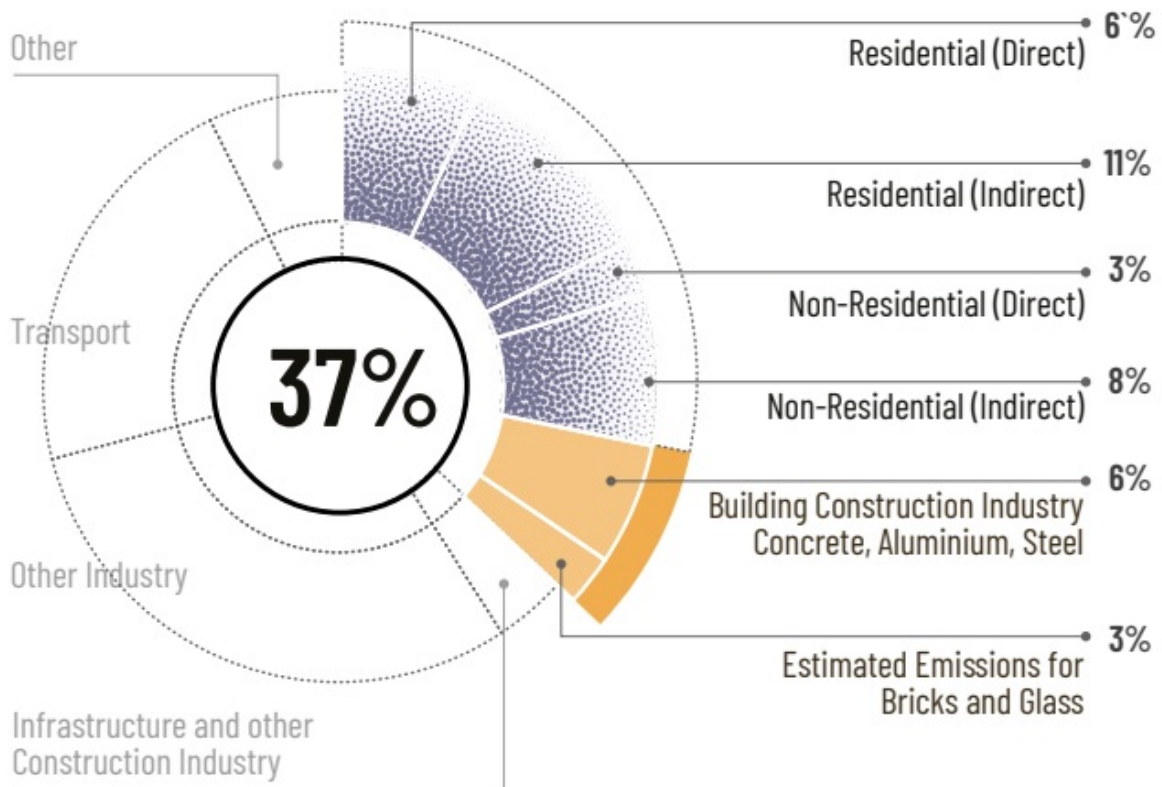
- **Embodied emissions** - Emissions associated with the construction and demolishing of a building.
- It include emissions from extraction, manufacturing, transport and on-site construction of building materials and “end-of-life” demolition or reuse.
- **Operational emissions**- Emissions generated while maintaining the building’s indoor “comfort levels”
- It includes emission from heating, cooling, lighting and electrical appliances.



What are the key highlights of the report?

- **Embodied vs Operational Emissions** - Indirect operational emissions from residential buildings make up a majority of emissions (11%), while embodied emissions from the use of concrete, steel, etc. account for at least 6%.
- The UNEP warns that embodied carbon is projected to surge from 25% to nearly 49% by 2050.
- The share of operational carbon emissions will shrink due to increased adoption of renewable energy and improvement of energy-efficient buildings.
- **Renovated building**- The report highlighted that a renovated building generates 50-75% fewer emissions than new construction.
- **Cement** - Processing of cement, the binding agent in concrete, contributes to 7% of global carbon emissions.

Global share of buildings and construction operational and process CO₂ emissions, 2021



How to reduce the emissions?

- **Circular design** - The experts call for incorporating circular design strategies to reduce GHG emission by 10-50%.
 - Circular design process enables the recovery of products, parts and materials when a building is disassembled or renovated.
- **Recycled materials**- Avoiding raw material extraction by promoting steel reuse and producing steel from scrap (discarded steel or steel product) can save around 60-80% of the energy.
 - If G7 countries and China use recycled materials, they could reduce emission in the material cycle of residential buildings by 80-100% by 2050.
- **Lifetime of buildings**- Increasing the lifetime of buildings creates significant opportunities to reduce aggregate embodied carbon.
- **Bio-based materials**- To reach net zero emissions in the built environment sector, the building materials of the future has to be procured from renewable or reusable sustainable sources.
 - **Mass timber** has emerged as an attractive alternative to concrete and steel due to scalability, sustainability, strength and flexibility in mid-rise urban buildings.
 - **Bamboo** can be processed and manufactured into *engineered bamboo* whose structural performance similar to that of cross-laminated timber and steel.

- **Decarbonise energy**- UNEP recommended electrifying and decarbonising the energy that is supplied to the production and maintenance of materials, buildings and urban infrastructure across their life cycle.
- **Sustainable alternatives**- Solutions such as reducing the clinker (produced from limestone and chalk)-to-cement ratio and increasing the share of cement alternatives, etc. could help in decarbonising the sector.
- **Carbon capture and utilisation (CCU)** - It is a process of removing carbon from the atmosphere and storing it within the building material itself over time.
 - It is estimated that CCU concrete can remove 0.1 to 1.4 gigatonnes of CO₂ by 2050.

References

1. [Down To Earth- UN report on reducing emissions](#)
2. [UNEP- Global ABC Report](#)

