

## 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.

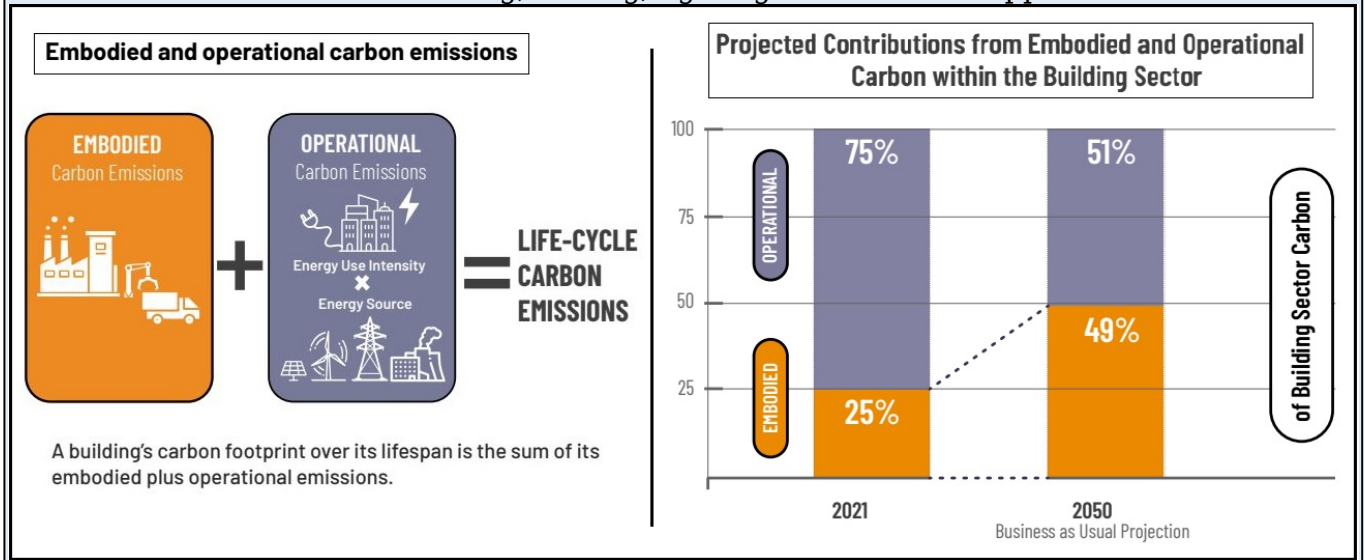
### What is the report about?

*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

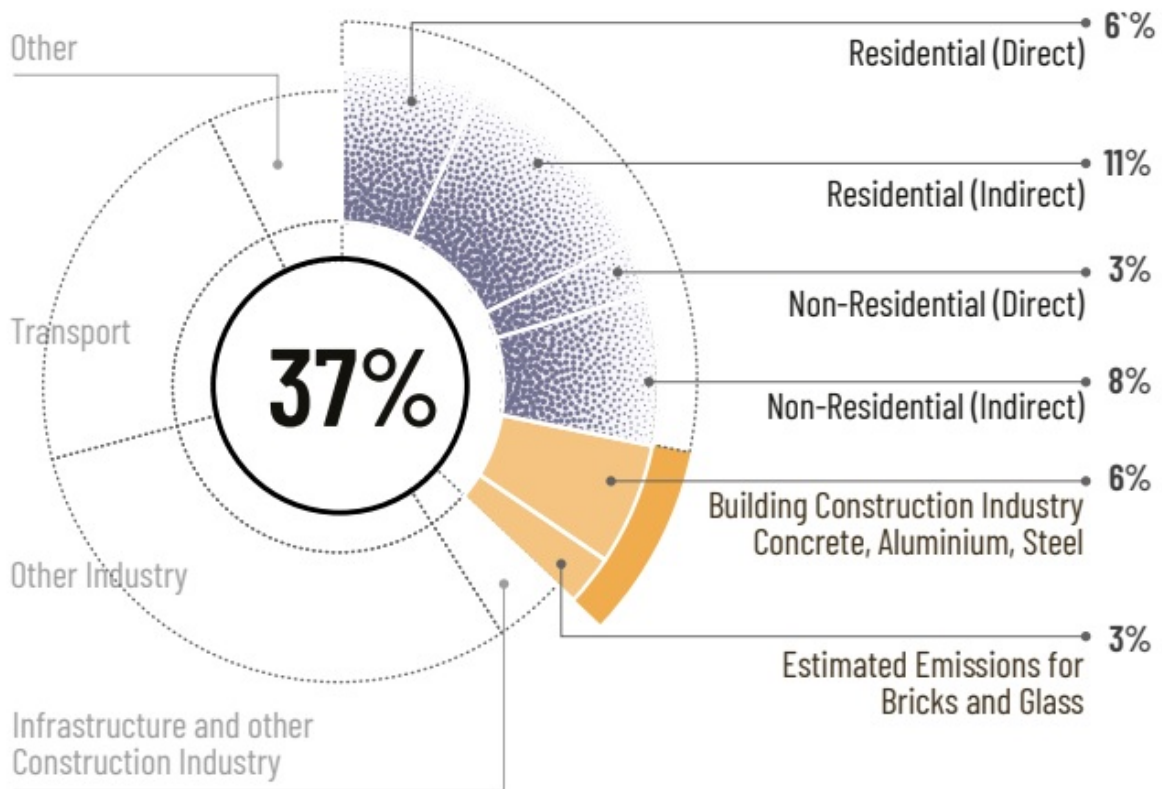
- **Embodied emissions** - Emissions associated with the construction and demolishing of a building.
- It include emissions from extraction, manufacturing, transport and on-site construction of building materials and “end-of-life” demolition or reuse.
- **Operational emissions**- Emissions generated 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 CO<sub>2</sub> 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 CO<sub>2</sub> by 2050.

## References

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

