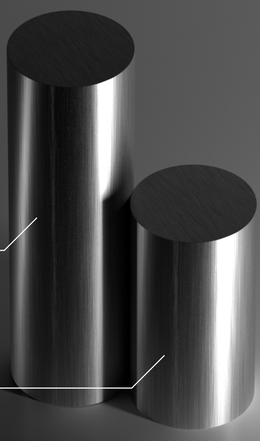
KAWNEER

HOW THE NETZERO BUILDING PLATFORM REDUCES OPERATIONAL AND EMBODIED CARBON

As the climate emergency becomes more pressing, reducing carbon emissions over the entire building life cycle has become mission critical. New buildings must generate fewer carbon emissions in both their construction and ongoing operations.



THE BUILT ENVIRONMENT ACCOUNTS FOR 39% OF TOTAL GLOBAL CARBON EMISSIONS[1]

28%

Operational emissions
Energy used by the building while in use

11%

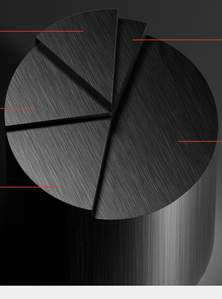
Embodied emissions
Energy used for raw material extraction, manufacturing, and transportation to the construction site

BREAKING DOWN EMISSIONS BY BUILDING COMPONENTS AND SYSTEMS

OPERATIONAL EMISSIONS ARE GENERATED BY[2]

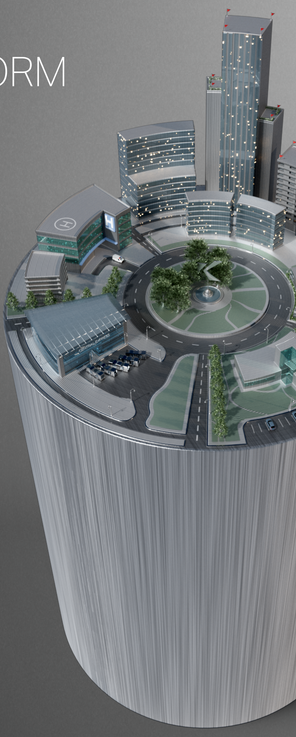
- **36%** Misc electronics
- **35%** Heating, ventilation, and air conditioning
- **11%** Lighting
- **18%** Major appliances

EMBODIED EMISSIONS ARE GENERATED BY[3]



- **15%** Misc electronics
- **4%** Internal finishings
- **16%** Facade
- **48%** Building structure
- **17%** Substructure

THE NET ZERO BUILDING PLATFORM



THE STRUCTURE

OPTIMISATION METHODS

To help reduce the embodied carbon in concrete, you can optimise the mix by incorporating alternative cementitious materials like fly ash, slag, or silica fume, which replace a portion of Portland cement.

Utilising recycled aggregates and industrial by-products as substitutes for traditional aggregates and implementing carbon capture technologies that inject CO2 into concrete, can further lower emissions.

CARBON IMPACT

In standard concrete, the embodied carbon typically ranges from 50 to 150 kg CO2e per tonne1. This value can vary depending on the mix and the methods used in production.

Efforts to reduce embodied carbon in concrete is possible by including using alternative materials with lower carbon footprints, optimising mix designs, and improving manufacturing efficiency.

THE MECHANICAL SYSTEM

OPTIMISATION METHODS

Smaller, long-lasting components and equipment than a HVAC system

Integrated radiant system is 50% more efficient than HVAC

Radiant system, thermal storage, grid flexibility, and ceiling fans significantly reduce electricity loads

CARBON IMPACT

75% less use stage mechanical embodied carbon than a HVAC system

Air-source heat pumps emit 51% less embodied carbon than HVAC outside condensing units

30% less operational carbon than a typical building

OPTIONAL PREFABRICATED ENVELOPE

OPTIMISATION METHODS

Shorter floor-to-floor height and panelised facade

Low U-value insulation and aesthetic design features help optimise thermal performance.

CARBON IMPACT

Energy used for raw material extraction, manufacturing, and transportation to the construction site

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SOURCES
www.worldgbc.org/embodied-carbon
www.energy.gov/sites/prod/files/2017/03/f34/qtr-2015-chapter5.pdf
www.levitbernstein.co.uk/site/assets/files/3494/feb-climate-emergency-design-guide.pdf
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