ENERGY EFFICIENCY IN THE BUILT ENVIRONMENT

Arch. Alexander Daw

BULGARIAN GREEN BUILDING COUNCIL

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SGI.
Architects & Masterplanners

Introduction

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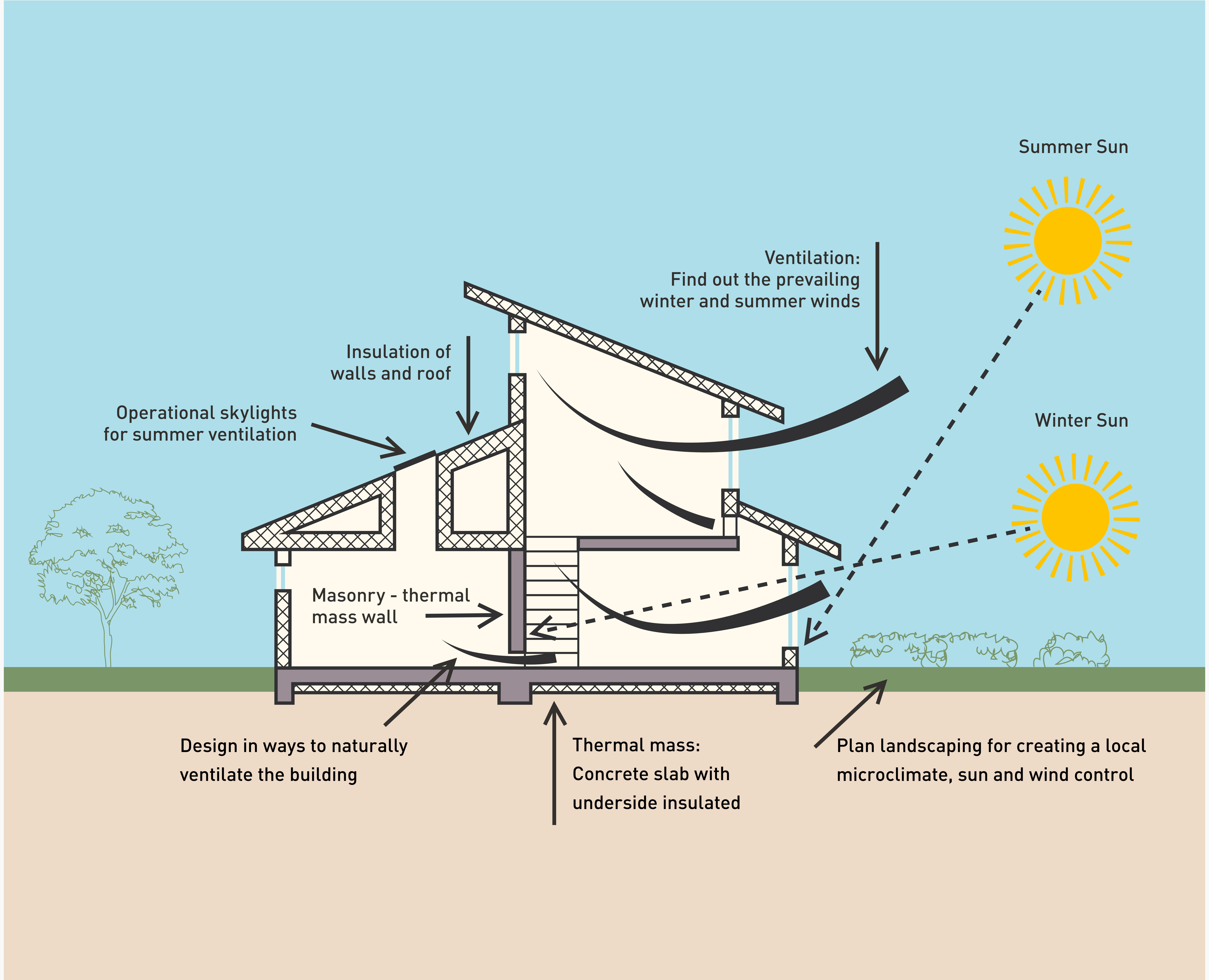
Energy Efficiency & Buildings

1.

Utilise Passive design

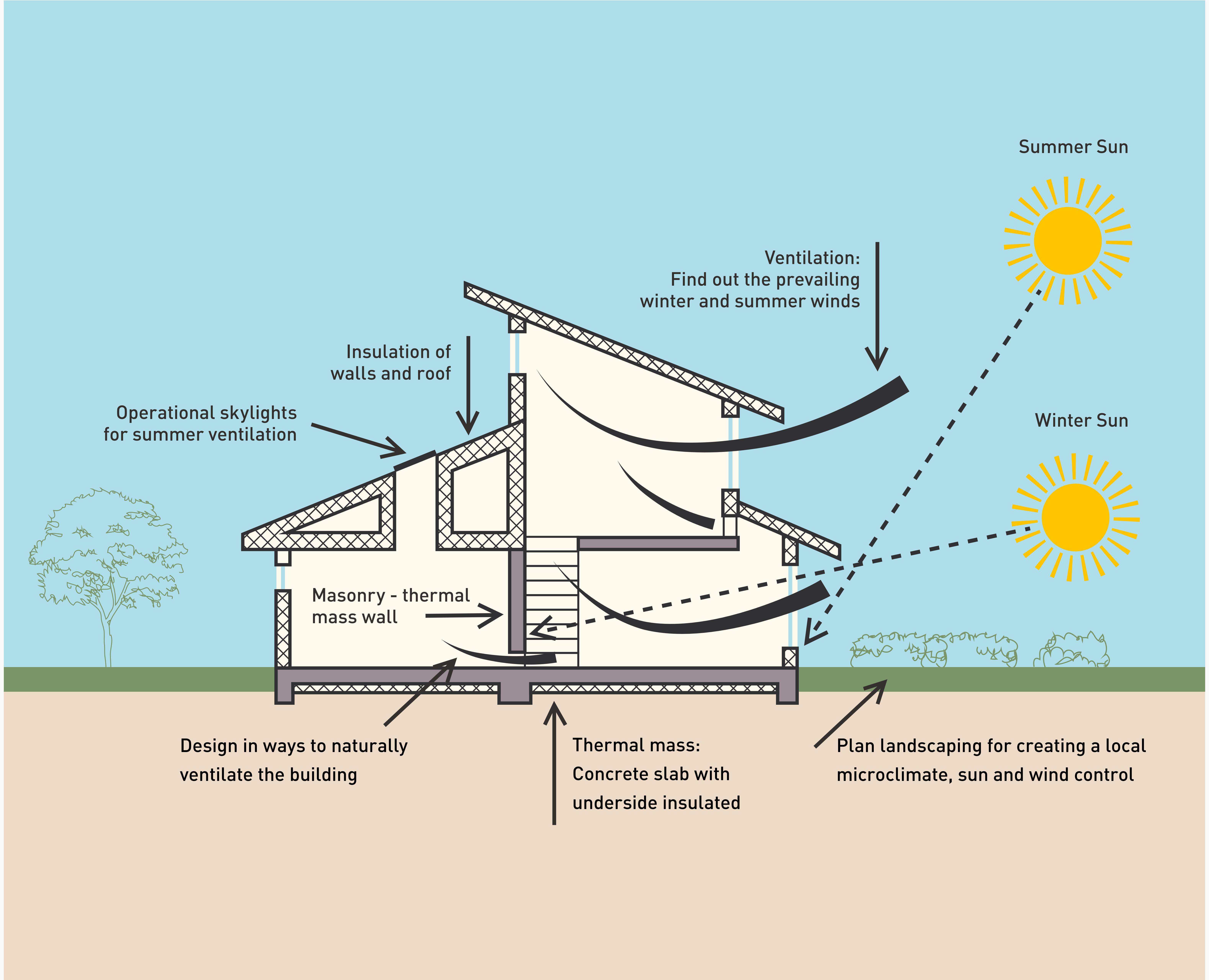
- Optimising the use of natural light
- Optimisation of building orientation to take advantage of passive solar gain
- Utilise thermal massing
- High-performance insulation and windows
- Air tight building envelope
- Natural ventilation strategy utilising the direction of prevailing air movement



2.

Use of efficient systems

- High-efficiency HVAC systems, such as geothermal or ground source heat pumps
- LED lighting systems



3.

Active design

Installing solar panels and wind turbines can help to offset a building's energy consumption and reduce its environmental impact.

4.

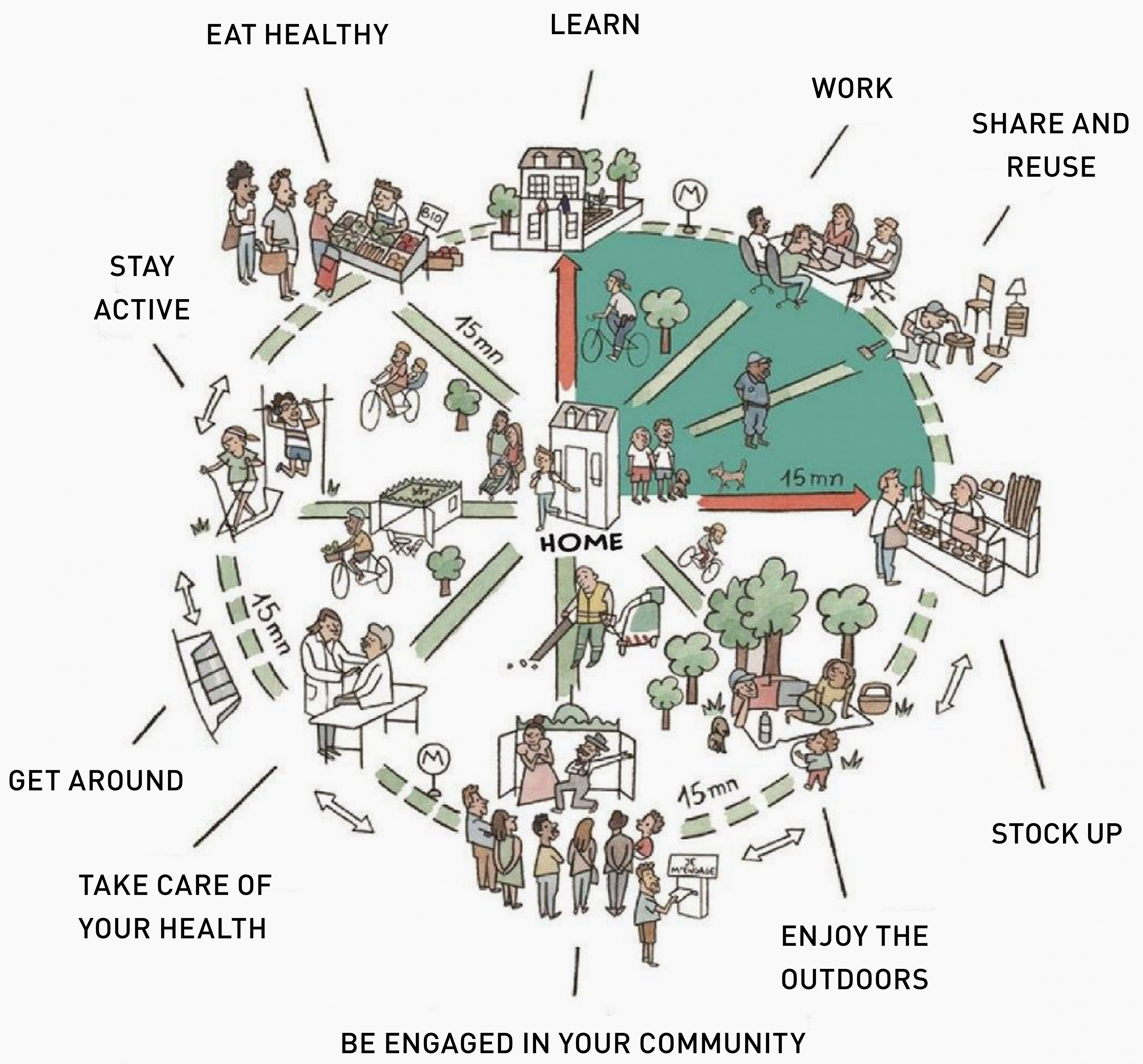
Implement smart technologies

Smart building technologies use sensors and automation to optimize energy use and reduce waste. For example, we can automatically adjust lighting and heating based on occupancy, or detect when a room is empty and turn off unnecessary systems.

Energy Efficiency & The City

Development of 15-minute city concept

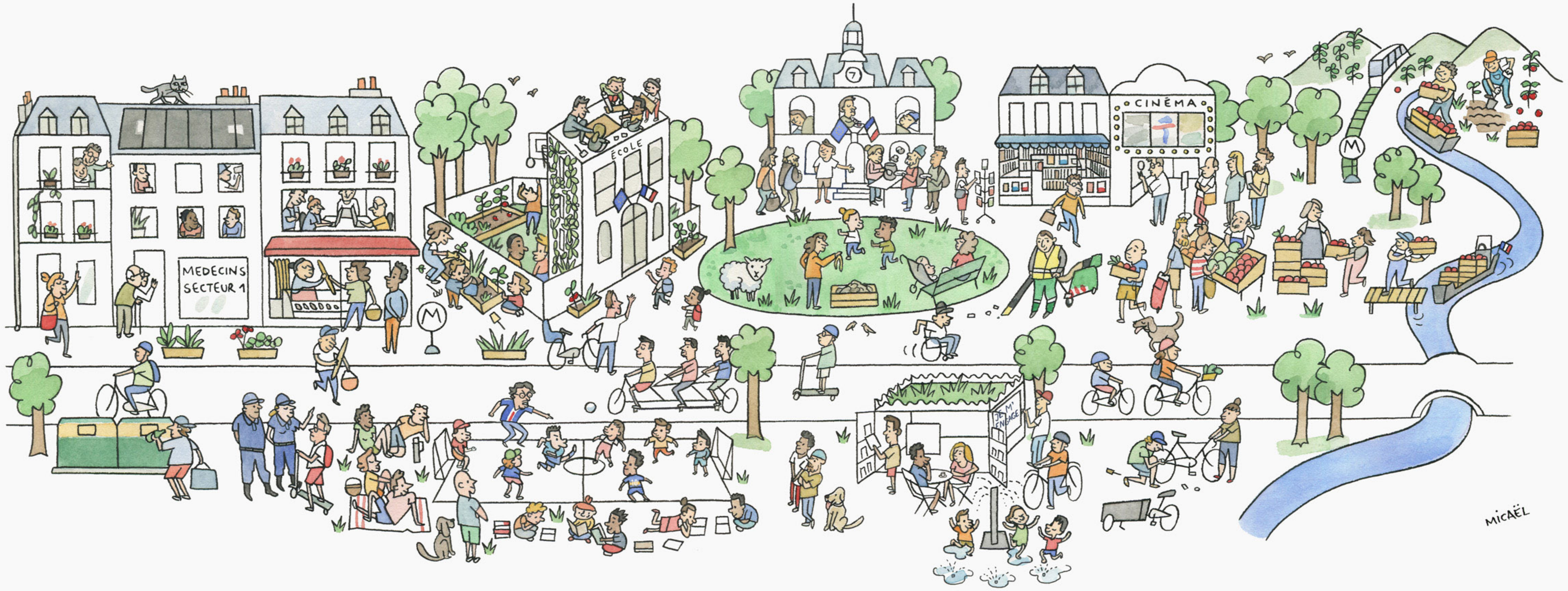
Definition: The 15-minute city is a compact, walkable urban area that provides all essential services and amenities, including housing, workplaces, schools, healthcare facilities, parks, and shops, within a 15-minute walk or bike ride from every residence.



—COURTESY OF DEZEEN & CARLOS MORENO

Development of 15-minute city concept

Benifits: Reducing car dependency, alleviating strain on public services, promoting physical activity, improving public health, reducing pollution, increasing social cohesion, and enhancing the local economy.

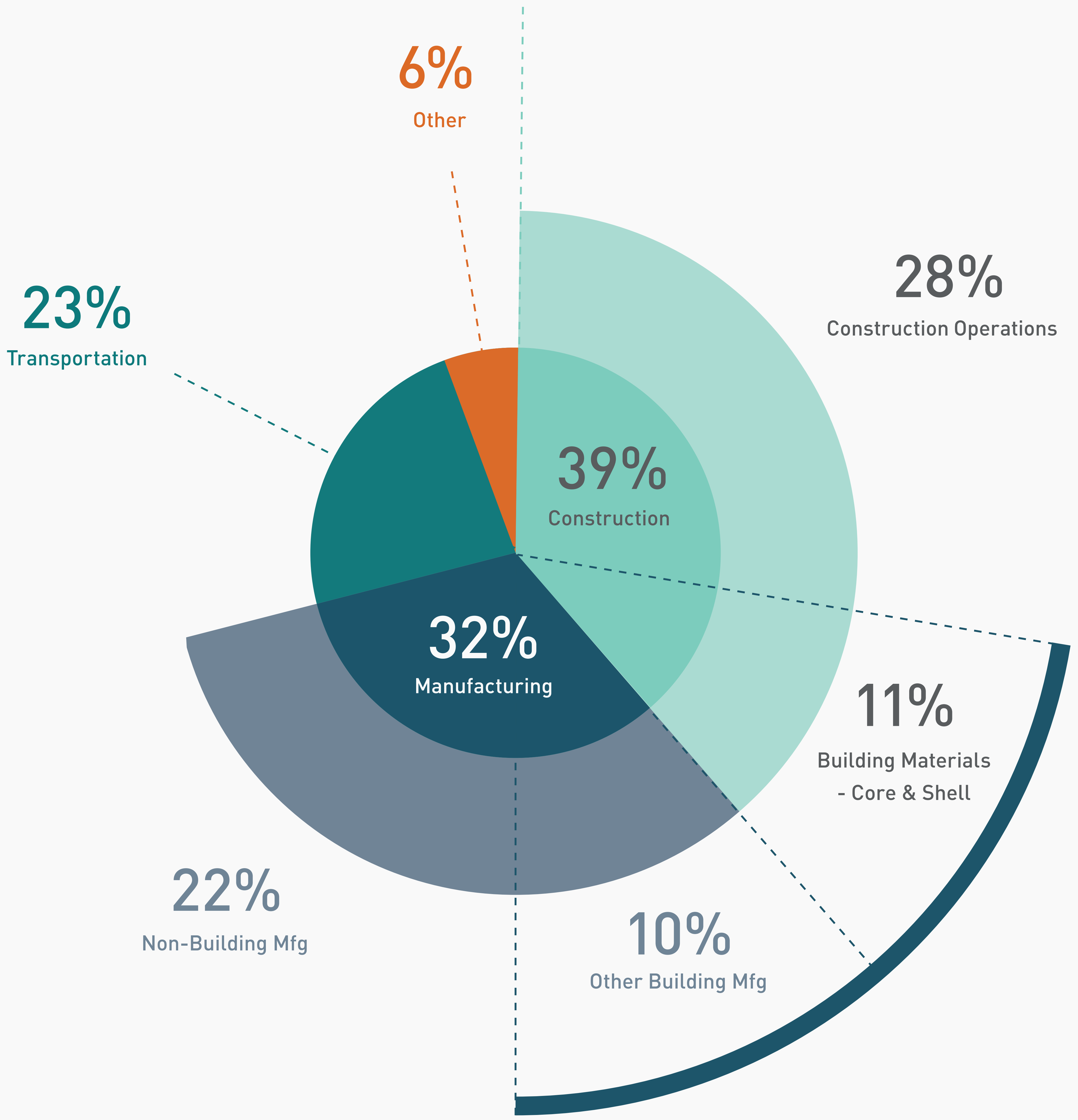


— COURTESY OF DEZEEN & CARLOS MORENO

Energy Efficiency & The Construction Sector

Buildings and the build environment account for over 40% of Global carbon emissions!

When Architects, Urban and regional planners talk about energy efficiency yes, we are talking energy security and energy cost, but by far the most important reason for conserving energy is to lower our carbon emissions and to play our part, to meet our obligations to the 2016 Paris Climate Accord and the global drive to achieve Net Zero by 2050.

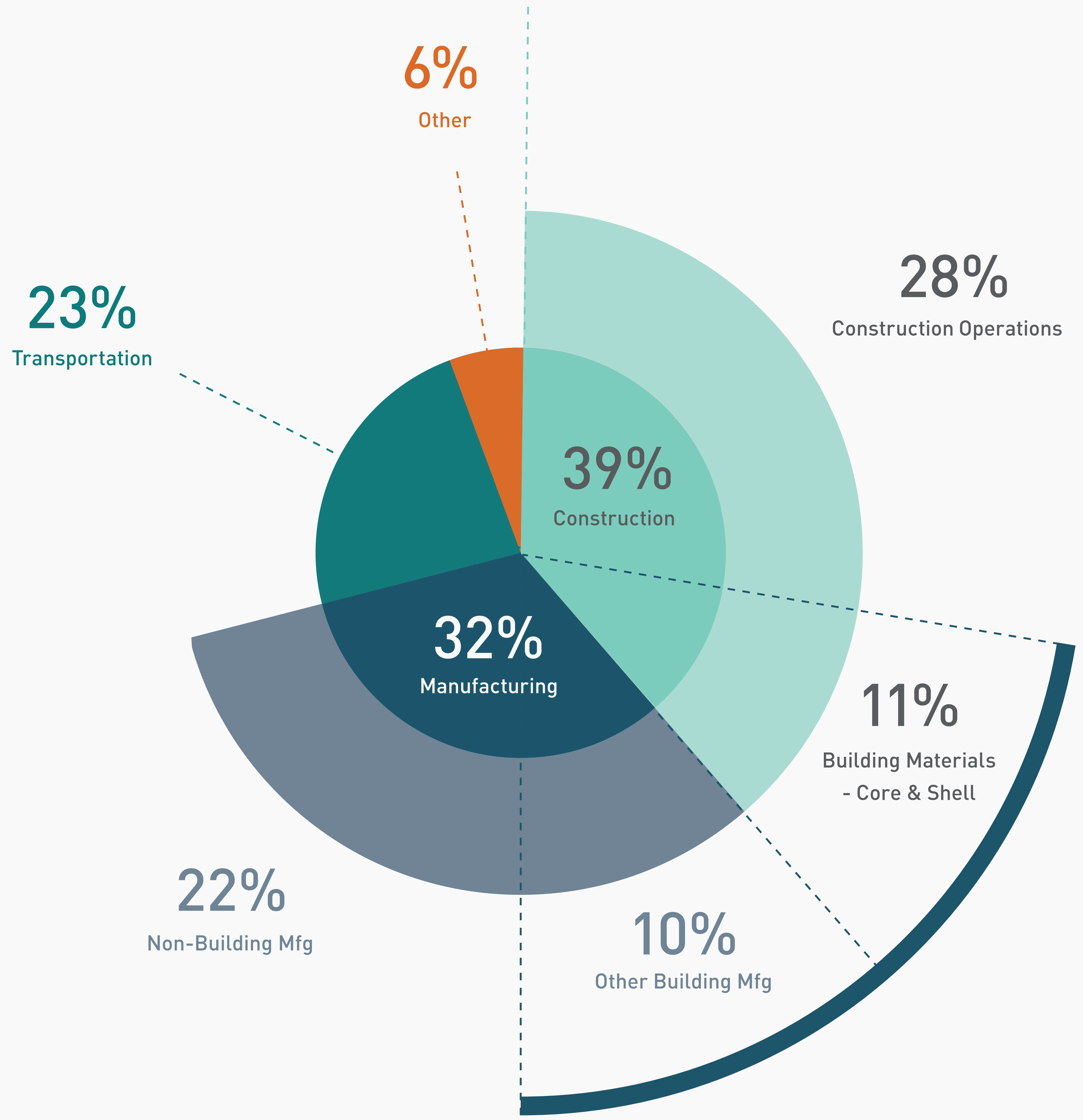


— SOURCE: 3WESTBEC.COM

Operational or in-use emissions are only 25% of this 40% of the overall energy expenditure.

These energy efficiency tools such as Passive & Active design we use in designing a buildings deal with buildings from the operational side. i.e. when they are in use.

While appreciating the importance of these aspects, because they are all essential in the fight to lower energy consumption, they actually only deal with 25% of the 40% of the overall energy consumption from the built environment.



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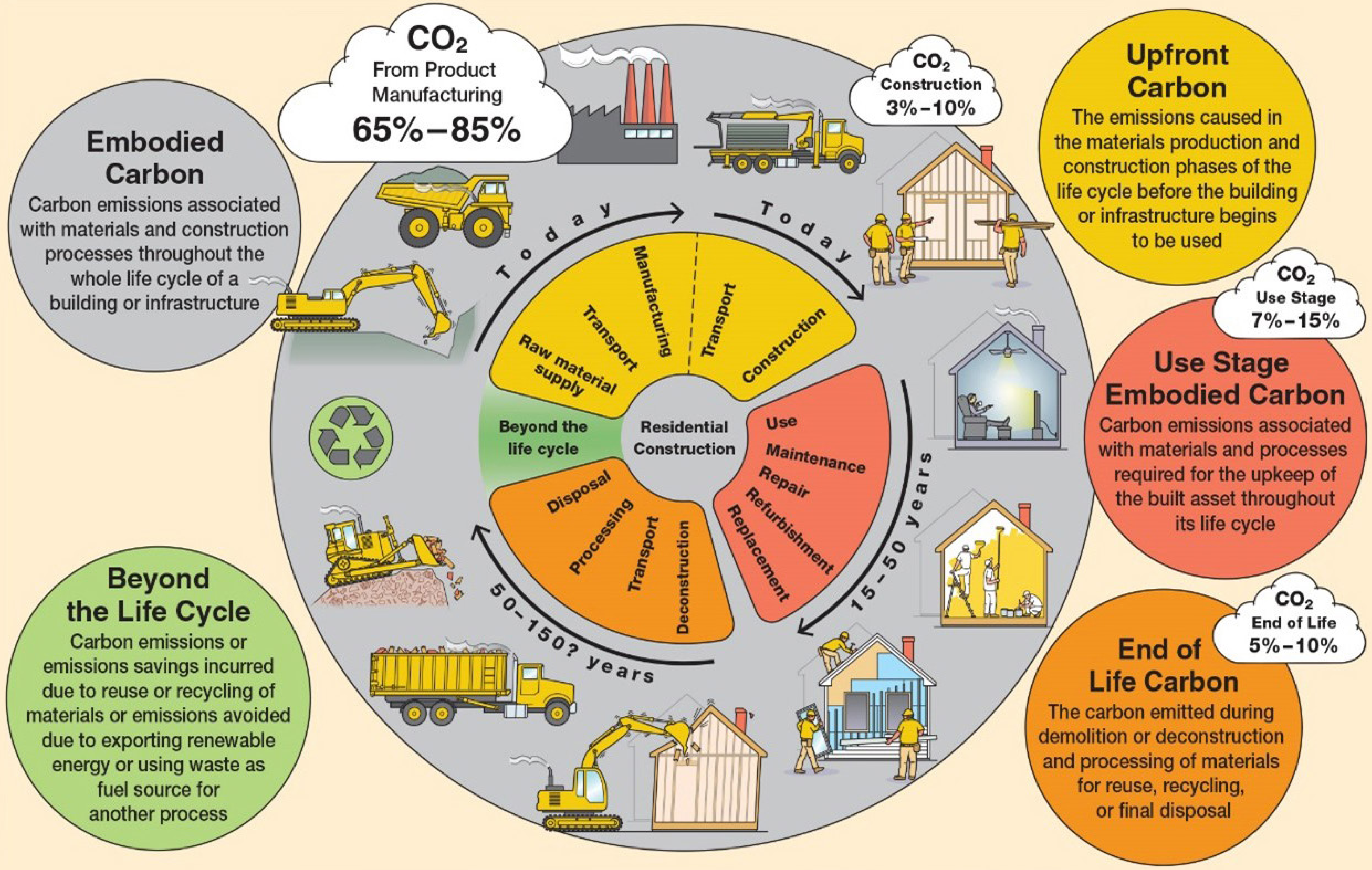
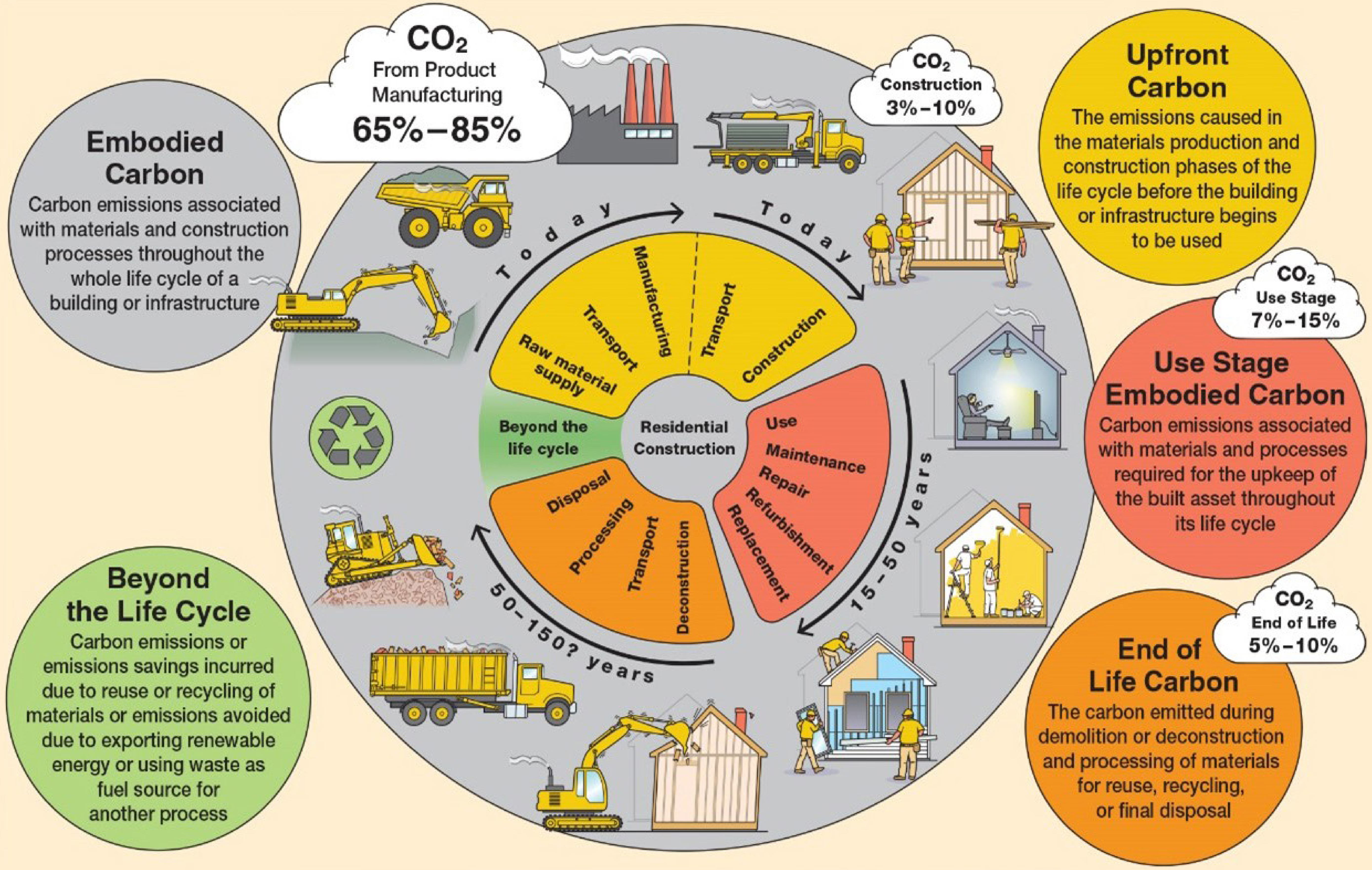
What makes up the other 75% of carbon emissions from the built environment and what do we also have to look at?



65 % to 85 % of emissions in the construction industry are caused by the embodied carbon from the use of energy in material production & transportation.

- Raw material mining and production
- Raw material transport
- Manufacturing
- Transport
- Construction process



How will the carbon emissions associated with construction materials be mitigated to reach net zero?

Global policy principals for a sustainable built environment for governments and policy makers

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CARBON

Prioritise renovation of existing buildings and eliminate both operational and embodied carbon emissions across the lifecycle of all buildings.

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RESILIENCE

Exchange the ability of homes and communities to respond to external shocks and stressors by integrating climate resilience and promoting adaptation.

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WATER

Conserve and protect water resources and guarantee equitable access to potable water and sanitation.

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BIODIVERSITY

Regenerate natural systems and restore biodiversity loss by avoiding development on land with high biodiversity, and by prioritising nature-based solutions that enhance, expand, and protect the natural environment.

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HEALTH

Develop healthy, equitable and resilient buildings and cities that deliver improvement in occupant, community and public health and wellbeing throughout the building and construction lifecycle.

Global policy principals for a sustainable built environment for governments and policy makers

CARBON	RESILIENCE	CIRCLULARITY	WATER	BIODIVERSITY	HEALTH	EQUITY AND ACCESS
Prioritise renovation of existing buildings and eliminate both operational and embodied carbon emissions across the lifecycle of all buildings.	Exchange the ability of homes and communities to respond to external shocks and stressors by integrating climate resilience and promoting adaptation.	Drive waste out of the construction value chain and minimise the use of primary materials by optimising use of resources and materials.	Conserve and protect water resources and guarantee equitable access to potable water and sanitation.	Regenerate natural systems and restore biodiversity loss by avoiding development on land with high biodiversity, and by prioritising nature-based solutions that enhance, expand, and protect the natural environment.	Develop healthy, equitable and resilient buildings and cities that deliver improvement in occupant, community and public health and wellbeing throughout the building and construction lifecycle.	Support equal access to safe, healthy, sustainable homes and communities for all citizens.

The Good News

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Large scale investment in Technologies

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Innovation in the cement industries

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- Large scale investment in Technologies
- Innovation in the cement industries
- 8 carbon neutral countries as of 2023

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Legislation is in line with 2050 goals

Thank you

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