



# Net Zero Whole Life Carbon Roadmap for the UK Built Environment

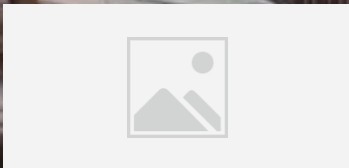
25 February



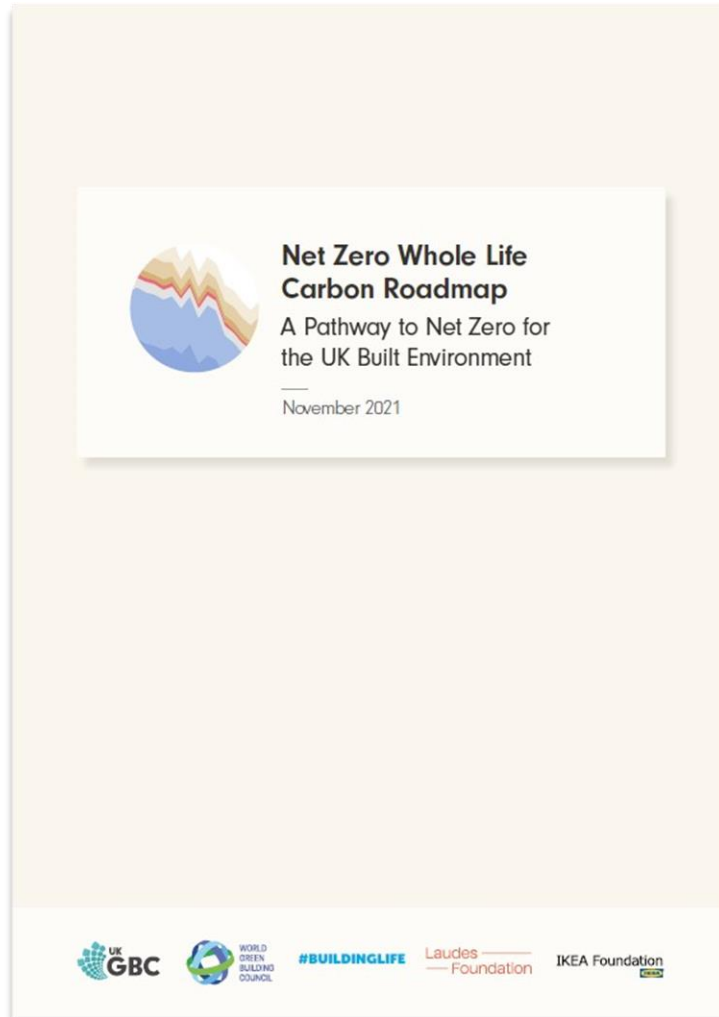
**#BUILDINGLIFE**



**To radically improve the sustainability of the built environment, by transforming the way it is planned, designed, constructed, maintained and operated.**



# Roadmap Outputs



- **A Pathway for the UK Built Environment**
- **Technical Report**
- **Summary for Policy-Makers**
- **Stakeholder Action Plans**

# Steering Group



**Robert Spencer**  
Director,  
Sustainable  
Development,  
AECOM



**Hannah Vickers**  
CEO, Association  
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Training Board (CITB)



**Ron Lang**  
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Value, Construction  
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**Richard Twinn**  
Principal Consultant,  
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**John French**  
Deputy Chair,  
Environmental Association  
For Universities And  
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Project Manager,  
Future Homes  
Task Force



**Lynne Sullivan**  
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Representative



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**John Slaughter**  
Director of External  
Affairs, Home  
Builders Federation



## Whole Life Carbon Roadmap Steering Group <1/2>

\*The Steering Group will also be supported by representatives from BEIS, MHCLG & the British Retail Consortium



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Office Investment  
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## Whole Life Carbon Roadmap Steering Group <2/2>

\*The Steering Group will also be supported by representatives from BEIS, MHCLG & the British Retail Consortium

# Task Groups

## Task Group 1 - New Build

- **AECOM**, Heidi Collocott
- **Arup**, Orlando Gibbons
- **Atelier Ten**, Meredith Davey (Task Group Chair)
- **Bennetts Associates / LETI**, Ben Hopkins
- **BRE**, Daniel Doran
- **Burges Salmon**, Ross Polkinghorne
- **BuroHappold**, Robert Buckley (Task Group Chair)
- **ChapmanBDSP**, Susan Hone-Brookes
- **Cundall**, Sarah Linnell
- **Feilden Clegg Bradley Studios**, Andy Macintosh
- **Hilson Moran / LETI**, Mirko Farnetani
- **Igloo Regeneration**, Peter Conboy
- **Mott MacDonald**, Monica Donaldson-Balan, Wei Wen Low
- **MPA The Concrete Centre / LETI**, Elaine Toogood
- **Multiplex**, Pavan Patel
- **Perkins&Will**, Asif Din
- **Peel**, Nick Hey
- **SEGRO plc**, Ben Brakes
- **Sweco UK**, Matthew Mapp (Task Group Chair)
- **Thakeham Group**, Anthony Barron
- **Turley**, James Blake
- **UKGBC**, Karl Desai
- **Willmott Dixon**, Doug Drewniak

## Task Group 3 – Non-Domestic Retrofit

- **Acclaro Advisory**, Jo Burton
- **BDP**, Philip Gray (Task Group Chair)
- **Cundall**, Jennifer Elias
- **Derwent London**, Samantha Carlsson
- **Elementa Consulting**, Ronan Pigott
- **Hawkins\Brown / LETI**, Louisa Bowles
- **MAPP**, Rowan Packer
- **Morrisons Plc**, Clare Davey
- **Overbury and Morgan Lovell**, Joe Croft
- **SOM**, Mina Hasman (Task Group Chair)
- **The Carbon Trust**, Nektarios Gkanis
- **The Crown Estate**, Jane Wakiwaka
- **Tuffin Ferraby Taylor**, Oliver Morris
- **Verco**, Dave Worthington
- **UKGBC**, Alastair Mant
- **WSP**, David Leversha, Shane Orne

## Task Group 2 - Domestic Retrofit

- **Alliance for Sustainable Building Products (ASBP)**, Katherine Adams (Task Group Chair)
- **Arup**, Andy Sheppard (Task Group Chair)
- **Dorrington PLC**, Julia Webb
- **Energy Systems Catapult**, Lewis Bowick
- **Essex County Council**, Thomas Day
- **Federation of Master Builders**, Lulu Shooter
- **Grainger PLC**, Chris Hesbrooke
- **Greengage Environmental**, Andrea Carvajal
- **Hoare Lea**, Michelle Wang
- **Knauf Insulation**, Christopher Price
- **Pivot Energy Services**, Joe Taylor
- **Passivhaus Trust**, Rachel Mitchell
- **SHAP**, Charlie Baker, Duncan Sluce, Richard Bubb, Rosemary Coyne
- **South Yorkshire Housing Association**, Gordon Watts
- **Twinn Sustainability Innovation / LETI**, Chris Twinn
- **UKGBC**, Jo Wheeler

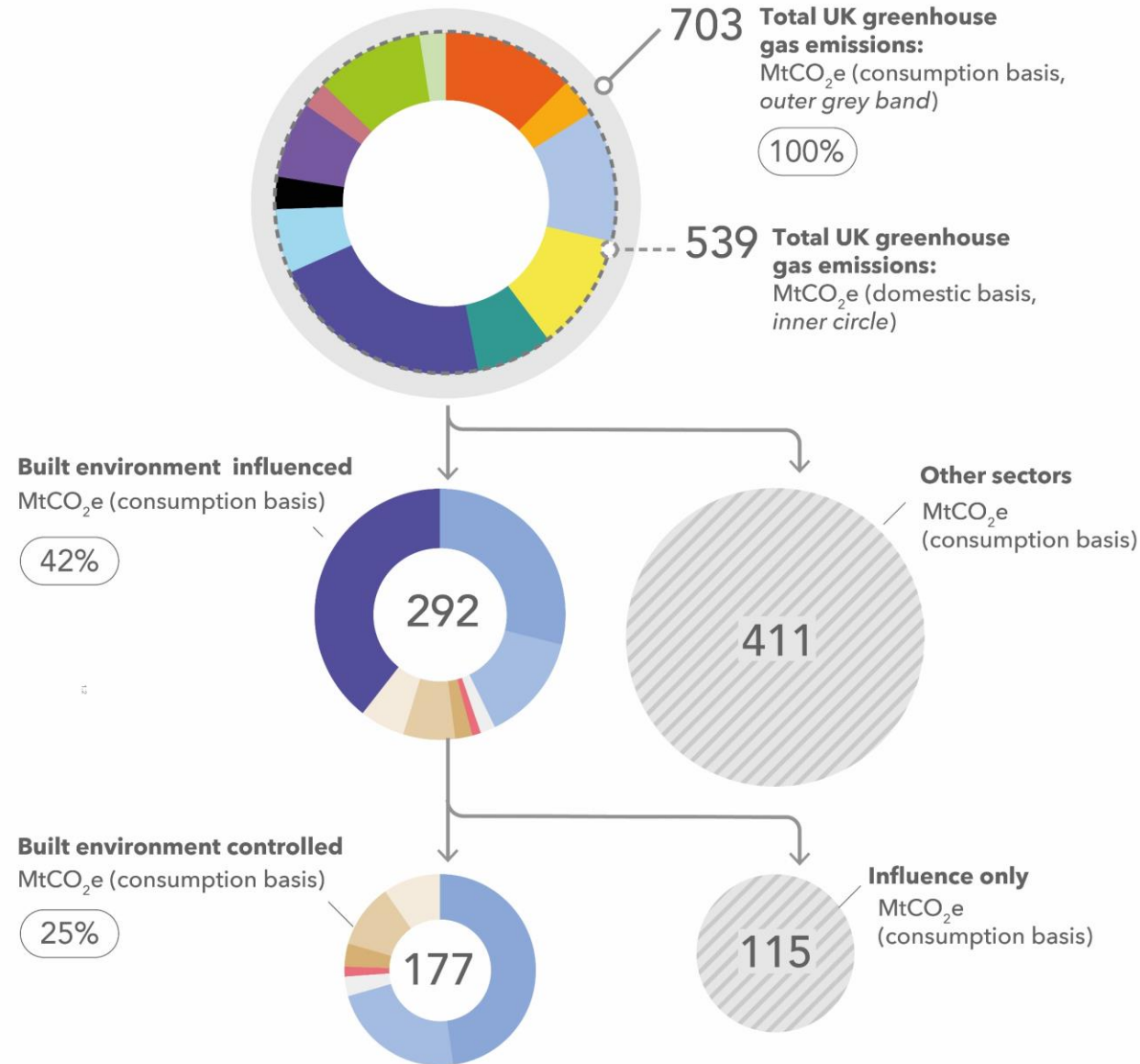
## Task Group 4 – Infrastructure

- **Arcadis**, Mark Edwards
- **BAM Nuttall**, Sarah Jolliffe
- **BuroHappold**, Martha Dillon
- **CALA Group (CALA Homes)**, Stephen Kelso (Task Group Chair)
- **CICES**, Elisabeth McLaughlin
- **dRMM / LETI**, Kat Scott
- **High Speed Two (HS2)**, Mark Fenton
- **National Grid**, Niki Kesharaju
- **Schneider Electric**, Peter Selway
- **Skanska UK PLC**, Christopher Hayes (Task Group Chair)
- **Tarmac**, Emma Hines
- **Tata Steel**, Barry Rust
- **UKGBC**, Emily Huynh

# Built Environment Emissions

# UK Built Environment Carbon Footprint

## Total UK GHG emissions (2018 CCC Data) showing proportion of Built Environment emissions



### CCC SECTORS (TOP CIRCLE)

- Residential buildings
- Non-residential buildings
- Manufacturing & construction
- Electricity supply
- Fuel supply
- Surface transport
- Waste
- F-gases
- Aviation
- Shipping
- Agriculture
- Land Use, Land-Use Change & Forestry

### BUILT ENVIRONMENT SECTORS

- Buildings (Non Domestic) Embodied Carbon
- Buildings (Domestic) Embodied Carbon
- Infrastructure Embodied Carbon
- Infrastructure Operational carbon
- Buildings F-Gas
- Buildings (Non-domestic) Operational Carbon
- Buildings (Domestic) Operational Carbon
- Surface transport

# Trajectory Inputs: Examples

## EXISTING NON-DOMESTIC BUILDINGS: PATHWAY



### BUILDING PERFORMANCE TARGETS

- 29% average non-domestic building energy intensity reduction by 2030 (49% by 2040)



### BOILERS

- End of sales of gas boilers in 2030
- End of Sales of oil boilers in 2030
- 7.5% of non-domestic buildings have hydrogen boilers by 2038



### HEAT PUMPS

- 70% of all non-domestic buildings benefit from heat-pumps by 2045



### PV

- 6.7% annual increase in PV installations on non-domestic building (existing trend)



### UNREGULATED ENERGY

- Continued trend of 1% PA reduction across all sectors.
- Gas cooking phase out in 2030-2040

## EMBODIED CARBON: PATHWAY



### BUILDING GROWTH RATES & UTILISATION

- c.200k new homes PA
- 25k new homes PA from 2025 onwards via change-of-use conversions
- 10% reduction in new office / resi demand by 2040 through Improved utilisation of existing building stock



### MATERIALS

- 20% reduction in material usage through design efficiency by 2050
- 10% reduction in material demand by 2040 through increased material reuse

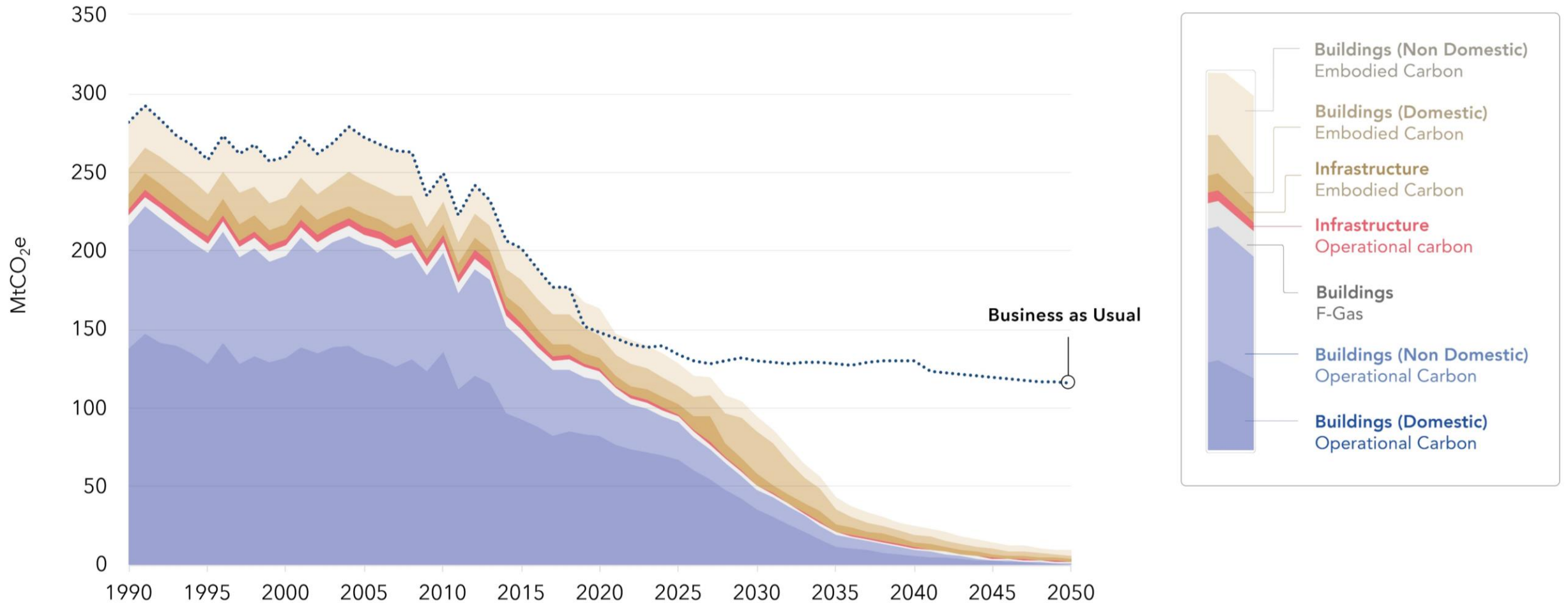


### SITE EMISSIONS

- 80% reduction in construction site emissions by 2050
- 50% reduction in construction material transportation emissions by 2050.



# UK Built Environment GHG Emissions 1990-2050



# Action Required

# Operational Carbon: Existing Homes

48%

*of UK built  
environment  
emissions*

**Key priority:** Nation-wide retrofitting of UK homes so they are efficient, warm, and cheaper to heat, whilst phasing out fossil fuel heating.



# Operational Carbon: Existing Non- Domestic Buildings

23%  
*of UK built  
environment  
emissions*

**Key priority:** Energy performance disclosure for non-domestic buildings to ensure that real-world performance of assets is visible to the market, and can influence asset valuation, market transactions, and management decisions.



# Operational Carbon: New Buildings

**Key priority:** Adoption of a design for performance approach to new buildings and to shift away from theoretical “notional building” approaches and focus on real-world energy performance, alongside other key net zero enablers such as peak demand limits.



# Embodied Carbon: All Buildings

20%

*of UK built  
environment  
emissions*

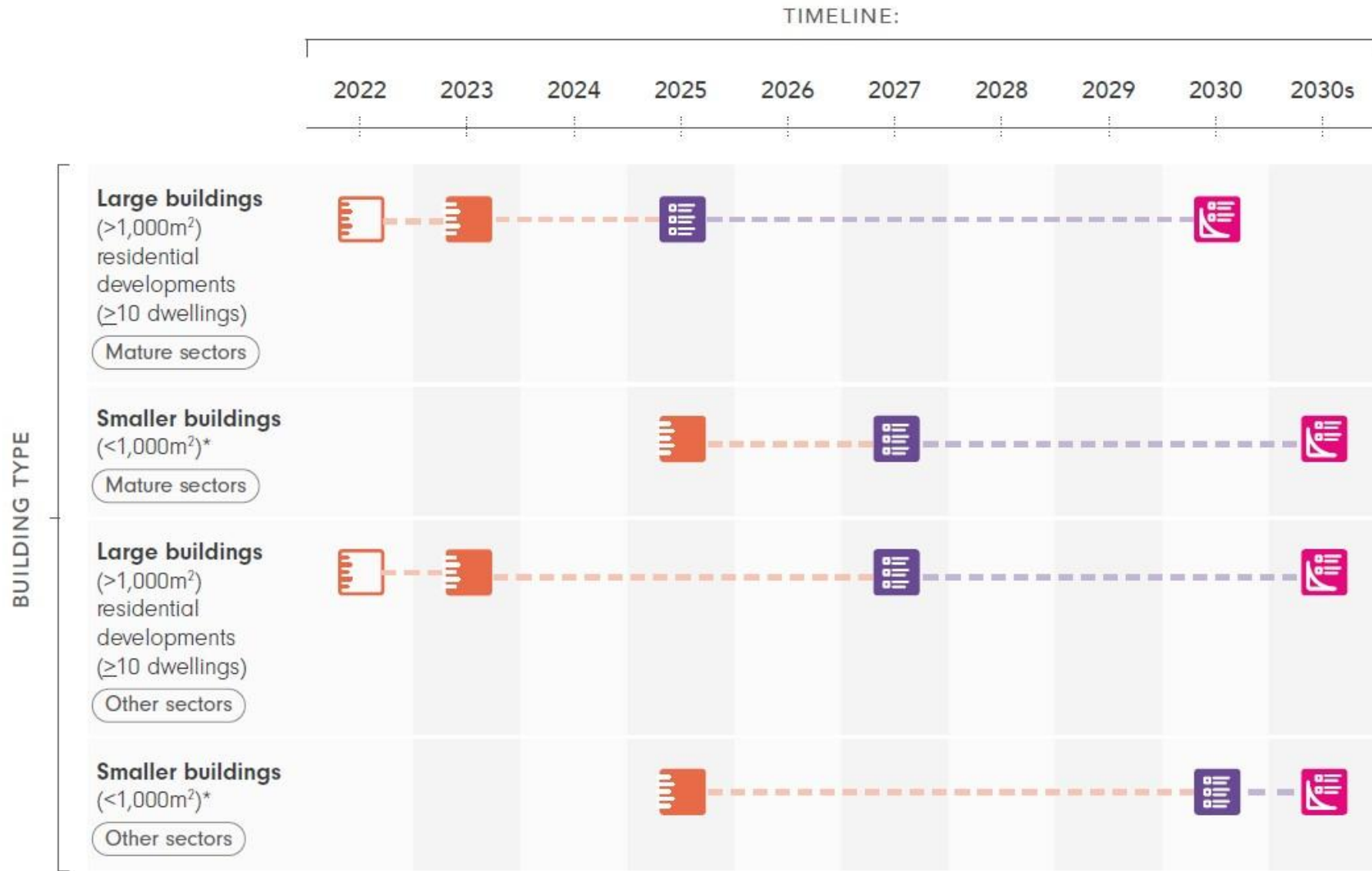
**Key priority:** Whole life carbon measurement and agreed limits

## Policy

- Mandatory measurement of WLC, followed by phased introduction of embodied carbon limits
- Support the industry to develop EPDs (to EN15804 & 3rd party verified) at the scale and quality required.
- Remove VAT on refurbishment works (i.e. 0% VAT) which retain building structural frame
- Supply chain decarbonisation investment



# Whole Life Carbon Regulation



# Embodied Carbon: All Buildings

20%

*of UK built  
environment  
emissions*

**Key priority:** Whole life carbon measurement and agreed limits

## Industry:

- Whole life carbon as first order consideration, alongside embodied carbon targets
- Procuring low carbon materials
- Capturing project data





# Embodied & Operational Carbon: Infrastructure

6%

*of UK built environment emissions*

**Key priority:** Infrastructure investment based on net emissions impact, alongside a policy framework and investment to drive industrial decarbonisation of key construction supply chains.



# Next Steps

## UKGBC

- Ongoing meetings with policy-makers
- Developing EUIs
- Future data updates (frequency to be determined)
- Maximising impact within the industry

## Call to Action

- Strategies to meet 2025 targets

**Thank you!**

