



# Green Buildings

**“The global green building movement has certified over 1.04 billion square metres of green building space around the world – equivalent to an area ten times the size of Paris”**

**Source: World Green Building Council**

# The building sector has an oversized environmental footprint



- **Energy:** Approximately one third of global energy end use takes place within buildings, while the manufacture of building materials consumes a further 10% of the global energy supply
- **Carbon:** the use phase of buildings alone is estimated to be responsible for 19% of total global greenhouse gas emissions.
- **Materials:** Each year, approximately 40-50% of the total flow in the global economy – are used in the manufacturing of building products and components worldwide
- **Waste:** Building construction and demolition waste contributes about 40 per cent of solid waste streams in developed countries.
- **Water:** Buildings in use have been estimated to be responsible for 12% of global water use, but can indirectly account for much more

# Reduction of the footprint through green buildings



Green buildings have de facto been defined by Green Building Certification Systems

- Expand the understanding of green building beyond energy or water efficiency
- Recognize and reward best practice and drive markets beyond code compliance
- Provide an independent assessment of environmental (and social) performance aspects
- Often serve as a guideline from planning and throughout the construction phase
- Serve as performance benchmarks for capital providers and developers
- Are targets for developers, tenants and investors and public sector policy instrument
- (Pre-) Marketing tools for developers towards tenants and investors / buyers
- Can be part of contractual agreement for design and construction process



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# Wood has the potential to help significantly reduce the environmental footprint



JRC Scientific and Technical Reports



## Environmental Improvement Potentials of Residential Buildings (IMPRO-Building)

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EUR 23493 EN - 2008



The proposed heat map allows no comparisons between different impacts and should not be understood or used for any conclusions in the sense that one material has a lower environmental impact than another.

Source: UNEP – Greening the Building Supply Chain



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# Business Case for Green Buildings

# Business Case for 'Sustainable' Buildings

## Investors & Tenants – Operating & Maintenance Cost



- Green buildings can save money through reduced energy and water consumption, and lower long-term operations and maintenance costs.
- Energy savings typically exceed any build cost premiums within a reasonable payback period.



Source: The Business Case for Green Building; A Review of the Costs and Benefits for Developers, Investors and Occupants, World Green Building Council and Skanska

# Business Case for 'Sustainable' Buildings

## Developer – Design & Construction Cost



### THE PERCEPTION GAP



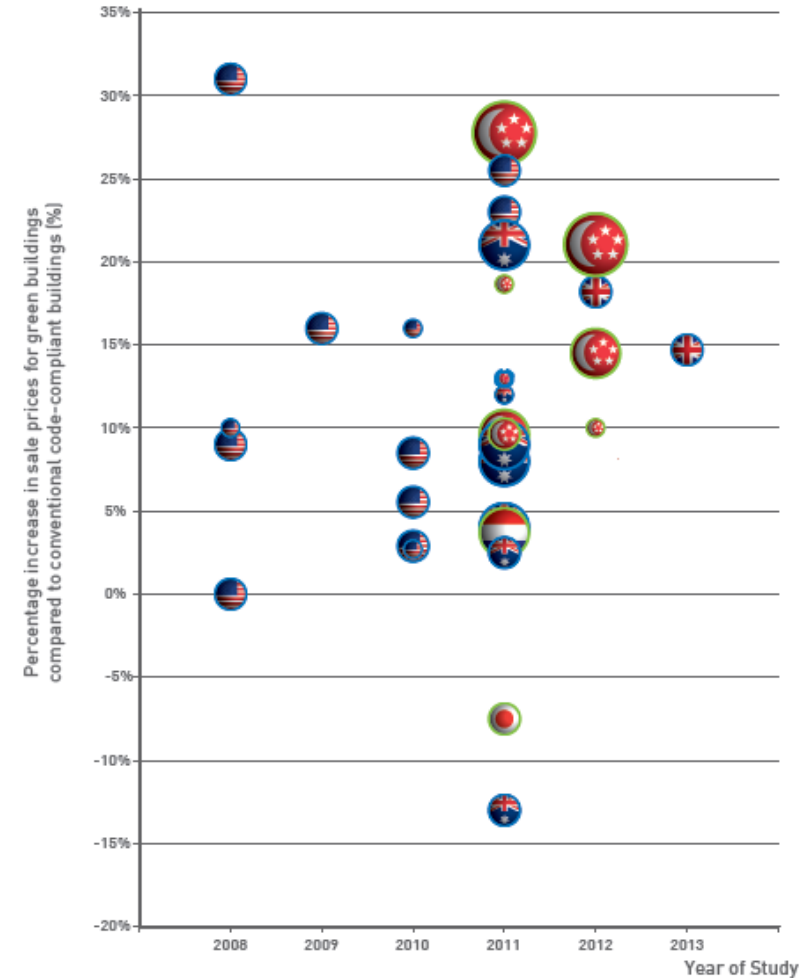
Source: The Business Case for Green Building; A Review of the Costs and Benefits for Developers, Investors and Occupants, World Green Building Council

# Business Case for 'Sustainable' Buildings

## Developer & Investor – Asset Value



- Studies show that green buildings attract tenants more easily and command higher rents and sale prices
- Local market conditions have a significant impact on the value of green buildings
- In markets where green is more mainstream, 'brown discounts' are emerging



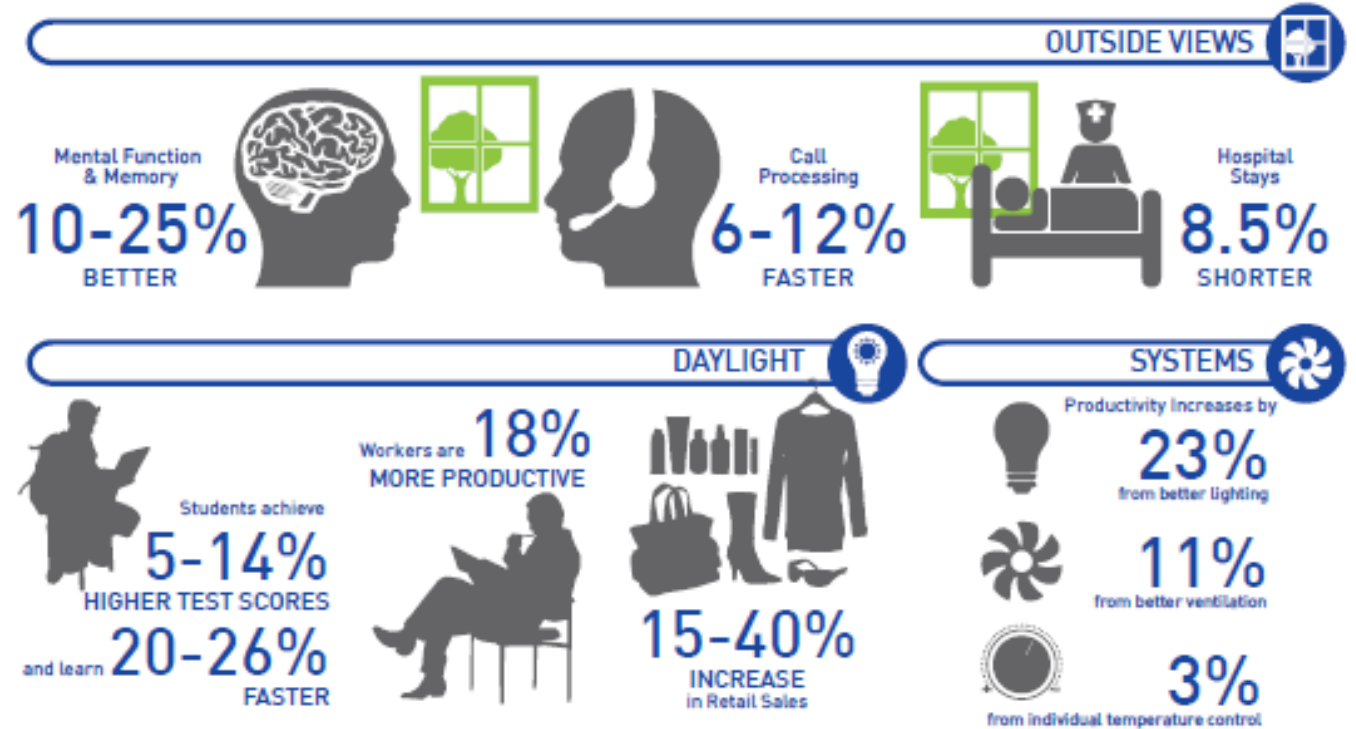
Source: The Business Case for Green Building; A Review of the Costs and Benefits for Developers, Investors and Occupants, World Green Building Council

# Business Case for ‘Sustainable’ Buildings

## Tenants – Health, Wellbeing and Productivity



- Evidence shows that green design attributes can improve occupant productivity, health and well-being.
- Investing in better indoor environments can lead to better returns on one of every company’s greatest assets – its employees.



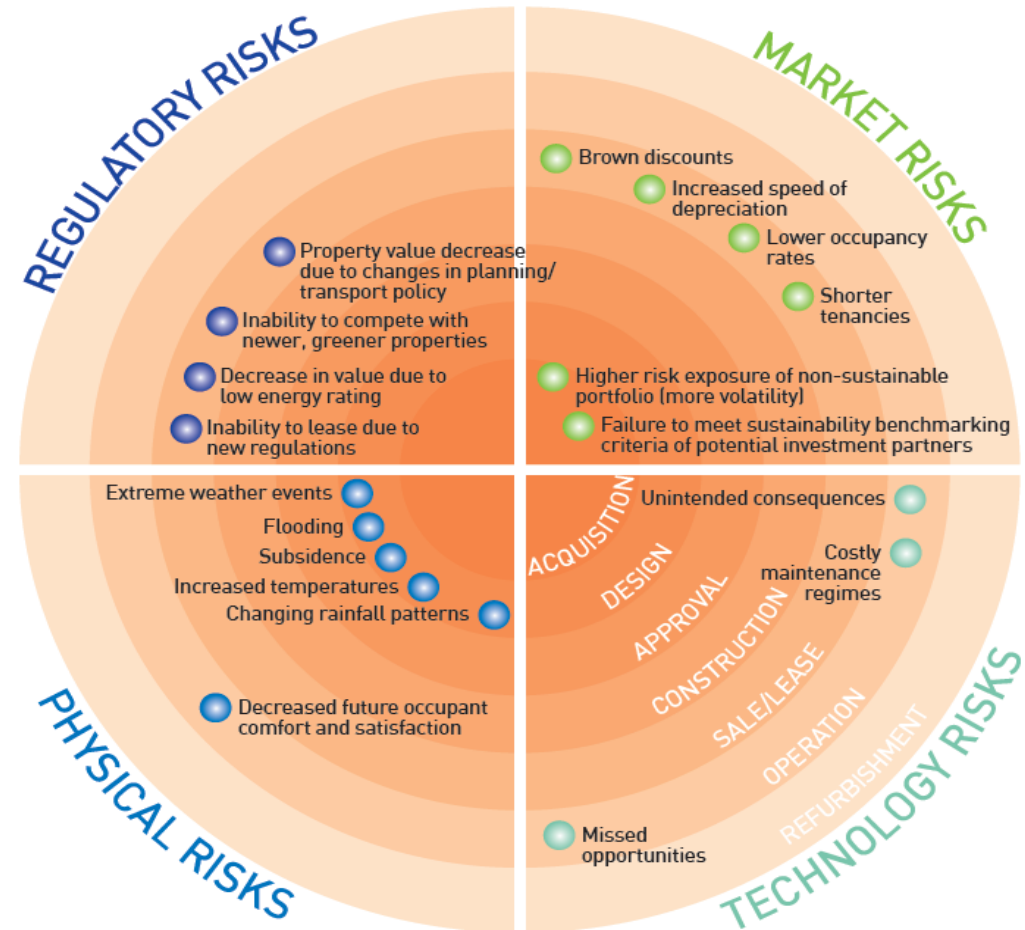
Source: The Business Case for Green Building; A Review of the Costs and Benefits for Developers, Investors and Occupants, World Green Building Council

# Business Case for 'Sustainable' Buildings

## Investors – Risk Mitigation



- Sustainability risk factors can significantly affect rental income and the future value of real estate assets, in turn affecting their ROI
- Changing tenant preferences and investor risk screening may translate into risk of obsolescence for inefficient buildings



Source: The Business Case for Green Building; A Review of the Costs and Benefits for Developers, Investors and Occupants



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# Market Trends for Green Buildings

# Market Trends – Developers & Contractors

## Life Cycle Costing (LCC) and Assessment (LCA)



### Life Cycle Costing (LCC):

- An economic evaluation of the total cost of a product, asset (e.g. building) or process throughout its life cycle
- Includes utility costs, replacement and maintenance costs
- Promotes the selection of cost optimal solutions
- Whole life cost (WLC) is often used interchangeably with LCC but specifically includes wider costs, which might include land acquisition costs and income generated from leases
- No standard communication output

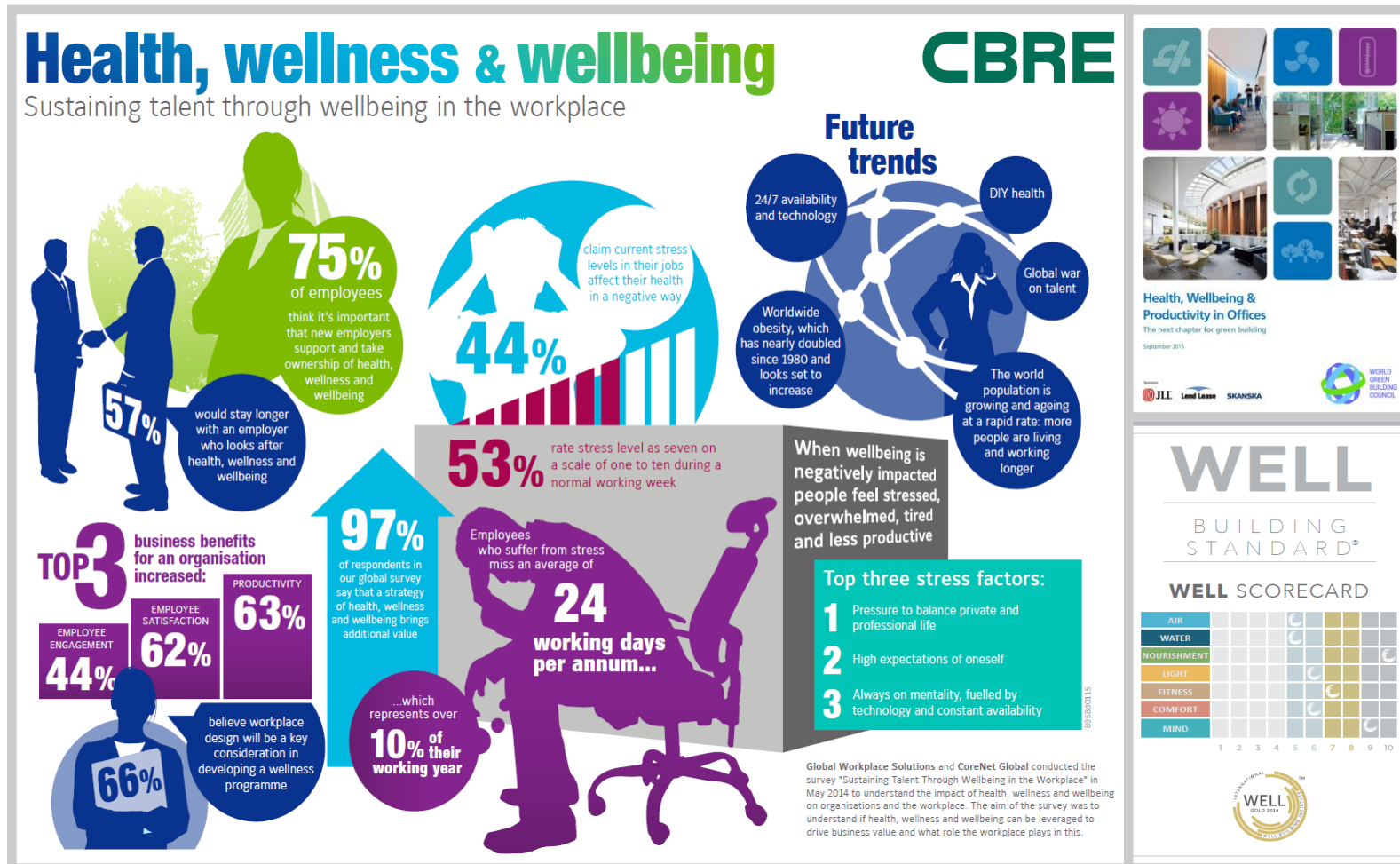
### Life Cycle Assessment (LCA):

- A tool for the systematic evaluation of a product's (e.g. building) or service's environmental aspects through all stages of its life cycle, including material manufacturing
- ISO and EN standards define methodology
- Building LCA needs consistent environmental data for the incorporated construction products, materials, and systems.
- **Environmental Product Declarations (EPDs)** communicate the environmental performance of construction products, resulting from the use of LCA

LCA and LCC provide the fundamental building blocks of a framework to support whole life thinking, which takes into consideration environmental, economic and social aspects and impacts.

# Market Trends – Tenants

## Health, Wellbeing and Productivity



### Design Attributes

- Indoor Air Quality
- Thermal Comfort
- Daylight & Lighting
- Biophilia
- Noise
- Interior layout
- Look & feel
- Active Design and exercise
- Amenities & Location

Source: Health, Wellbeing & Productivity in Offices – The next chapter for green building, September 2014, World Green Building Council



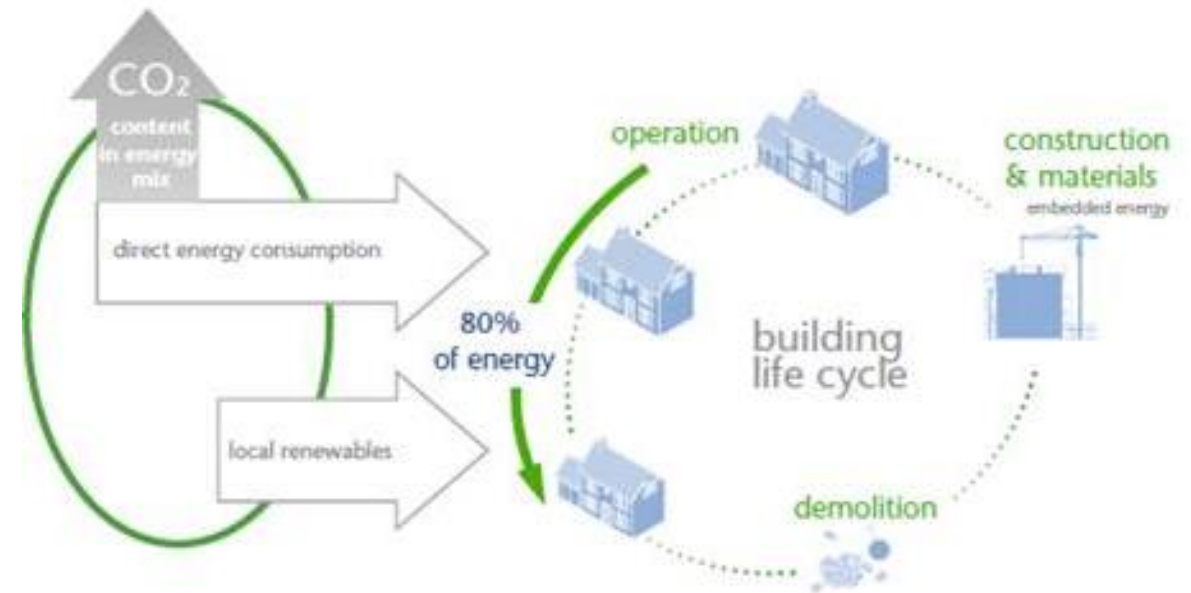
# Legislative Trends – Energy and Carbon

# Legislative drivers and Public Procurement

## Building-use Energy Consumption and Carbon Emissions



Building-use energy consumption and carbon emission are heavily regulated and quickly approaching (nearly) zero levels.



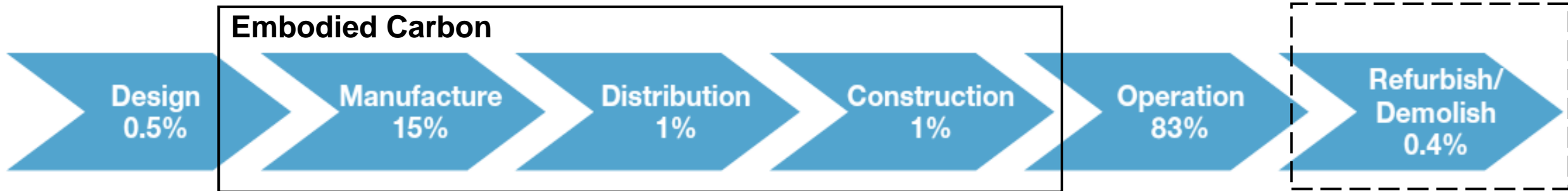
# Legislative drivers and Public Procurement

## Life Cycle Energy Consumption and Carbon Emissions



Embodied carbon:

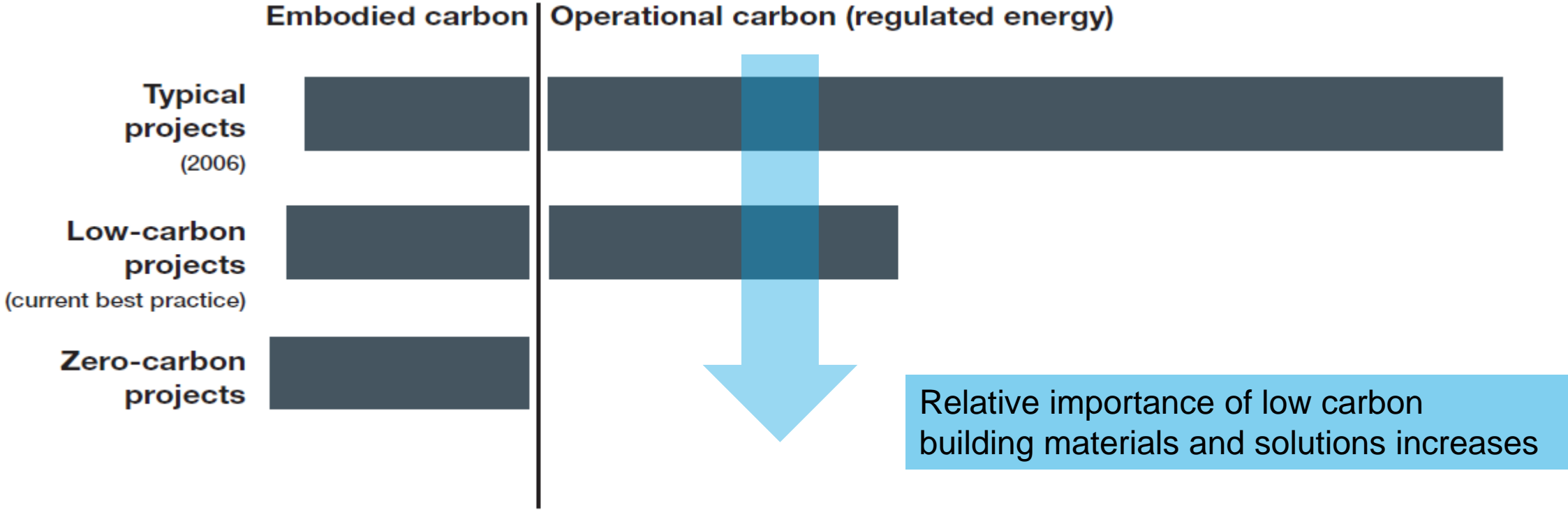
- Carbon emissions associated with energy consumption (embodied energy) and chemical processes during the extraction, manufacture, transportation, assembly of construction materials or products.



Source RICS: Carbon life cycle phases of a building and their contributions to the overall UK carbon emissions that the construction industry has the ability to influence

# Legislative drivers and Public Procurement

## Life Cycle Energy Consumption and Carbon Emissions



Source: RICS, Methodology to calculate embodied carbon of materials, 2012

# Legislative drivers and Public Procurement

## Circular Economy and Building Assessment



### 'Life cycle environmental performance' macro-objectives for buildings

- Greenhouse gas emissions from building life cycle energy use
- Resource efficient material life cycles
- Efficient use of water resources.

### 'Quality, performance and value' macro-objectives for buildings

- Healthy and comfortable spaces
- Resilience to climate change
- Optimised life cycle cost and value



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# Thank you!