

Timber construction and carbon

CLIMATE CHANGE

- More forest and woodland area
- Fuel substitution
- Material substitution: increased use of wood and wood based products

Timber in construction

- Versatile material
- Strong and light
- Engineered panels
- Thermal insulator
- High aesthetic
- Biomass boiler



UK construction industry

- £80bn industry 10% GDP
- 1.4m people employed
- 420m tonnes materials used
 - 15m tonnes timber
- Timber frame 22% new housing market
- 50% of all energy generated is operational energy for buildings
- We spend 90% of our time in the products



Construction impacts

- 50% of UK carbon emissions
- 50% of water consumption
- 35% of landfill waste
- 13% of all raw materials used in the UK economy
- 94 million tonnes of demolition waste annually

Regulatory change

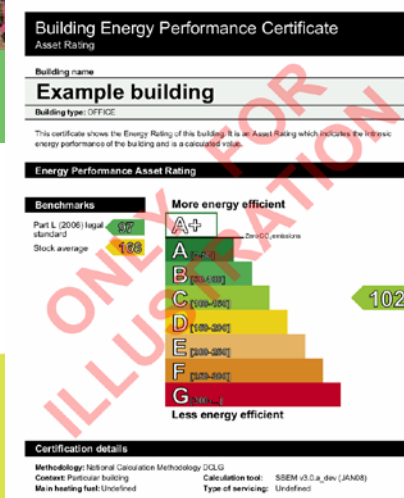
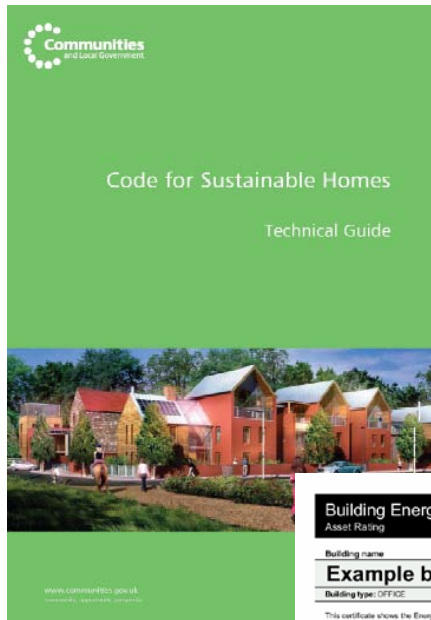
All new build homes to be zero carbon by 2016

All non-domestic buildings to be zero carbon by 2019

An increase in renewable energy generation from 1% to 15% by 2020

Kyoto – reduce UK carbon by 80% by 2050

Energy Performance of Buildings Directive



Concrete in construction

- 5% annual anthropogenic CO₂
- CO₂ product of cement reaction
- Widely used 2bn tonnes per annum and rising
- Calcium silicates formed up to 1500 C \Rightarrow cement
- 800kg CO₂ per tonne

Innovative concrete

- Low impact cement is here...
- Net CO₂ absorption as it cures

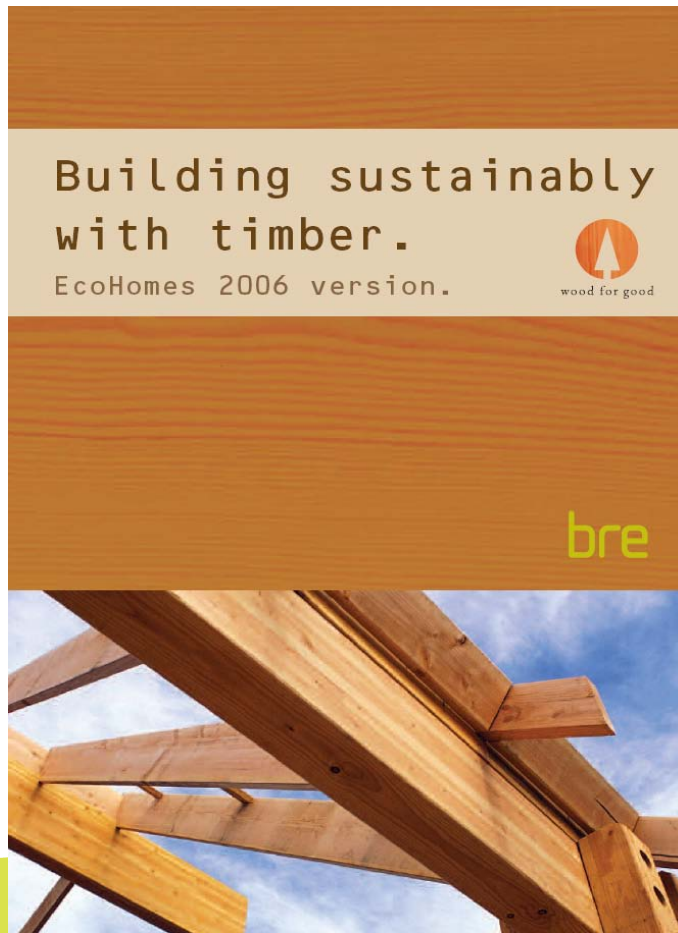
**Revealed: the cement that eats
carbon dioxide** guardian.co.uk

The Guardian 31 December 2008

Steel in construction

- 10-15% CO₂ emissions in China, Brazil, South Africa, India
- Burning coke or charcoal as fuel
- 30-50% of primary energy input can be saved
- 20% CO₂ emission reduction by 2020 compared with 1990
- “Energy consumed to produce 1 tonne of steel has fallen by 11% since 2000 to 50% of that required 40 years ago”

Timber in construction



- Rural employment and communities
- Lightweight
- Thermal insulator
- High aesthetic
- Versatile
- Adaptable
- Energy recovery

Timber

- Renewable resource and sequestration of CO₂
- “...substituting 1m³ other building materials with wood stores on average 0.8 tonnes of CO₂”
- “...timber buildings achieve negative net CO₂ emissions...”
- emissions of CO₂ kg/m² of building area:
 - Concrete 11.1 Steel 5.2 Timber 1.4

Waingels College, Wokingham

- Cross laminated timber
- Less embodied energy
- Minimised waste
- 60% reduction in carbon emissions



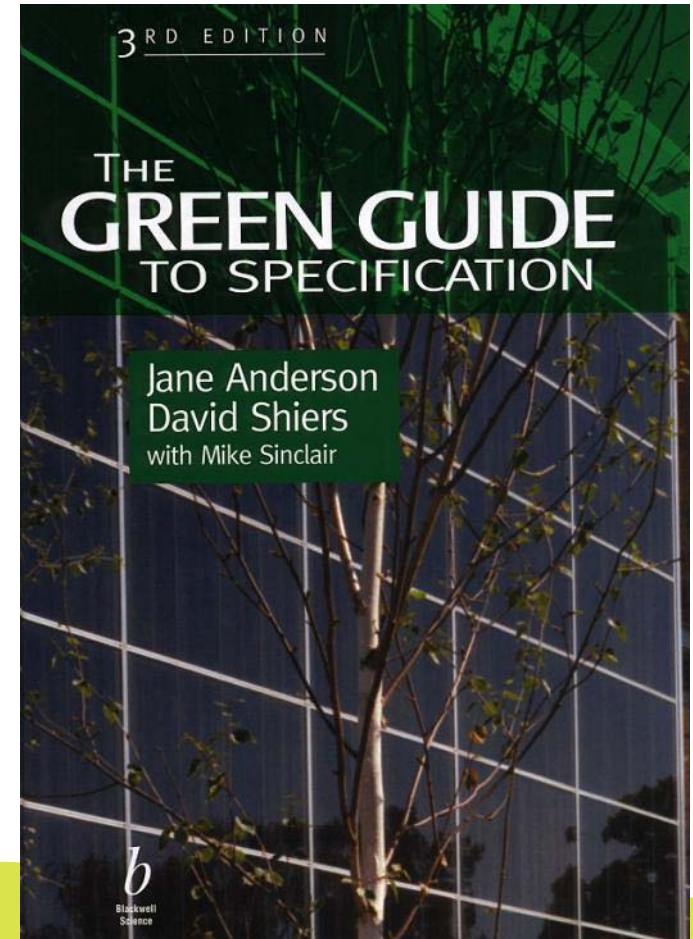
What do construction clients want?

- Peace of mind (chain of custody)
- Value for money
- Confidence in performance
- Homes to meet Ecohomes or Code levels
- Credits in the Code

- Low impact materials

Green Guide for Specification

- Environmental impacts of building elements
- Life cycle assessment
- A+ to E rated
- Supports the Code and Ecohomes
- www.thegreenguide.org.uk



Carbon stored

- Carbon in the regions trees 8.4MtC
- Carbon in a log 1tC
- 19MtC stored in timber in UK homes
- Carbon stored in 750,000 new homes in region could be 0.9MtC and a further 2.2MtC from the substitution effect
- Grow the wood products pool of stored carbon

Transport

- Finland to Harwich by ship
2600km
- 23kg CO₂/t
- Plus 60kg CO₂/t in Finland road transport
- 83kg CO₂/t timber
- “less carbon stored”
- Locally sourced could save

Rail	0.0270 kgCO ₂ /tkm
Road	0.1862 kgCO ₂ /tkm
Barge	0.0346 kgCO ₂ /tkm
Ship	0.0088 kgCO ₂ /tkm

Summary

- Vital that forest products are a growing part of construction
- Carbon storage potential is considerable
- Step change in forest area delivering products into construction needed
- Local supply chain





Lingwood, Norfolk. Flagship Housing Group

15 houses constructed using panelised timber

Code 3/4

Carbon +36t/CO₂