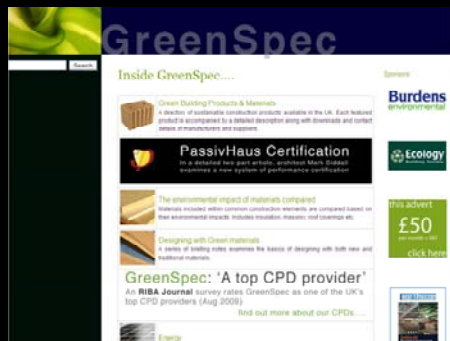


Environmental Technology

Post Graduate RIBA Pt 2 Yr 1

Mike Kane & Brian Murphy



GreenSpec

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CAP'EM

Cycle Assessment Procedure for Eco-Materials



www.capem.eu

- Friday 9.00-11.00
- Keyworth Building,
- Room: K305/6



1

5th Feb

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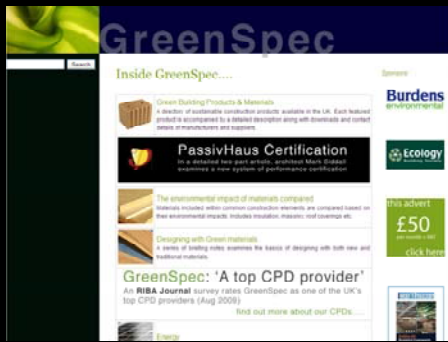
CAP'EM

Cycle Assessment Procedure for Eco-Materials



www.capem.eu

- ET Course introduction.
- Overview of key issues & outline of lectures and
- relevance to studio work.
- MK

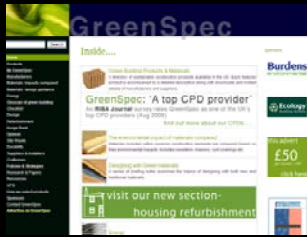


2. 12th Feb.

- Energy & resource efficient design - overview
- insulation, construction, embodied energy
- off-site construction methods & local sourcing.
- BM

Resource Efficiency

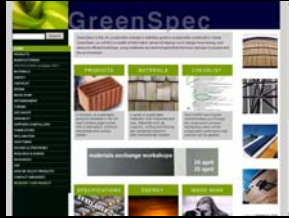
- Intelligence (people, if they are allowed to use it)
- Free issued & abundant (sun, wind, precipitation, soil, materials, etc.)
- Carbon (global issue, government objective)
- Energy (Carbon's poor cousin)
- Materials (embodied carbon and energy)
- Water (Carbon and energy load)
- Surplus (waste materials)
- Time (renewable or finite materials)
- Space (excavation holes, spoil heaps or growing fields,
 - but competition for land for food, fuel. materials)
- Environment (pollutants, hazardous and waste released to the atmosphere, water and soil)



Low v High Carbon Lifestyles

Implied criticism
Green v Violet
Good v Bad

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Carbon Hierarchy

Fuel Energy Heat
Low Carbon Lifestyle

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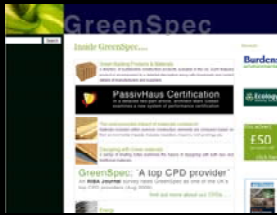


Waste Hierarchy

Ideals & reality
How many Rs in Recycling?
42 Rs so far

1

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Sustainable Materials for SMEs

Performance, Sourcing & Costs

smart 11/02/10

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MMC Modern Methods of Construction

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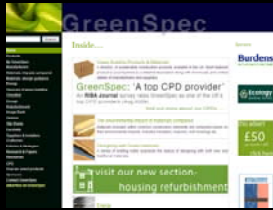


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Local Sourcing

Why is it important
Where to look

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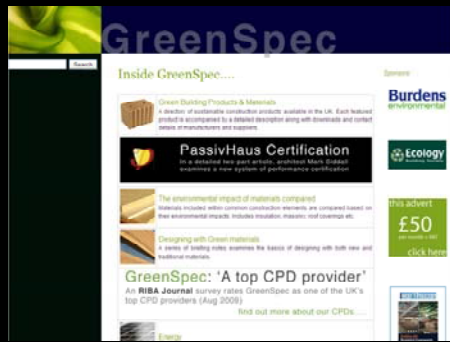


Design to Reduce Waste

Easy steps to reduce your share of the 109 m tonnes of construction and demolition and excavation waste each year

1

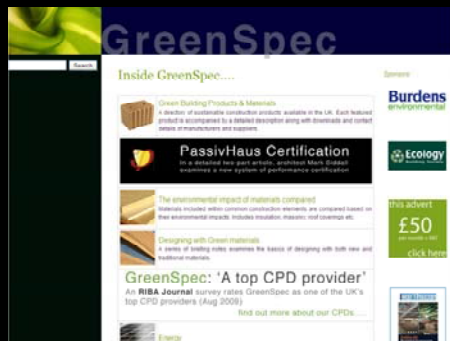
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3. 19th Feb.



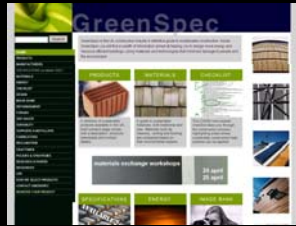
- Energy systems 1
- Solar – Solar Century talk
- Wind- LSBU engineer?
- various



4. 26th Feb.



- Energy systems 2
- Air movement in large buildings & Atria.
- Ground source, air source, geothermal, Biomass, CHP
- ~~inc. visit to 'sustainability centre K2~~
- BM/MK



Air Movement in Buildings

Index

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Air Movement in Buildings

- Principles of Element Design
- Climate Change
- Wind
- Wind Tunnel Testing
- Wind Turbines
- Natural Ventilation
- Moisture Vapour & Condensation
- Thermal Insulation
- Breathing Construction
- Dynamic Breathing Construction
- Airtightness
- Wind & Airtightness Testing
- Indoor air quality
- **Building Elements**
- Passive Ventilation •
- Active Ventilation
- Stack Effect
- Atrium •
- Solar Orientation & Solar Gain •
- Conservatories •
- Thermal mass,
- **Thermal lag, Decrement delay**
- Thermal bridges
- Conduction, Convection, Radiation
- Solar Shading, alternative shading
- **Thermal mass, Passive and active cooling**
- Fluid dynamics •
- Mechanical Ventilation
- Air-Conditioning



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Passive Ventilation

U10 Passive & Active Ventilation

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Sun Space Winter Gardens Conservatories

B12 Conservatories
Source of free heat
or a Drain on energy

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Atrium & Atria

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Fluid Dynamics

Understanding how a building works
or solving problems that arise

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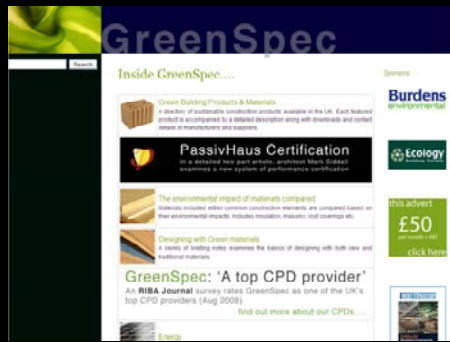
GreenSpec Energy: Renewables

EcoBling, carbon & energy efficiency

GreenSpec Website Energy pages

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5. 5th March



- Current guidelines & legislation relative to future needs.
- Critique and overview on the adequacy of the current situation.

Kyoto, Carbon targets, EU and UK

- **Kyoto**
 - was not enough
- **Not all signed up**
- **USA enticed**
 - Carbon trading
 - **Sex Analogy:**
 - **Some Abstain whilst others have Affairs**

EU Directives

- **EPBD Energy Performance in Building Directive**
- **Implemented in UK in Building Regulations**

UK Building Regulations,

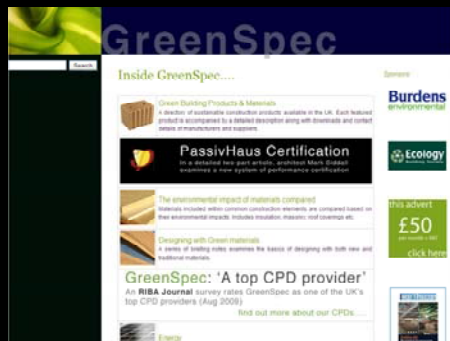
- **Building Acts**
- **Building Regulations**
- **Approved Documents**
 - Part L
 - U values
 - Airtightness
- **Tertiary Documents by industry**

UK Building Regulations:

- **Stop-Gap measures**
 - Will not meet Kyoto or other targets
- **Code for sustainable Homes**
 - Progressive targets
 - Code 4 now
 - Code 4.5 has been invented by HCA
 - Code 6 Zero carbon by 2016

UK target for zero carbon buildings

- **New homes by 2016 (CfSH)**
- **New schools by 2018 (Budget)**
- **New buildings by 2019 (Budget)**
- **Building Regulations will align with Code in next revisions**



Calculators

- for Building Regs. Approval:
- SAP for housing
 - Continually being revised but not well enough
 - won't work well enough for very low energy buildings
 - Ignores moisture in building
 - Ignores insulation at pitched roof
 - Ignores heat loss from pipes
 - Ignores solar gains
 - Ignores conservatories
- SBEM for non-domestic
 - Questions Engineer's careers so far
 - Nobody has confidence in it

EU: Voluntary Codes

- **Passivhaus, (Germany)**
 - PHPP software
 - **CarbonLite Programme UK (AECB)**
 - Training programmes running now
 - TSB (UK Government encourages its use)
- **Minergie (Switzerland)**



Copenhagen



- Very expensive jolly
- Ambitions but no decisions
- All targets to be made afterwards
- Permission to not act now
- Kyoto took decades to implement
 - By which time it had run its course
- So will Copenhagen



Carbon:

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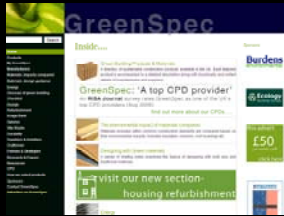
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- Zero Carbon definitions
- Carbon Jargon Buster
- Carbon efficiency v Energy Efficiency



Jargon Buster: Carbon Dioxide CO₂

Definitions & Meanings

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Carbon Hierarchy

Fuel Energy Heat
Low Carbon Lifestyle

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Low v High Carbon Lifestyles

Implied criticism
Green v Violet
Good v Bad

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Targets, Regulations & Codes

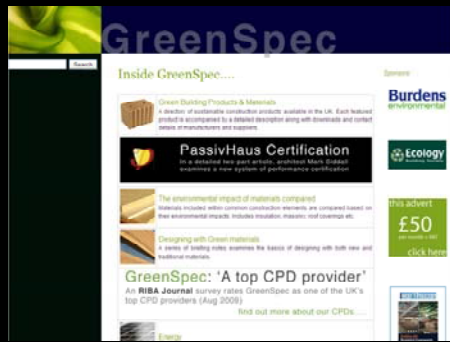
- **Environmental Assessment Methods:**
 - EcoHomes, BREEAM, LEED, DREAM, SPEAR, CEEQUAL, Ska,
 - Local & Regional Checklists
- **Code for Sustainable Homes**
 - Challenges:
 - Energy: Carbon Lite Programme & Liz Reason
 - Water: AECB & Cath Hassell
 - BRE Green Guide to Specification
 - Materials: Good Homes Alliance & Renewable Building & Brian Murphy
- **Existing Buildings**
 - BREEAM, EcoHomes XB,
 - MOBS, Ska
 - BRE EcoBuild '10 launch of
- **Code for Sustainable Buildings**
 - UK GBC
 - Schools, Public Buildings, etc.
 - Budgets



Green Material Olympics

BRE Green Guide to Specification

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6. 12th March



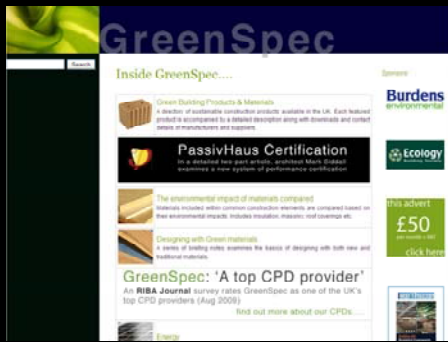
- Green Specification.
- BM



Specification



- **NBS & Software**
- **Greening of NBS & NES Specification**
- **Substitution & Impact**
- **Robust Specification**
- **GreenSpec**
 - Product Spec
 - Assembly Spec
 - Waste Spec
 - Maintenance Spec
 - Appendix
- **Elemental everything**
 - MyGreenSpec



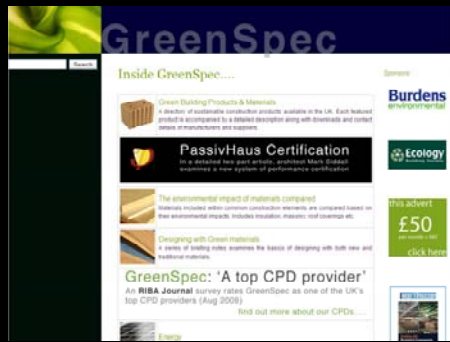
7. 19th March



- Future of Sustainability
- BM

Future of Sustainability

- BRE green or GreenSpec green
- BRE EP or CAP'EM SLCA tools
- On-line virtual building, Green Construction Materials Choice & Specification assembly tool:
 - MyGreenSpec



Diagrams

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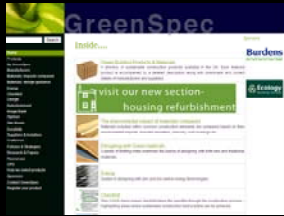
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- Sustainability Definition
- Double ended Funnel Route to future



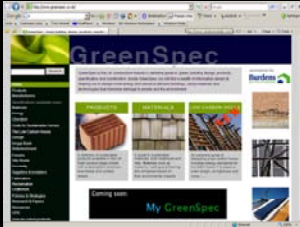
Sustainability Definitions

17/03/2010

© NGS 2004-09 Brian Murphy Sustainability Definition

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Route to the Future

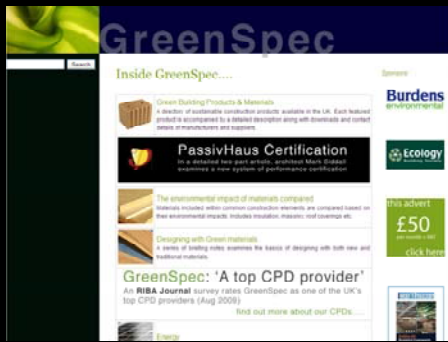


© Forum for the Future

Idea from Forum for the Future

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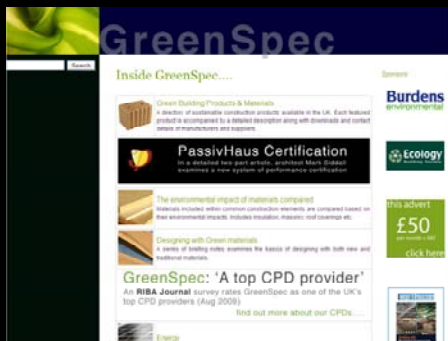
Ambitions

- BRE GGtS added positive attributes
- Better LCA tools
 - CAP'EM, GreenSpec & MyGreenSpec

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Ambition



- **Better SAP & SBEM**
 - Doubtful
- **Carbonlite PassivHaus PHPP**
 - Here now
 - Training programmes
 - Published data & Guides
 - <http://www.carbonlite.org.uk>

Welcome to the CarbonLite Programme

- [Home Page](#)
- [Energy Performance Standards](#)
- [Training](#)
- [Support and Guidance](#)
- [Software](#)
- [Buildings Performance Database](#)
- [Learning and Feedback Zone](#)
- [Building Certification](#)
- [CLP Forum](#)
- [FAQs](#)
- [Downloads](#)
- [Contact](#)

Welcome to the CarbonLite Programme - an AECB initiative providing the tools and knowledge to create low-energy buildings in line with existing and future legislation covering both domestic and non-domestic buildings.

Available to all AECB members, the CarbonLite Programme is a practical step-by-step guide aimed all those practitioners involved in the design, construction and use of low-energy, low-CO₂ emissions buildings. The Programme is designed to be clear, informative and impartial, and outlines the reasons behind the need for more sustainable building practices, as well as providing wide-ranging yet detailed guidance on the ways in which this change is best achieved.

Through its unique combination of research materials, technical data, training programmes, discussion forums and useful links and contacts, the CarbonLite Programme represents an essential resource in the building sector's drive towards low-carbon living and the legislation that will regulate it.

The CarbonLite programme was endorsed at its launch by the president of RIBA and directors of the UKGBC and CABE.

The Introduction to the CLP and The Energy Standards are free to anyone wishing to download them. All other CLP documents are available to AECB members only. [Join the AECB here](#)



[Pines Calyx centre Gold Standard](#)



[Elizabeth Fry Building Carbonlite Standard](#)



[Stawell Silver Standard](#)



[Herefordshire Gold Standard](#)



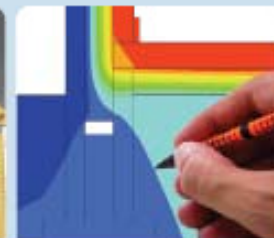
CLP VOLUME ONE
An Introduction to the CarbonLite Programme



CLP VOLUME TWO
Principles and Methodologies



CLP VOLUME THREE
The Energy Standards



CLP VOLUME FOUR
Step One Design Guidance Silver Standard



CLP VOLUME FIVE
Step Two Design Guidance Passivhaus/Gold Standard

- [Training](#)
- [Support and Guidance](#)
- [Software](#)
- [Buildings Performance Database](#)
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Available to all AECB members, the CarbonLite Programme is a practical step-by-step guide aimed all those practitioners involved in the design, construction and use of low-energy, low-CO₂ emissions buildings. The Programme is designed to be clear, informative and impartial, and outlines the reasons behind the need for more sustainable building practices, as well as providing wide-ranging yet detailed guidance on the ways in which this change is best achieved.

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CLP VOLUME ONE An Introduction to the CarbonLite Programme	CLP VOLUME TWO Principles and Methodologies	CLP VOLUME THREE The Energy Standards	CLP VOLUME FOUR Step One Design Guidance Silver Standard	CLP VOLUME FIVE Step Two Design Guidance Passivhaus/Gold Standard
CLP VOLUME FIVE Appendix	CLP VOLUME SEVEN Delivering the Vision	CLP VOLUME EIGHT The Design Process	CLP VOLUME NINE The Construction Process	CLP VOLUME TEN Owning and Operating Low Energy and CO ₂ Buildings



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[Stawell Silver Standard](#)



[Herefordshire Gold Standard](#)

Better Integrated Design Tools

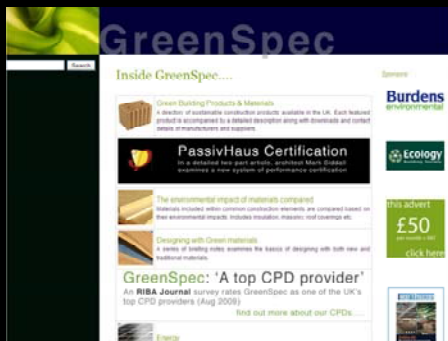
- TSB Design & Decision Tools
 - TSB Retrofit Programme
 - GreenSpec bid failed
 - Slider studio bid failed
 - Stickyworld exists
- SusCon development of TSB Retrofit
 - GreenSpec talking to SusCon

Codes for Refurbishment

- **TSB Retrofit for a future outputs**
 - Data gathering
- **Codes to follow**
- **SusCon development TSB retrofit**
 - GreenSpec and MyGreenSpec?

Codes for Sustainable Building

- UK GBC and BRE
- 10 years
- Too late?



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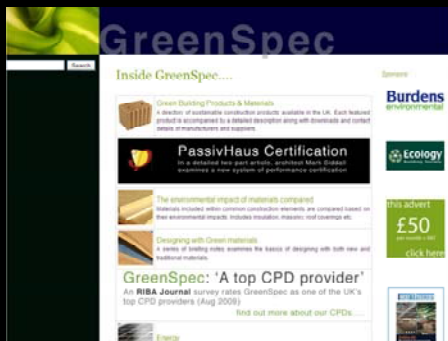
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Feedback

- These files are created by generalists with a big dollop of green flavour
- These files are updated from time to time
- We are not experts so from time to time these file may get out of date or may be wrong.
- If you feel that we have got it wrong please let us know so we can put it right.



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- **Brian Murphy BSc Dip Arch (Hons+Dist)**
- **Architect by Training**
- **Specification Writer by Choice**
- **Greening up my act since 1999**
- **Founder of www.greenspec.co.uk**
- **E BrianSpecMan@aol.com**
- **Twitter: <http://twitter.com/brianspecman>**
- **Scribd: www.scribd.com/brianspecman**