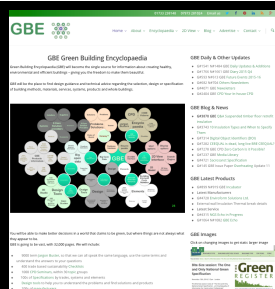




# Zero Carbon

## Is it Possible?

CIOB CPD Dec 2015



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# CIOB Q?

- Our members are interested in Zero Carbon and where it is now within construction.
- We hear a lot on “buildings must be zero carbon” and then others talk about “it is not possible”
- I think mainly it is cost prohibitive but you may know otherwise.



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Investing in Opportunities



This project has received  
European Regional  
Development Funding  
through INTERREG IV B.

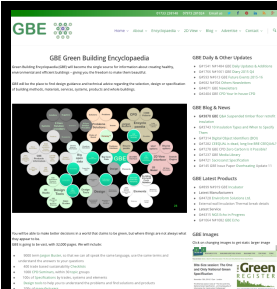


INTERREG IVB

# Government takes next step on zero carbon homes

01/12/15

3



2012

- “25% of carbon emissions produced each year come from our homes, so it is vital we get to grips with energy efficiency to tackle this problem.
  - Making our homes more sustainable will also keep people warm, drive down bills and support jobs in the construction industry.
- “The Coalition is committed to being the greenest government ever,
  - so improving the energy efficiency of our existing buildings through the Green Deal,
  - and ensuring that all new homes are zero carbon by 2016 is a top priority.

# Zero-Carbon Homes

## February 2012

- **Proposals to cut carbon emissions in new and existing buildings by DCLG**
- **Changes to building regulations would make new homes, shops and offices warmer and cheaper to run, support growth and take England a step closer to meeting its bold low carbon commitments.**
- **New measures, developed together with the construction industry, will help reduce the regulatory cost for businesses,**

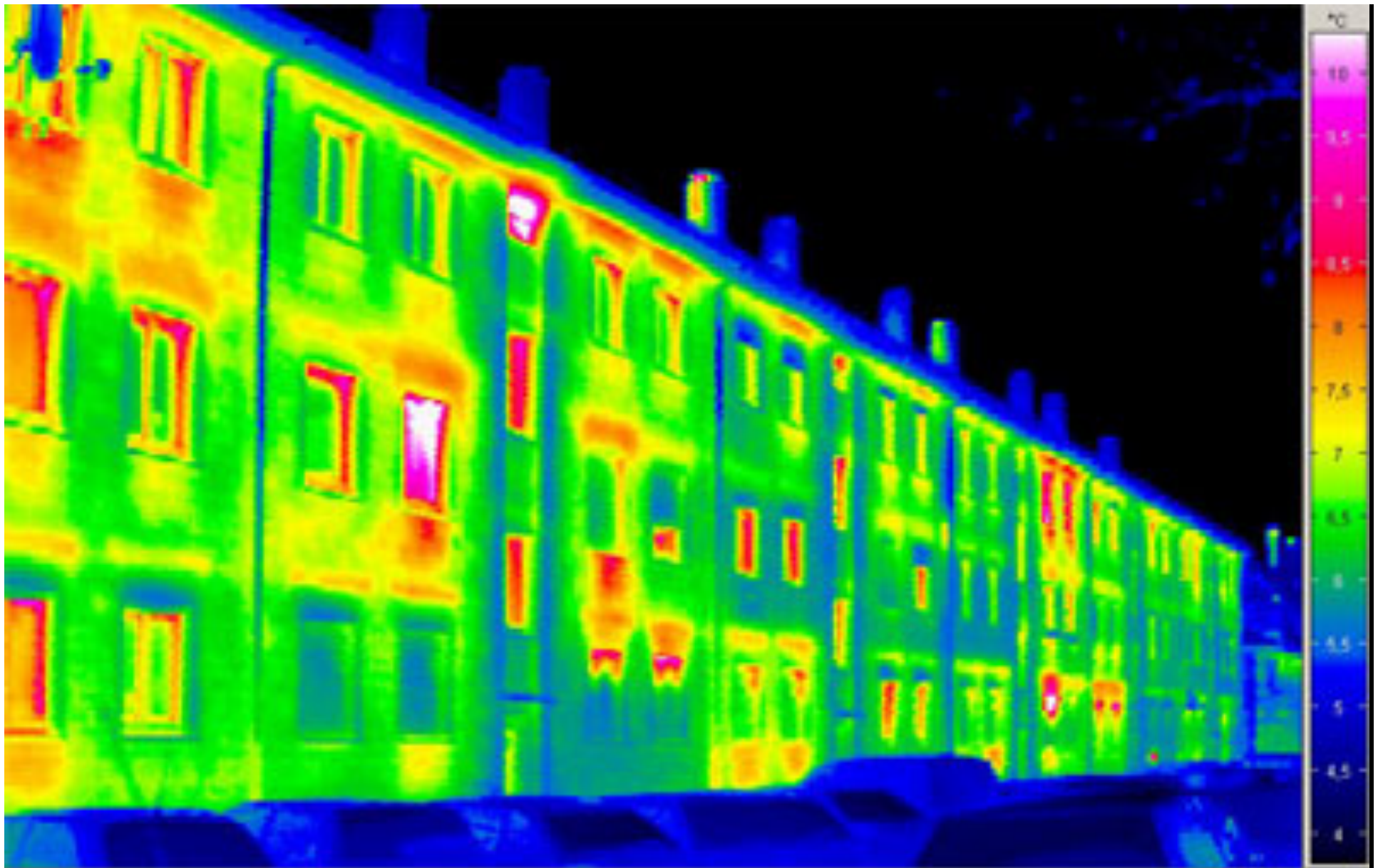
# Building Regulations consultation Feb 2012

- Amendments come into force in 2013,
- Will save over £63 million a year for businesses by cutting excessive red-tape
- typically save householders over £150 a year on energy bills compared with homes being built in May 2010.

# Green Deal

## Autumn 2012

- Proposals will help roll out by stimulating demand, whilst helping to cut both carbon emissions and energy bills for householders.
- It failed by being so top heavy with 'proof' of competency the risk to the funders meant the interest rates were 3 times what was bearable







# Zero Carbon Is It Possible?

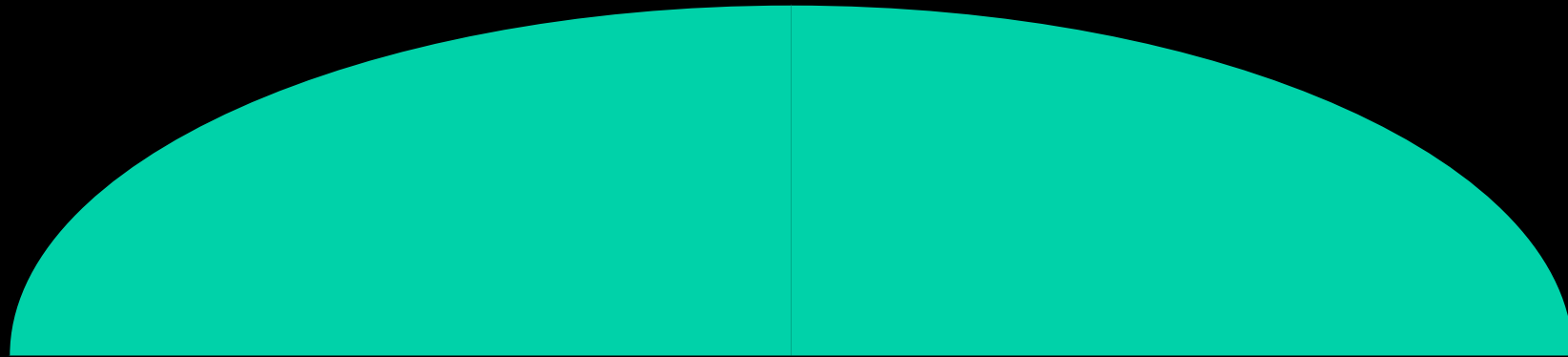
- Not with the
  - “Greenest Government Ever”
- Who claim:
  - To be “as committed to carbon reduction as ever”
  - To have achieved 2020 targets early so stopped
- Ignoring Stern Report

# Zero carbon

## Is it even desirable?

- When UK Government announced Zero Carbon
- Europe laughed out loud
- With whom and with what?
- We are so far behind the rest
- Well it is easier to chase your prey
- But this is not easy and we need to learn how

# Learning Curve Forgetting Curve



70's & 2 Oil Crisis

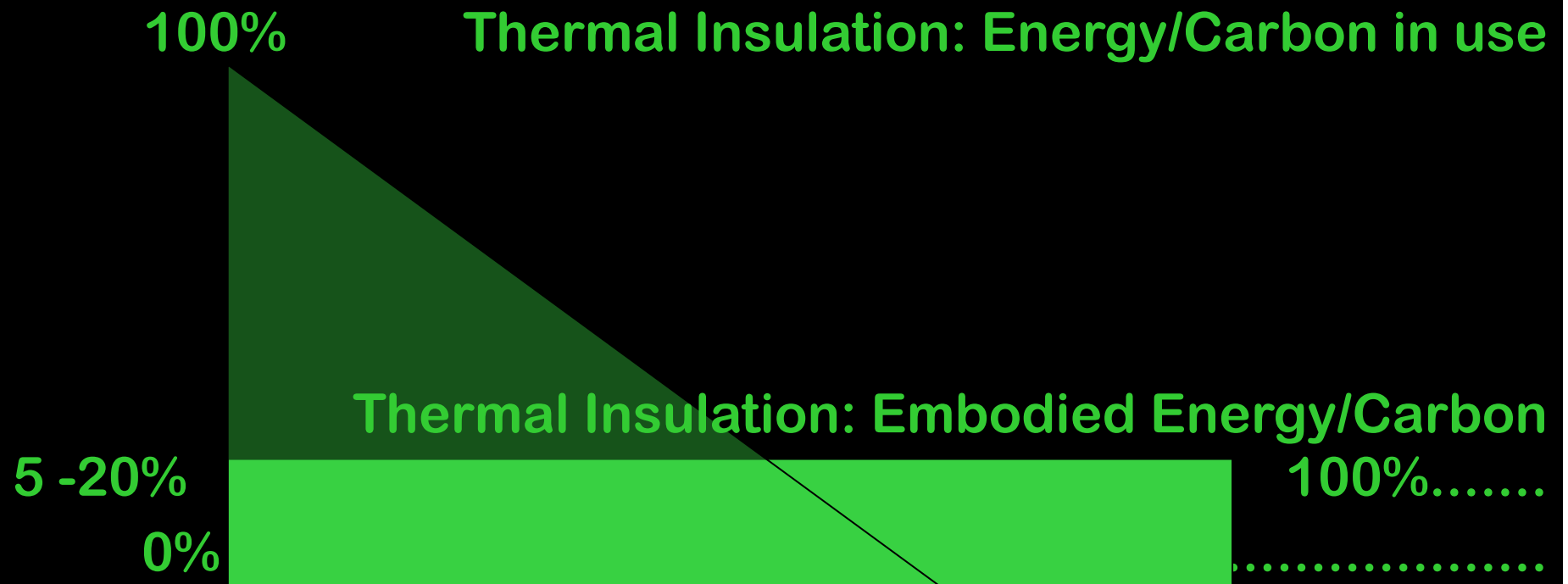
80's Energy World @ Milton Keynes UK

Architects Journal: Energy Studies

Few individuals embraced the learning  
and carried the batten, full time, long term

Most Forgot

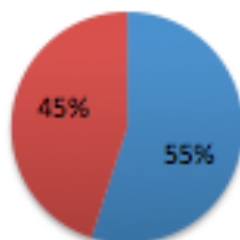
# Which Carbon?



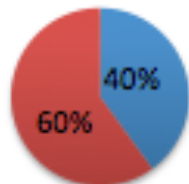
# Operational & Embodied Carbon Today & in 10 years time

RICS Report Redefining Zero

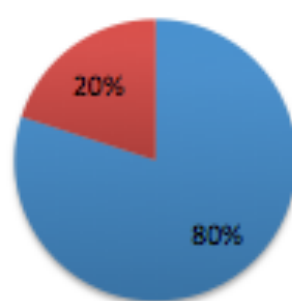
Offices Today



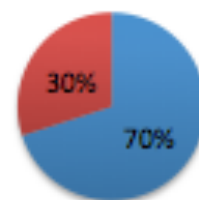
Warehouses Today



Supermarkets Today



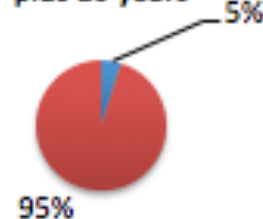
House Today



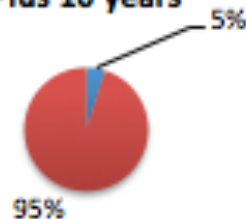
Offices  
plus 10 years



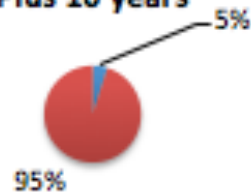
Warehouses  
plus 10 years



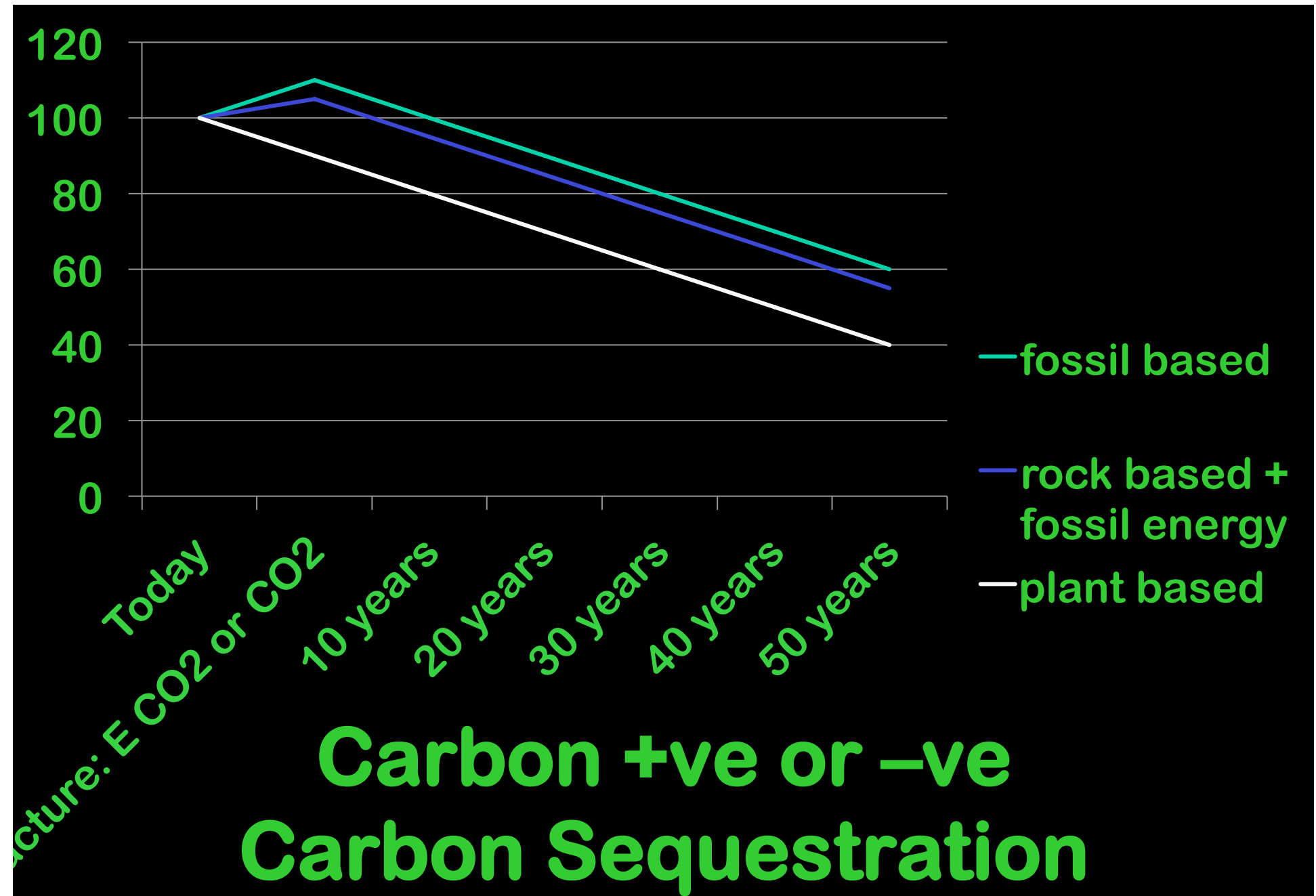
Supermarket  
Plus 10 years



House  
Plus 10 years



- Operational
- Embodied



# 80:20 Rule

- Pareto's Principle
- 80% is achieved with 20%
  - Design, effort, costs
- Last 20% achieved with 80%
  - Design, effort, costs
- Early decisions: Load bearing masonry
  - Dictates a significant % of the overall costs
  - But it dictates insufficient insulation
- Late decisions: Choosing paint colours
  - Dictates little of the overall costs
  - Or expensive nano-paints with little improvement in U value but improvement in comfort conditions



# Achieving 80% Carbon Reduction the expensive way!

Current situation

100% today

**Cut the Carbon Power stations:**  
Build more Nuclear  
Replace Coal, Oil, Gas  
Add Renewables

**Quad efficiency**  
Cut waste, CHP, CCHP

**Efficiency**  
Reduce demand



20%

Some time when  
JTL Just too late

# Achieving 80% Carbon Reduction the hard way!

Current situation

100% today

**Cut the Carbon Houses:**

Add renewables:  
PV, PV-T, ST, Wind,  
GSHP, ASHP, WSHP

**Efficiency**

Reduce demand  
Insulate  
Low flow taps  
Appliances

**Lifestyle**

Turn stuff off

Some time when  
JTL Just too late

# Achieving 80% Carbon Reduction is easy!

UsableBuildings Bill Bordass

Current situation

100% today

Halve the demand

Insulation & Airtightness  
Thermal breaks  
Passive Design

50% (-50%)

Double efficiency

Equipment Appliances

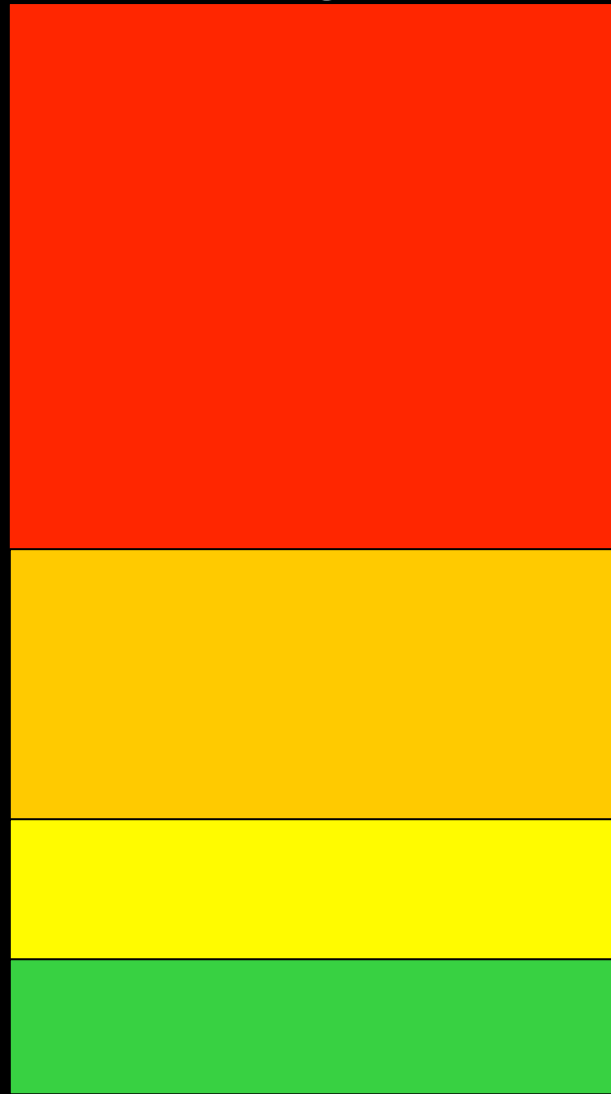
25% (-75%)

Halve the carbon

In the supply/mains  
Get off mains supply

12.5% (-87.5%)

Some time soon



# Achieving 80% Carbon Reduction is easy!

UsableBuildings Bill Bordass

Current situation

100% today

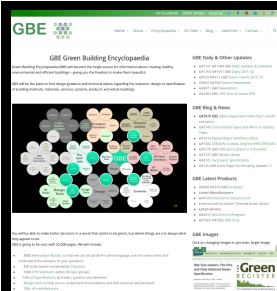
Education

Children then adults



6.25% (-93.75%)

Some time soon <sup>20</sup>



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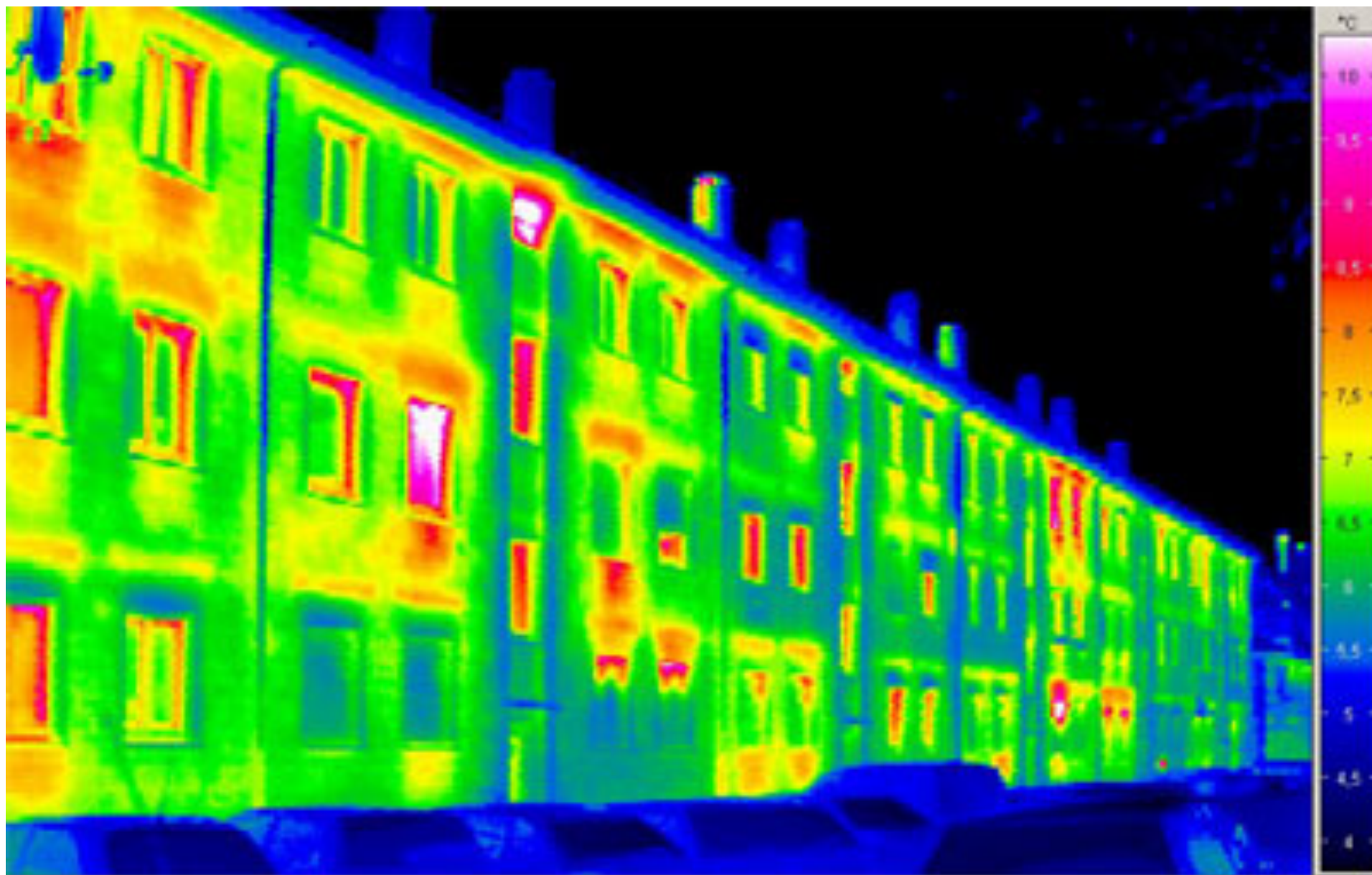
# Government Failed:

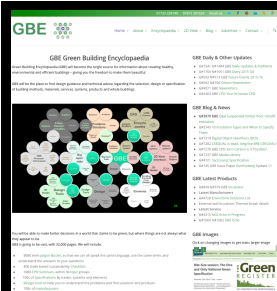
- Turned CRC incentive into a tax
- Denied the poor to pay the rich in ECO
- Failed to enable GreenDeal
- Slashed FIT and RHI killing RE sector
- Introduced ESOS (Energy Audit)
  - Energy Saving Opportunity Scheme
  - Not for SME but Big Business

01/12/15

- only 1% of UK businesses 53% of turnover

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# Zero Carbon Hub

- **Government Announcement 13/07/15**
  - No longer chasing Zero Carbon
- Time to consolidate and learn what has been discovered so far
- Delay in BRAD L upgrade
- ZCH are considering rename to:
  - Nearly Zero Carbon Hub!

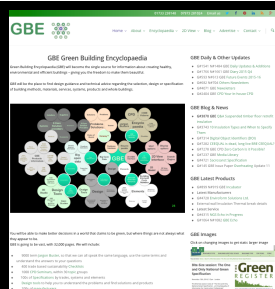
# Zero Carbon? BRE advising

- **Green Guide to Specification**
  - Violet construction methods and materials
  - Must use them to get BREEAM credits
- **Environmental profiles (LCA and EPD)**
  - Violet Products
  - EPS encourages poor performing products



# Government is business focussed, failing in Governance

- This UK Government is prepared to suffer the inevitable EU fines for missing emissions and pollution targets
- rather than spend money on solutions.
- All solution investments should have a long term and repeating effect
- E.g. insulate properties once v winter heating payments every year



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# The House of Lords

- voted to make thermal insulation of buildings part of Infrastructure
- where there is £billions in the budget to spend.
  - After: Crossrail, HS2, Crossrail 2
  - Thames Sewer, Thames Barrier 2?
- Insulation of buildings will reduce the demand for more power stations
  - Especially when many are ready to be decommissioned
  - Government want to ROW to build Nuclear in UK
    - Low-carbon but high radioactive waste and decommissioning burden
    - Risk of radioactive pollution of oceans on coastal sites



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# Zero carbon?

- Not with UK Building Regulations
- Out of sync with any set Targets
  - Least of all carbon
- Focused on energy efficiency driven by U values ignoring overheating
- BRAD L was to be updated to fill CfSH chasm
  - Delayed 13/07/15



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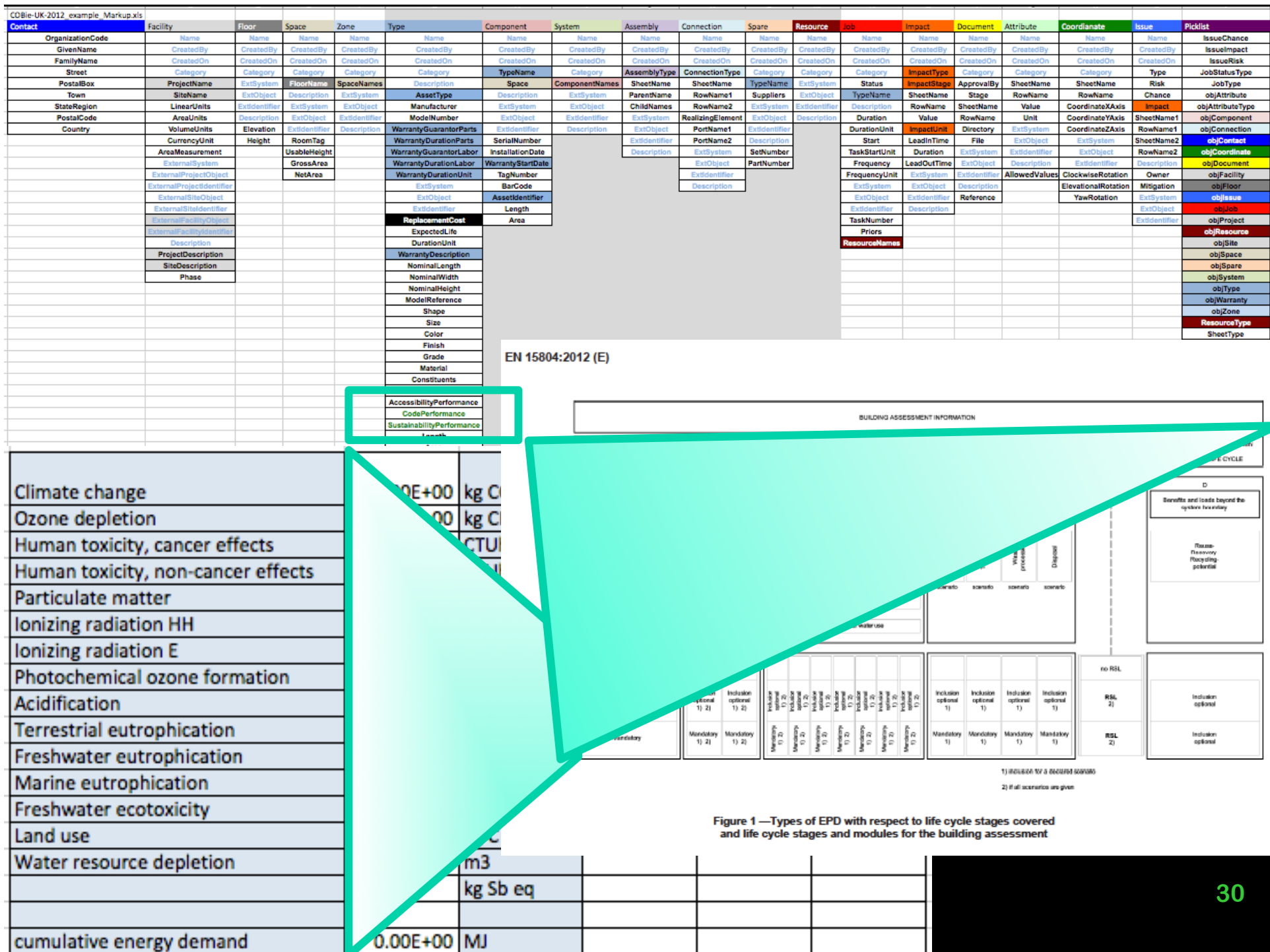
# Zero carbon?

- Not with the current industry
- Suffering from major Performance gap
- 20% of housing is overheating
  - ZCH do not understand it yet
- ZCH and major house builders
  - trying to meet carbon targets
  - And avoid consumer backlash
  - But do not understand how yet

01/12/15 ZCH guides and Builders Book

# Zero Carbon Will BIM help?

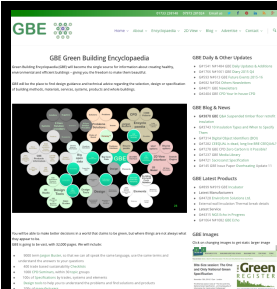
- National BIM library
- Full of dumb data models
- No Carbon Datasets included
- No LCA and No EPD data included
- COBie and IFC cannot cope with EPD
- 1 table has to fit in one cell



# Zero Carbon?

## Will Big Data help?

- We now have information technologies and a global data infrastructure that will accelerate us towards BIM *evolution*
- allowing us to remake the industry in novel, but desperately needed, ways;
- transforming an adversarial self-serving Construction Industry into a low cost, low carbon Built Environment industry that sustainably serves society.



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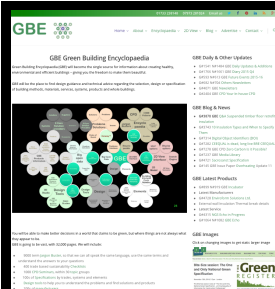
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# Performance Gap?

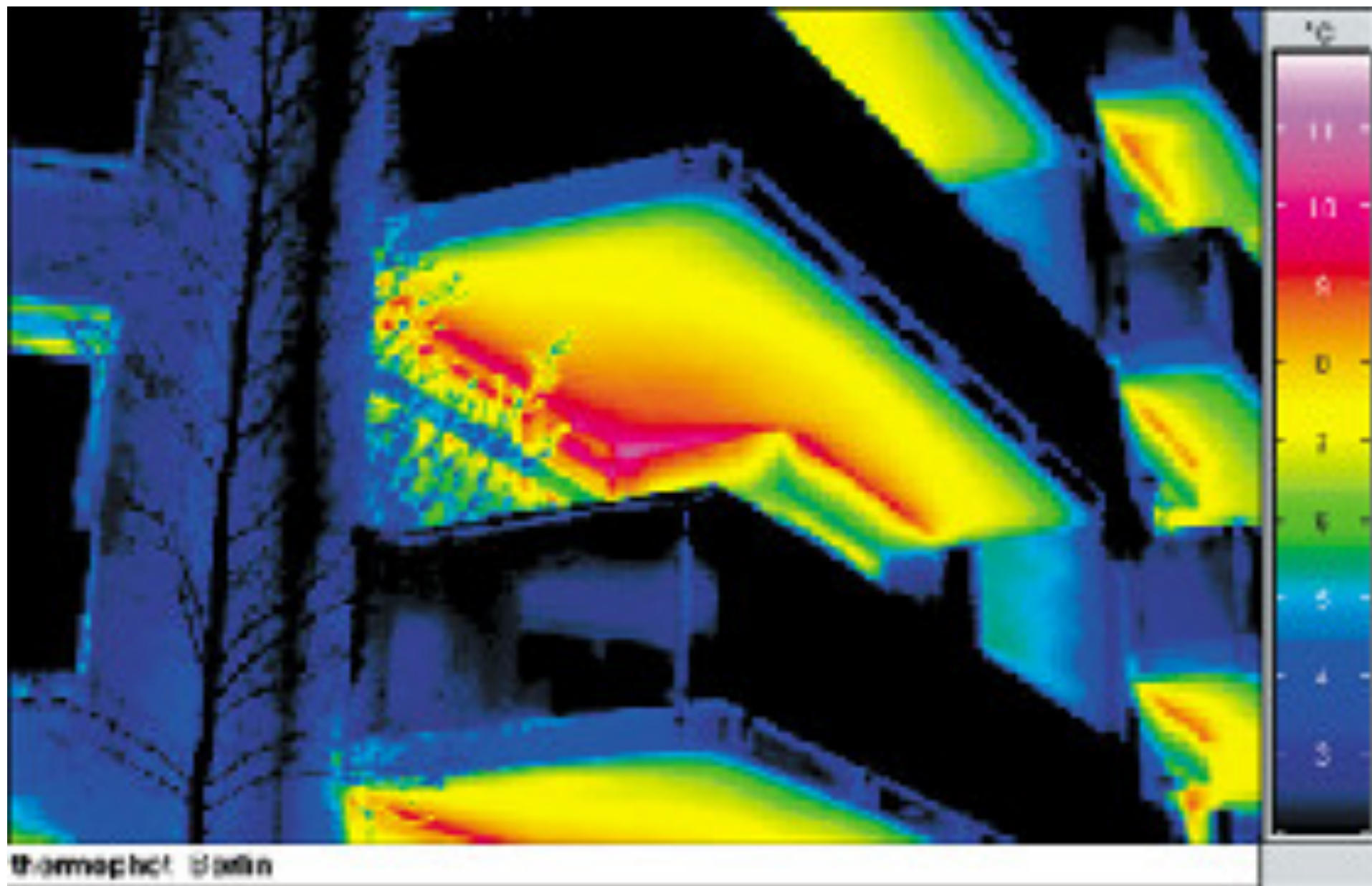
- Paid by the quantity of work built
  - not the quality of building performance
- BRAD L inadequate BCO inadequate
  - Low targets
  - Insufficient testing
- No accountability on site for performance of building
- Profits before People before Planet





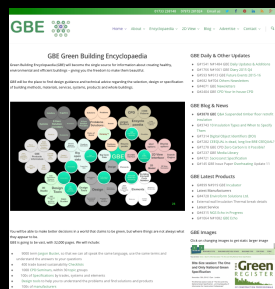
# Scrutinise the Detail

- Don't take anything as presented to you
- Test it in your mind and question the claims
- Test it in your software
- Test it in a rig (£££)



# The Construction Industry

- There are others that know what they know
  - and to change is expensive
  - Safety margins in pricing
  - Not competent in new methods
  - New skills training needed
    - Not more of the same
- Instead use different people who do know how



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# The Greens

- There are plenty of campaigns, initiatives, research and methods available to meet and exceed these targets.
- And there are more intelligent approaches to consider in the Bio-based world.
- There are people who say its all possible and easy



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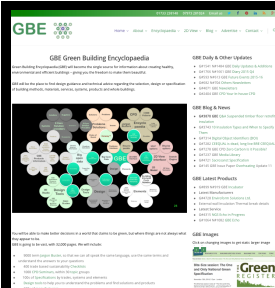


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# The Greens

- AECB Association of Environment Conscious Building
- TGR The Green Register of Construction Professionals
- Membership who understand Design & Decision tools, materials and methods



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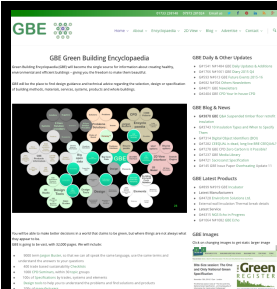


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# The Tools

- Passivhaus PHPP Calculators
- Passivhaus Designers
- AECB Carbon Lite Design Guides
- EnerPHit for refurbishment
- Green EnerPHit from AECB



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# Green Guidance

- **Passive House+ Magazine**
  - AECB are now adding content
- **STBA Sustainable Traditional Building Alliance**
  - Historic Fabric Refurbishment
  - Online Tools
- **CoRE Centre of Retrofit Excellence**
  - Training

01/12/15

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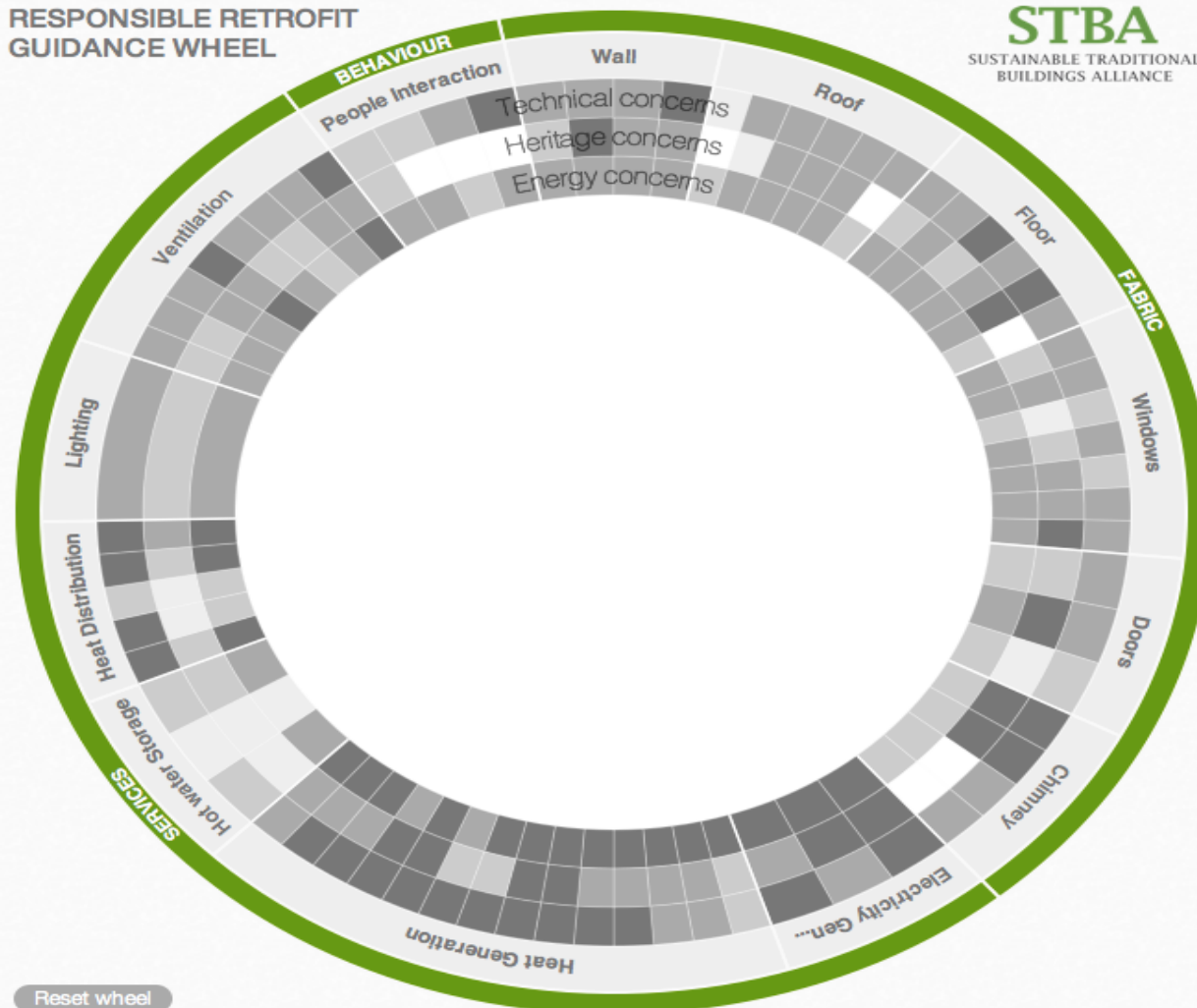


Type search here ...

All Categories



## RESPONSIBLE RETROFIT GUIDANCE WHEEL



**STBA**

SUSTAINABLE TRADITIONAL  
BUILDINGS ALLIANCE

GETTING STARTED

ABOUT

GLOSSARY

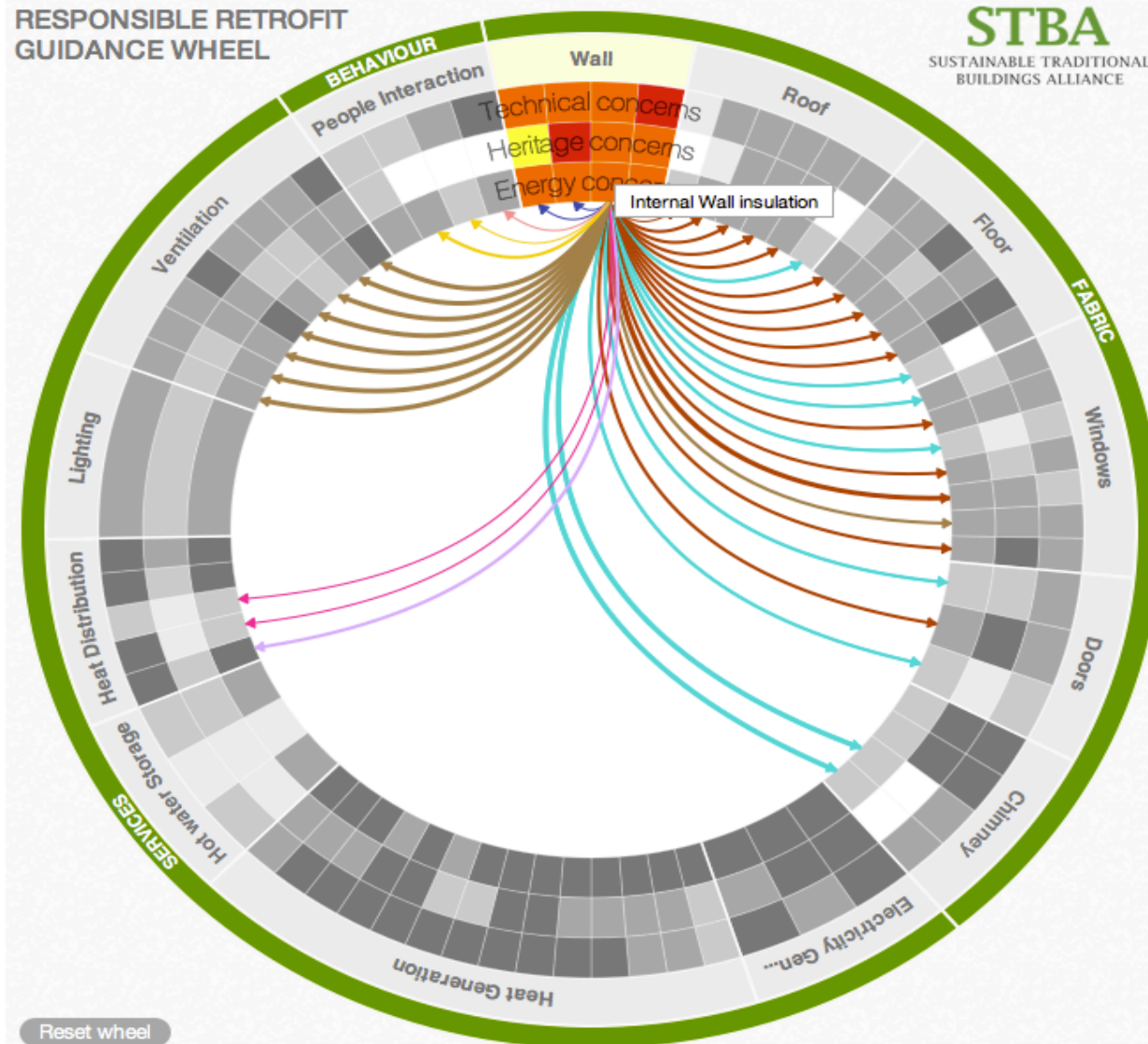
REPORT

► Colour key

► Building context



## RESPONSIBLE RETROFIT GUIDANCE WHEEL



### ► Colour key

### ► Building context

#### Wall

### Internal Wall insulation

Insulation material is fixed to the inside surface of external walls and new internal finishes applied or insulation is blown behind existing linings

ADD TO LIST

CLOSE MEASURE

### ► Advantages

### ► 8 Technical Concerns

### ► 3 Heritage Concerns

### ► 3 Energy Concerns

### ► Related measures

# ASBP Alliance for Sustainable Building Products

- Promoting Better than Business as Usual
  - Sustainable Solutions
  - Resource efficiency
    - Circular Economy
  - Low Carbon Construction
    - Low carbon materials
      - Carbon sequestration (Carbon negative)



# EPC

- Energy Performance Contracting
- Commonplace in FM contracts
- Schools Facilities Management
- Private Commercial Estate Management

# Horizon 2020 R&D projects

- **Built2Spec** [www.built2spec-project.eu](http://www.built2spec-project.eu)
- **Reducing the Energy Performance Gap**
- **Boosting Construction Practices**
  - New set of excellent building science technologies and techniques
  - Create new knowledge for inspection, check processes and automate it.
  - IDDS resource accessible on-site
  - Create synergies and new functionalities through integration



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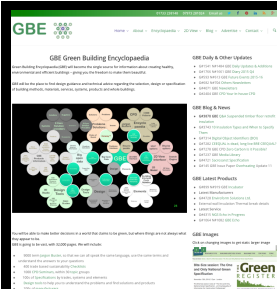


# Built2Spec Outputs

- Energy Efficiency Quality Checks
- Thermal Imaging Tool
- Indoor Air Quality Tool
- Airtightness Testing Tool
- Acoustic Tools
- 3D and Imagery Tools
- Smart Building Components
- Building Information Modeling
- Virtual Construction Management Platform

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# Built2Spec Objectives

- Create new capabilities
- Introduce mobile devices to site
- Gain efficiency reduce administrative burdens on workers inspectors and managers
- Automate data capture, inspection steps, quality checks, measure with smart devices, intelligent surveys, data analytics
- Gain levels of performance by linking data, integrated collaborative design and construction management framework
- Make this technically feasible, cloud capable, synchronized devices, office/site, via platform



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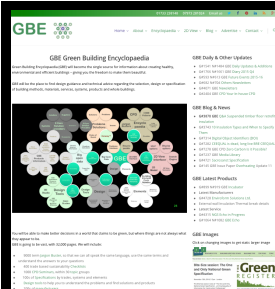
# Built2Spec

- Every Quality Related Event and Check point is added to project tool
- Checks the person carrying out a task is competent
- Checks are made and recorded against individuals
- Handovers are signed off between trades
- Everybody becomes accountable for their actions
- Actions enable sign-off
- Sign-off releases payments

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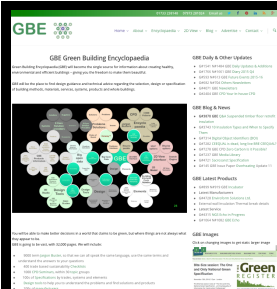


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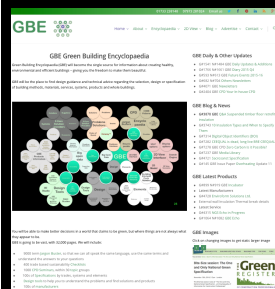
# Sampler

- This is a cut down version of the original file to give you a sample of the whole
- It's the front end of the file with the middle and rear end deleted
- Go to [www.GreenBuildingEncyclopaedia.uk](http://www.GreenBuildingEncyclopaedia.uk)
- to download the whole file
- You will find a large number of other files there too



# Feedback

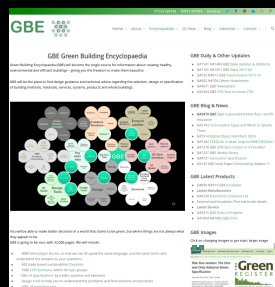
- These files are created by generalists with a big dollop of green flavour
- These files are updated from time to time
- We are not experts so from time to time these file may get out of date or may be wrong.
- If you feel that we have got it wrong please let us know so we can put it right



Another GBE CPD file to download  
and [www.greenbuildingencyclopaedia.uk](http://www.greenbuildingencyclopaedia.uk)  
ZeroCarbonIsItPossible?

01/12/15

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- **Brian Murphy BSc Dip Arch (Hons+Dist)**
  - Architect by Training
  - Specification Writer by Choice
  - Environmentalist by Actions
- Greening up my act since 1999
- Founded National Green Specification 2001
- Launched [www.greenspec.co.uk](http://www.greenspec.co.uk) 2003
- Created: GBE at [www.greenbuildingencyclopaedia.uk](http://www.greenbuildingencyclopaedia.uk) 2015
- E [BrianSpecMan@aol.com](mailto:BrianSpecMan@aol.com)
- Twitter: <http://twitter.com/brianspecman>
- Scribd: <http://www.scribd.com/brianspecman>
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- LinkedIn: