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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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Government takes next step on zero carbon homes

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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.

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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,

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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.

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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

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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

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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

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Learning Curve Forgetting Curve

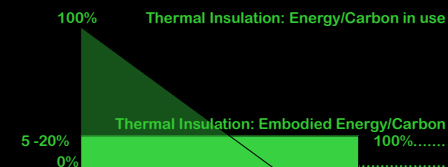


70's & 2 Oil Crisis
80's Energy World @ Milton Keynes UK
Architects Journal: Energy Studies
Few individuals embraced the learning
and carried the batten, full time, long term
Most Forgot

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Which Carbon?

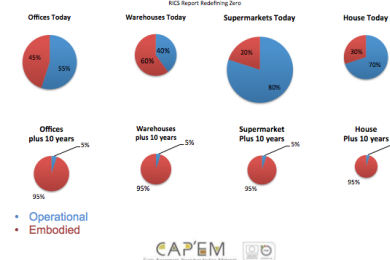


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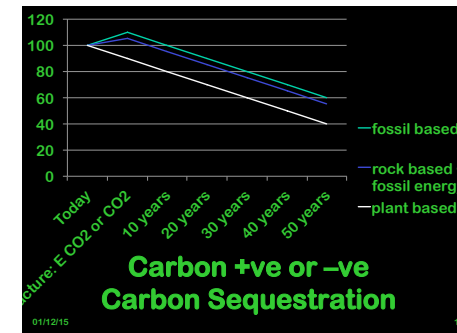
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Operational & Embodied Carbon Today & in 10 years time



- Operational
- Embodied

CAPeM
Carbon Assessment Platform for the Built Environment

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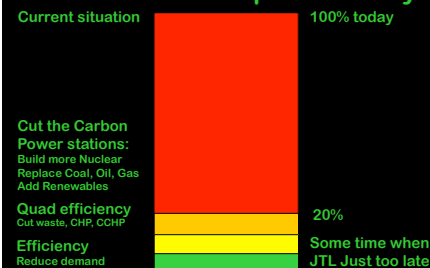
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80:20 Rule

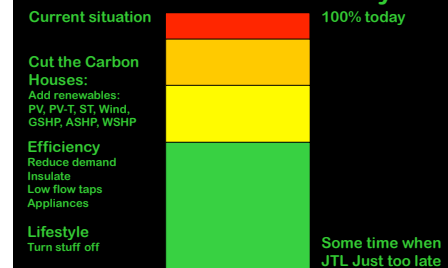
- Pareto's Principle
- 80% is achieved with 20%
 - Design, effort, costs
- Last 20% achieved with 80%
 - Design, effort, costs
- Early decisions: Load bearing masonry
 - Dictates a significant % of the overall costs
 - But it dictates insufficient insulation
- Late decisions: Choosing paint colours
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

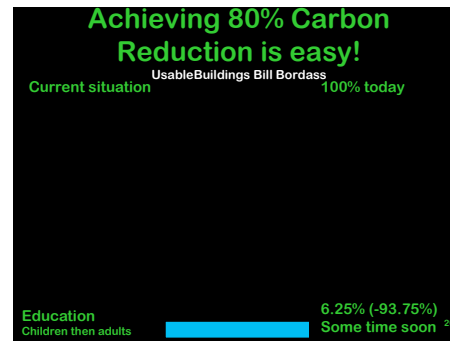
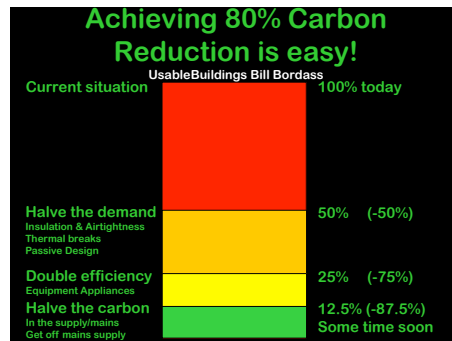
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Achieving 80% Carbon Reduction the expensive way!



Achieving 80% Carbon Reduction the hard way!





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 21



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!

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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

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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

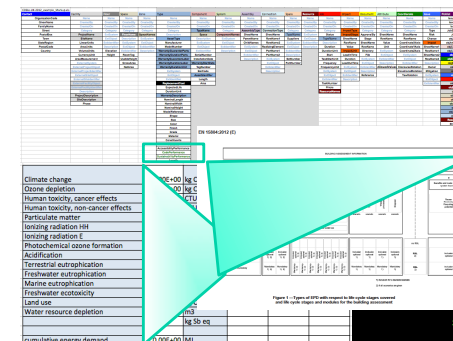
01/12/15 ZCH guides and Builders Book 28

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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

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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.

01/12/15 (Paul Fletcher 2012) 31

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Performance Gap?

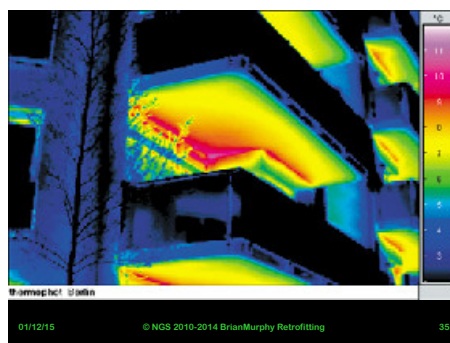
- Paid by the quantity of work built
 - not the quality of building performance
- BRAD L inadequate BCO inadequate
 - Low targets
 - Insufficient testing
- No accountability on site for performance of building
- Profits before People before Planet

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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 (£££)

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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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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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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

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STBA
SUSTAINABLE TRADITIONAL BUILDING ALLIANCE

WELCOME TO THE RESPONSIBLE RETROFIT KNOWLEDGE CENTRE

RESPONSIBLE RETROFIT GUIDANCE WHEEL

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STBA
SUSTAINABLE TRADITIONAL BUILDING ALLIANCE

WELCOME TO THE RESPONSIBLE RETROFIT KNOWLEDGE CENTRE

RESPONSIBLE RETROFIT GUIDANCE WHEEL

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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)

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EPC

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

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Horizon 2020 R&D projects

- Built2Spec 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.
 - DDS 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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- Brian Murphy BSc Dip Arch (Hons+Dist)
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 - Specification Writer by Choice
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- Greening up my act since 1999
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