



<https://GreenBuildingEncyclopaedia.uk>



Green Building Calculator

<https://GreenBuildingCalculator.uk>

One Planet Lifestyle: What does zero carbon home & living look like?

07 May 2023 12:00 - 12:45 Sustainable Future Theatre
Grand Designs Live 2023

© NGS GBE GBC GRC 2011-2023
BrianSpecMan Murphy GBC Number-Cruncher
Grand Designs Live 2023
representing HiiGuru ask an expert



Need some expert advice?

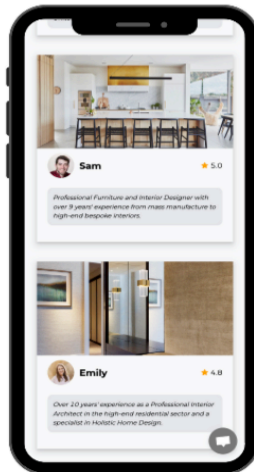
Chat with top home design & build experts
at a fraction of the cost

1



Select a Category

2



Choose Your Guru

3



Book a Slot

4



Get Live 1:1 Advice



Access vetted experts



Save time & stress



Avoid expensive mistakes



Create a home you love with an expert by your side

Book a Guru today at Stand E125 to get:

- 20% off any service
- a chic HiiGuru tote bag
- an ultra lightweight mini tape measure





The screenshot displays the 'Green Building Calculator V2' interface. On the left, there are several data tables with columns for categories like 'Material', 'Energy', 'Water', and 'Carbon'. The main area features the 'GBC' logo in large green letters, followed by 'Green Building Calculator' in a smaller green font. To the right of the text is a network diagram consisting of interconnected nodes in various colors (green, blue, orange, red).



Brian

New!

Book Now

Message

Award-winning Professional Eco-Home Advisor with over 45 years' experience in Architecture & Construction and over 23 years' experience in Sustainable & Environmental design.

Areas of expertise

- Green construction choices
- Environmental specifications
- Sustainable materials
- Energy, carbon & cost efficiency calculations

Qualifications

- BSc Degree (Hons) & PG Diploma (Distinction) in Architecture from London Metropolitan University — ONC & HNC Construction from Peterborough Regional College



30-Minute Video Chat- Environmental Design & Construction Advisor

Get live, 1:1 advice from a vetted vetted Eco-Construction Professional over video chat

£35 | \$45

Check Availability

Learn More

Visit www.hiiguru.com/brian to book a chat

Brian Murphy

- **ONC & HNC Construction**
- **BSc Degree Architecture (Honours)**
- **PG Diploma Architecture (Distinction)**
- **Technician and Architect by training**
- **Specification Writer by choice (e.g. British Library)**
- **Environmentalist by action**
- **Educator by calling**
- **Carbon Counter by necessity**
- **Building Tour Guide for Fun (E.g. British Library)**
- **45 Years of experience in violet construction**
- **39 years in specification (£2420m project value, no not income)**
- **23 years in environmental**
- **15 years in education**
- **11 years building carbon calculators**
- **Pensioned off but not finished**

**British Library
£511m**

**1st Freelance
commission**

**Contract
Specification
writing**

8 years



Aberystwyth University Arts centre & Dance School extensions: Specifications




**BCT & RSPB
RIBA Publishing
1st & 2nd editions
BRM Wrote 50%
of book
10 Future proof
construction
methods
3D cutaways
2D Sections
Details and
Specifications
Product Critique**

Biodiversity for Low and Zero Carbon Buildings

Dr Carol Williams of the Bat Conservation Trust



RIBA  Publishing

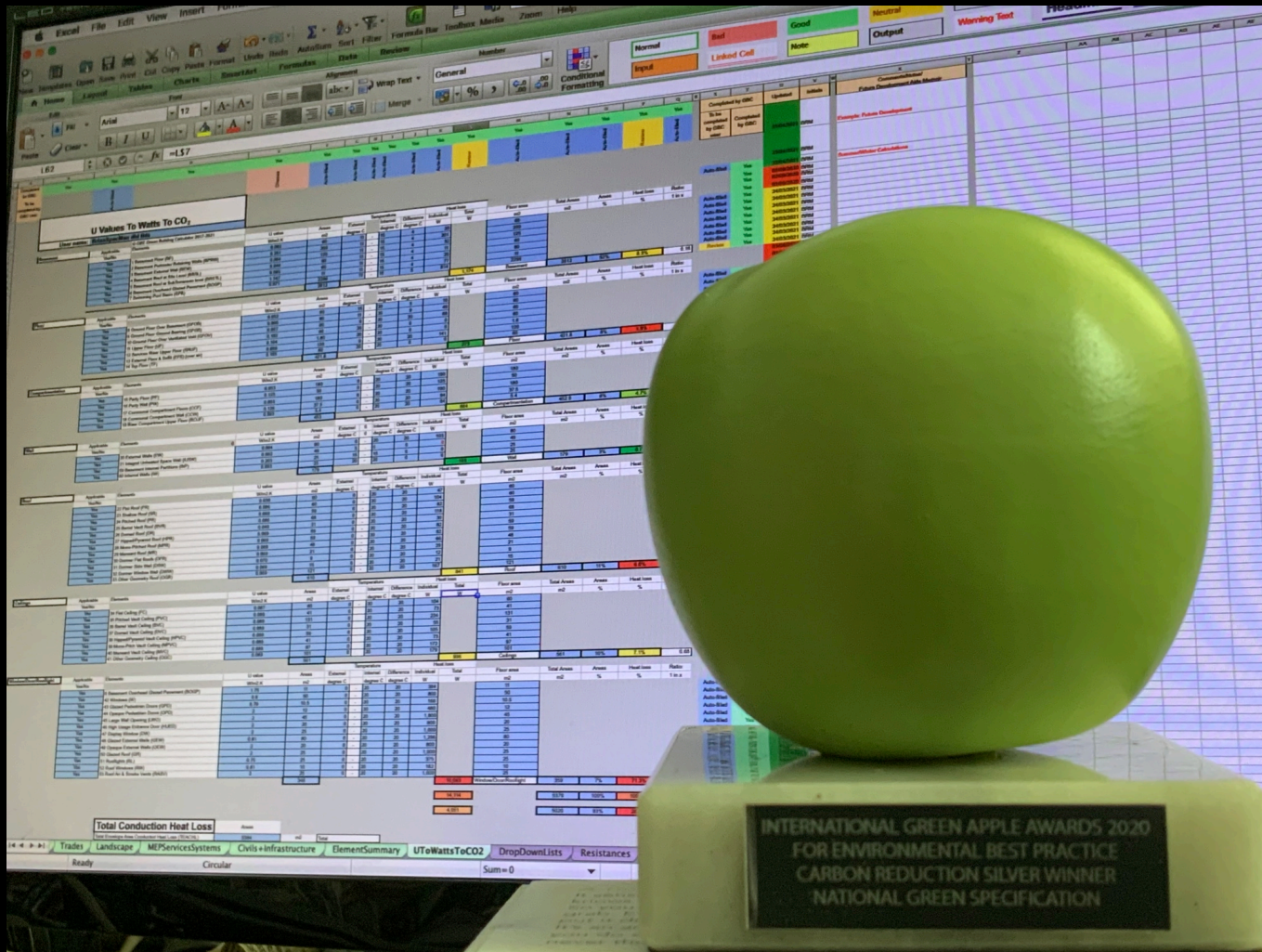


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Green Apple Award 2020 International Silver for Carbon Reduction



Green Retrofit Calculator

Completed by GBC		U Values To Watts To CO ₂														Scenarios					Completed by GBC	
To be completed by GBC user		Elements														Scenarios					To be completed by GBC user	
		DR Check Actual														Previous Proposed 1 Improvement Proposed 2 Improvement						
Scenario: Proposed 2		© STBA 2021 developed by GBC and STBA														Scenario: Normal						
Floor		Temperature Heat loss														Scenario: Normal						
No		Calculated U value Area External Internal Difference Individual Total Area Total Area Area Heat loss Ratio														Scenario: Normal						
Yes		Ground Bearing Solid Floor (GBP) Suspended Ground Floor (SGF)														Scenario: Normal						
Compartment Floor		Temperature Heat loss														Scenario: Normal						
No		Calculated U value Area Party Internal Difference Individual Total Area Total Area Area Heat loss Ratio														Scenario: Normal						
Yes		Party Floor (PF) Solid Masonry Party Wall (SMPW) Cavity Masonry Party Wall (CMPW) Timber Frame Party Wall (TFPW)														Scenario: Normal						
Wall		Temperature Heat loss														Scenario: Normal						
No		Calculated U value Area External Internal Difference Individual Total Area Total Area Area Heat loss Ratio														Scenario: Normal						
Yes		Solid Masonry External Wall (SMEW) Cavity Masonry External Wall (CMEW)														Scenario: Normal						
Roof		Temperature Heat loss														Scenario: Normal						
No		Calculated U value Area External Internal Difference Individual Total Area Total Area Area Heat loss Ratio														Scenario: Normal						
Yes		Flat Roof (FR) Pitched Roof (PR)														Scenario: Normal						
Window/Door/Rooflight		Temperature Heat loss														Scenario: Normal						
No		Calculated U value Area External Internal Difference Individual Total Area Total Area Area Heat loss Ratio														Scenario: Normal						
Yes		Windows (W) Glazed Pedestals (GP)														Scenario: Normal						
Total Envelope		Total Envelope Heat Loss (TEHL) Total Transmitted Area of Combined Heat Loss (TACHL) Total Opaque Area of Combined Heat Loss (TOACHL) Transparent area as % of whole Total Envelope heat loss as % of whole heat loss														Scenario: Normal						
Total Envelope Heat Loss (TEHL)		111.7 m ²														Scenario: Normal						
Total Transmitted Area of Combined Heat Loss (TACHL)		3.8 m ²														Scenario: Normal						
Total Opaque Area of Combined Heat Loss (TOACHL)		55.8 m ²														Scenario: Normal						
Transparent area as % of whole		5.9%														Scenario: Normal						
Total Envelope heat loss as % of whole heat loss		34.8%														Scenario: Normal						
In-Use Energy		Energy Intensity														Scenario: Normal						
No		Floor area Walls Windows Doors														Scenario: Normal						
Yes		36.270 m ² 481.798 W 0.462 kWh/m ² 0.013 kWh/m ² 0.204 kWh/m ² 7.389 kWh/m ² 0.204 kWh/m ² 30.856 kWh/m ² 865.097 kWh/m ²														Scenario: Normal						
In-Use Carbon Dioxide		CO ₂ Carbon Dioxide														Scenario: Normal						
No		Fuel Choice kg CO ₂ /MWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh kg CO ₂ /kWh														Scenario: Normal						
Yes		0.186 1.374 0.334 83.378 143.143 153.509														Scenario: Normal						
In-Use Hours to Whole Life		Hours of operation per day (Spaces heated) Days Per week (Spaces heated) Weeks per month (Spaces heated) Months per year (Spaces heated) Weeks per year (Spaces heated) Days per year Hours per year (Spaces heated) Hours per building life														Scenario: Normal						
No		24 7 4.33 12 52 895 8,760 245,280														Scenario: Normal						
Yes		24 7 4.33 12 52 895 8,760 245,280														Scenario: Normal						
In-Use Running Costs		E in-use cost/whole life														Scenario: Normal						
No		E in-use cost/whole life														Scenario: Normal						
Yes		£3,051.71														Scenario: Normal						
Embodied Energy to Sequestered Carbon		Embodied Carbon Dioxide Sequestered Carbon Dioxide Total Carbon Dioxide														Scenario: Normal						
No		Embodied Carbon Dioxide Sequestered Carbon Dioxide Total Carbon Dioxide														Scenario: Normal						
Yes		5,876.76 kg CO ₂ 1,044.82 kg CO ₂ 4,831.94 kg CO ₂														Scenario: Normal						

Sustainable Future Theatre

One Planet Lifestyle: What does zero carbon home & living look like?

 07 May 2023  12:00 - 12:45  Sustainable Future Theatre

Remember what a simple, internet-free, stress-free world felt like? Each new technology brings an increase in our carbon footprint. The average UK citizen today is living a three planet lifestyle and yet we only have one. To bring us all back to a one planet lifestyle and to consume only our fair share, we need to strive for the levels of consumption from years past. Join this talk to understand how we can all do our part, starting from our homes.

Chairperson



Brian Murphy, Environmental design & Construction advisor - HiiGuru.com

Speakers



Kevin McCloud

- On the eve of the event Kevin McCloud was invited to do a 121 with Brian Murphy
- What follows are the prepared but not show slides

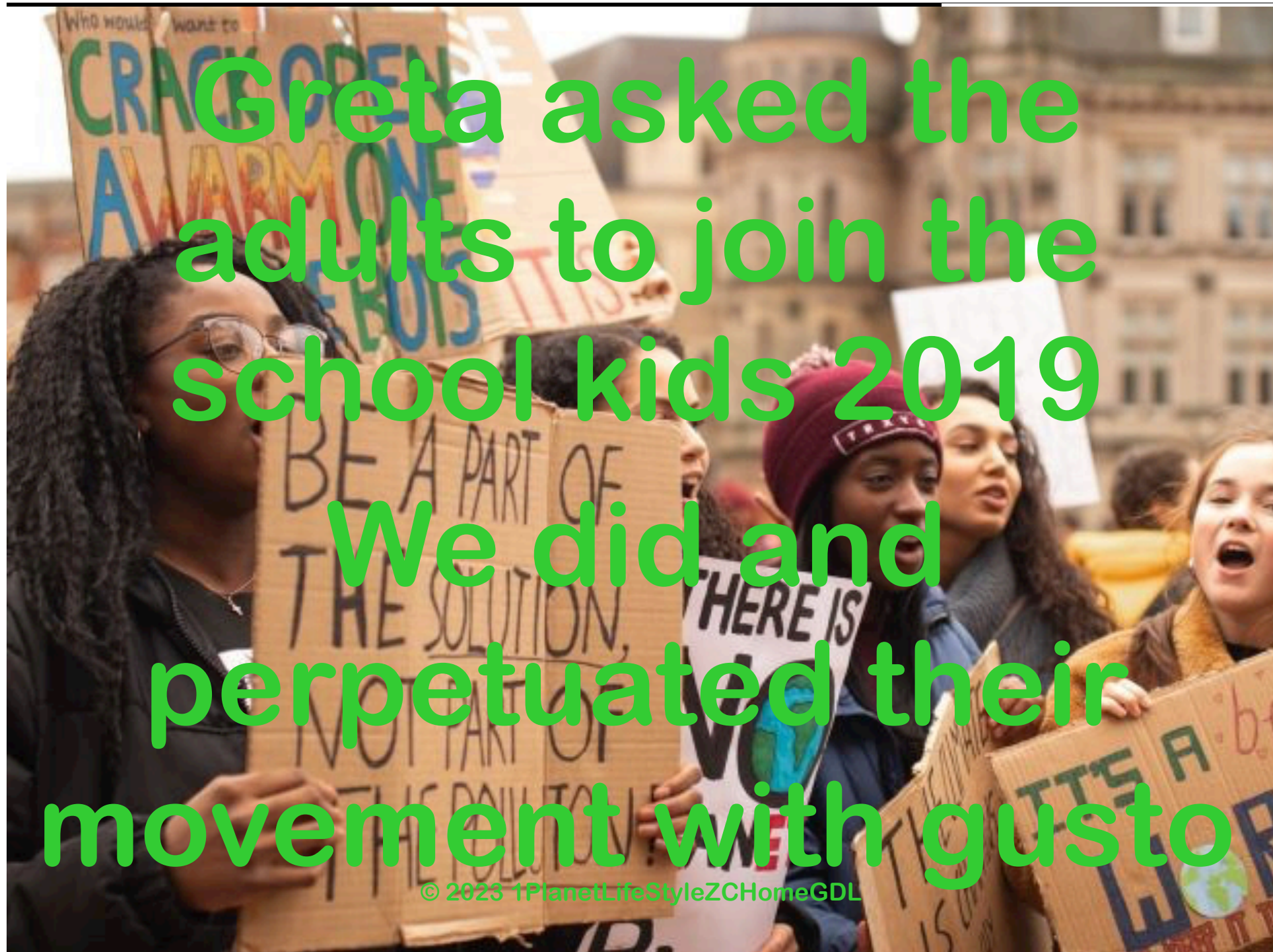
- Remember what a simple, internet-free, stress-free world felt like?
- Each new technology brings an increase in our carbon footprint.
- The average UK citizen today is living a three planet lifestyle and yet we only have one.
- To bring us all back to a one planet lifestyle and to consume only our fair share, we need to strive for the levels of consumption from years past.
- Join this talk to understand how we can all do our part, starting from our homes.

I want I want I want
I am reminded to

**Be the change
you want to see in
the world**

Mahatma Gandhi





Greta asked the adults to join the school kids 2019

We did and perpetuated their movement with gusto



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Self-build
Self-manage
Custom-build



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ACAN launch

Householdsdeclare.org

[DECLARE!](#) [HOME](#) [OUR DEMANDS](#) [CONTEXT](#) [ABOUT](#) [RESOURCES](#) [SIGNATURES](#)



**HOUSEHOLDS
DECLARE!**



It's time for every UK household to declare a climate emergency

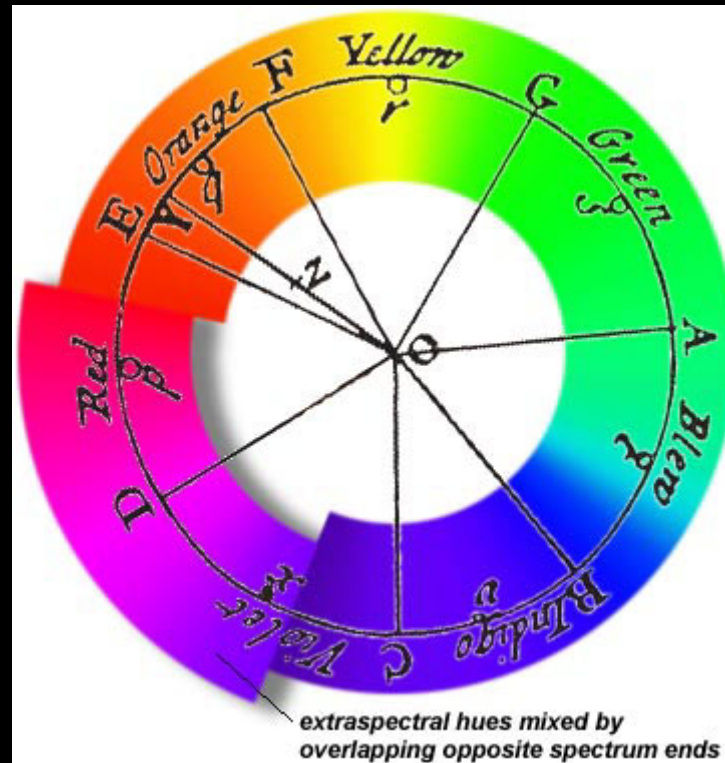
[▶ Read on ...](#)



DECLARE!

Sustainable Environmental Eco Green

Violet
Violent
Violate



One planet lives

- We only have one planet and 8,000,000,000 people 15/11/2022
- Will it plateau at 10 billion at 2050 as predicted?
- NW are opting for less kids
- SW are business as usual
- China's one child/family policy is history

Saving the planet?

- Sounds a bit hippy and receives a laugh or derogatory feedback
- Criminal record or prison sentences for XR for speaking out
- Dictatorship laws to silence the population of worried citizens
- Saving the planet for comfortable human and nature occupation
- We are already seeing some of the uncomfortable, in the news everyday
- Boiled Frog Syndrome
- Contraction and Convergence is the way forward
- Doughnut economics v Fiduciary Rule
- Profits for shareholders before people before planet
- HERACEY™ Healthy Environmental Resourceful Appropriate Competent Effective Yardstick = Sustainable

It does not apply to me!

- Climate Change sees no political or site boundaries
- Everyone will get some back lash
- Even if it is only financial
- We are all part of the problem
- We are all part of the solution
- Behaviour change is within our toolbox
- Pick up the tools and start tilling

Double ended funnel

- Increasing demands
- Reducing resources
- The longer we take to make environmental decisions
- The less choices we have available to us
- We risk not having a way through to the future
- This is not a worm hole to the future
- Nor an NASA SpaceX escape route to Mars

We need to aspire to a One Planet Lifestyle

- Average UK & EU Citizen lives a **three Planet Lifestyle**
- We lived a one planet lifestyle in 1972 Star wars, 1973 Tubular bells, 1976 10 week Heatwave and ladybird plague
- One family car, a few bikes
- A record playing stereo or hi-fi, a radio, a CRT TV, no CD, No DVD, Cassette player, a walkman
- A kettle, an oven and a small freezer in the fridge and a toaster
- 600cc to 2000cc small cars, exceptionally larger engine
- One nicker draw/person, One or two pair of shoes, 1-2 foot of clothing per person

What we did not have

- No 4 wheel drive for school runs, no 4 litre thug trucks
- No 3 car families
- No computers, no laptops, no mobile phone, no smart pad, no flat screen TV, No Wi-fi, No internet, no anti-social media
- No Jacuzzis, Hot tubs, saunas, Power Showers, Patio heaters
- **No Microwaves**, No Icemakers, Small freezer in the fridge,
- No energy saving light bulbs
- No coffee making machines, No smoothy makers, No ice makers,
- No coffee café culture, occasional tea rooms, no pavement cafe
- No multiplex or 3D cinema

Grand designers are not average UK and EU Citizens

- Council tenant 50m² and 100m² of land
- One guest at HiiGuru Ask an Expert:
 - 600m² and 2 acres = 12 planets
- Past Grand designers:
 - 20 km of copper cable: power, communications and entertainment in every room
- For every planet above one you want to live
 - somebody else has to live a zero planet lifestyle
 - Have your fair share and no more?

80-90% Reduction Is Easy

- Carbon Savings + Energy Savings + Cost savings
 - (not in equivalent percentages)
- New build is easy but not enough,
- Retrofit can be more difficult & expensive & slow
 - 1/2 50% reduction in energy demands = 50% (this is easy & cheap)
 - 1/2 25% increase in efficiency = 75% (better controls)
 - 1/2 12.5% carbon reduction in supply = 87.5% (expensive kit)
 - 1/2 6.25% let the school kids run the country = 93.75% (free)
 - Don't bother to ask a politician, they are too busy banking lobbying dosh, shareholder profits and expenses claims

Zero Carbon Home

- Zero carbon in energy in use
- Zero Embodied Carbon in materials
- Sequestered carbon
- Total carbon

Zero carbon in energy in use

- Form Factor suggests U Value targets
- Floor area: (determines energy consumption)
- Hours of occupation (heating or cooling)
- Lifestyle: clothing (dictates temperatures)
- Energy efficiency (U values) Regulations, Design Standards, Campaigns
- Energy Demands
- Fuel Choice determines carbon factor in fuel
- Consumed Carbon In use

Zero Embodied Carbon in materials

- Form Factor suggests U Value targets
- Floor area: (determines areas of materials)
- Energy efficiency (U values) Regulations, Design Standards, Campaigns
 - determines thickness of materials
- Areas x thickness = Volumes of materials
- Density: Determines weight
- Energy in production of materials
- Fuel Choice determines carbon factor in fuel
- Embodied Carbon In materials

Primary materials manufacturing carbon dioxide

- Total global man made CO₂: 9.4 Gt 2021
- Cement: 9% of total global manmade CO₂
- Steel: 7% of total global manmade CO₂
- Plastics: 4.5% of total manmade CO₂ = 2.2 bn tonnes 2015
- Aluminium: 3% of total global manmade CO₂ = 1.1 bn tonnes 2021
- Brick: 7-8% of total global manmade CO₂ (including concrete)
- Copper 0.2% of total global manmade CO₂
- Glass: 86 m tonnes manmade CO₂
- Lime: 58.6 m tonnes manmade CO₂
- Stainless steel: scrap 0.49 t CO₂/tonne

So what can we use instead?

- Natural and low processing materials
- Renewable materials
- Rapidly renewable materials
- Low chemistry
- Low embodied water
- Low to Zero plastic
- Plant based plastic

Natural and low intensity processing of materials

- Manual self build or artisan labour and 3 weatabix
- Stone: No cement or lime mortar
 - Earth mortar
 - Turf mortar
 - Dry stone walling
- Sub Soil
 - Cob
 - Structural (traditional cob)
 - Insulating cob (plant fibres and clay slip)
 - Rammed earth: Clay, Chalk
 - Unfired clay bricks and blocks

Low Chemistry & High Mineral

- Low VOC Low Offgassing Low Sick Building
 - Good Indoor Air Quality
 - No Titanium Dioxide
 - No carbon Black
- Mineral based pigment paint or finish: long life, no fade
 - Lime: Moisture management
 - Clay: absorbs smells, electromagnetic radiation
- Insulating finish
 - Clay and cork render
 - Diamatious earth and cork
- Mineral based Insulation

Natural and Renewable

- CLTP Cross laminate Timber panel wall floor and roof slabs (excessive spec?)
- Glulam Laminated timber columns and beams
- Timber curtain walling and windows
- Softwood framing
- Timber panel products (adhesives)
 - Plywood
 - Marine grade Plywood (excessive spec?)
 - Block board

Rapidly renewable materials

- Plant based thermal insulation
- Plant based acoustic insulation
- Plant based materials
- Plant based paint
- Straw
- Hemp
- Mycelium based materials
- Mycelium based insulation
- Animal hair and feather

Sequestered Carbon

- **Photosynthesis:**
 - Trees and plants convert carbon dioxide from the atmosphere into plant fibres
 - and export oxygen to the atmosphere
- Carbon is held in the timber for the life of the building
- We have a carbon crisis now, we need to use timber now

Low-carbon concrete?

- **GBS Ground Granulated Blast Furnace Cement**
 - From Steel production
 - Slower set, same ultimate strength
 - Blended with OPC acts like normal concrete
 - Creamy colour, not cold grey, cheaper?
- **PFA Pulverised Fuel Ash**
 - From coal power stations
 - Cement and aggregate replacement

Carbon8Systems

- Grow Aggregates from carbon dioxide water oxygen pressure and heat
- Particle to grow from, like a grit in an oyster
- Creating stone aggregates from carbon dioxide
- Moves concrete towards lower carbon

Concrete claims sequestered carbon

- But Carbonation of concrete leads to destruction of reinforcement
 - All of a sudden a failure is presented as a bonus
 - £12m/annum marketing budget
- Crushed concrete at end of life exposes surfaces to absorb carbon dioxide

Total Carbon =

- Embodied Carbon minus Sequestered carbon
- Timber materials = negative result
- Good for the planet
- Good for the planet now
- We might not have a future

Biogenic carbon

- Not Fossil carbon (finite)
- Bio-based carbon (renewable, rapidly)
- Trees and Plants
- Wood, fibre, lignin and oils

Kevin McCloud talked about

- Aldrington Craig Architects (Brief > Design)
- WWF (1m refurbished homes ambition)
- Bioregional (One planet Life style data)
- UNSDG 17 Sustainable Development Goals
- CLT multi use tower in Scandinavia
- Accommodating Bats in the attic
- And much more....

BrianSpecMan talked about

- Some of the previous slides:
- **HiiGuru: Ask Any Expert all year round**
- **Materials to avoid (Cement steel aluminium plastic brick)**
- **Materials to choose (earth timber stone plant-based materials)**
- **Green Building Calculator Design & Decision Tool**
- **Green Retrofit Calculator Design & Decision Tool**
- **Bats & Low Energy Buildings (BCT RIBA Book)**
- **Brown Long Eared Adaptable Bat House (BCT & Prison Service)**
- **CobBauge (21st century Cob Interreg project)**
- **UpSTRAW (21st century Straw Interreg project)**
- **Olympics 2012 discussions (single issue v multiple issue)**

Kevin McCloud Asked

- What is the one thing you would choose to make a difference
- Brian: I have 1000, too many to choose
- PS: Choose timber construction and plant based insulation and materials to protect from overheating
- Build light Insulate right Solar tight ©

So what will you do? with your Grand Designs?

- Smaller Footprint? Enough floor area
- Smaller handprint? Less Embodied Carbon
- More Insulation? Before posh taps
 - Less Air leakage, thermal bridges
- More Timber?
 - More Plant based materials?
- Less Concrete Steel Plastic Aluminium?
- Less copper cables?



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Rev No	Comment	By	Date
A00	Created for GDL 2023 Seminar	BRM	06-07/05/2023
A01	Updated after event that became 121 conversation between KMcC and BRM	BRM	08-10/05/2023



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- **Brian Murphy ONC HNC Construction BSc (Hons) PGDip (Dist) Architecture**
 - Technician and Architect by Training
 - Specification Writer by Choice
 - Environmentalist by Actions
 - Writer and Editor by necessity (Websites & Book parts)
 - Educator by calling (CPD, University Lecturer & Studio Tutor)
 - Number Cruncher by necessity (Calculators)
- Greening up my act since 1999
- Founded National Green Specification 2001
- Funded and Launched www.greenspec.co.uk 2003
- Created: GBE at <https://greenbuildingencyclopaedia.uk> 2015
- Launched: GBE Learning <https://GBELearning.com> 2020
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