

We need a net-zero built environment roadmap

Dr Jannik Giesekam

Research Fellow in Industrial Climate Policy

University of Leeds

27/11/2019





Centre for Research into Energy Demand Solutions (CREDS)

Multi-disciplinary centre, funded by EPSRC and ESRC - £19m over 5 years.







www.creds.ac.uk

Last time I was here...

Paris = net zero

Explained carbon figures & trends (Infrastructure Carbon Review, Green Construction Board Low Carbon Routemap, CCC scenarios etc.)

Guidance on managing capital carbon

Challenges & opportunities









slides still available from www.jannikgiesekam.co.uk

GCB Low Carbon Routemap

2013 plan to achieve 80% emissions reduction by 2050 across UK built environment

Considered operational carbon and capital carbon

Considered KPIs, policies, and actions

Included report, infographics, and interactive model

Last updated in 2015







Report and tool at www.greenconstructionboard.org/index.php/resources/routemap

This time...

Progress in reducing emissions Why we need a net zero built environment roadmap now What this roadmap should include & facilitate







UK greenhouse gas emissions & targets





EPSRC

Engineering and Physical Sciences

Territorial emissions & carbon footprint from 2019 official statistics to 2017 and 2016 respectively. Others from CCC (2019) Net Zero. The UK's contribution to stopping global warming & 2019 Annual Progress Report to Parliament; DBEIS Energy and emissions projections and last Green Construction Board Low Carbon Routemap update (2017).

CCC net zero scenario







Figure 6.5 from CCC (2019) Net Zero. The UK's contribution to stopping global warming

Is now the time to align targets?

Carbon reduction targets of selected UK housebuilders & construction firms (representing turnover of £88.4bn in 2016) - based on July 2017 review



Engineering and Physical Sciences







Figures from Giesekam et al. (2018) Aligning carbon targets for construction with (inter)national climate change mitigation commitments & UKGBC (2017) Delivering low carbon infrastructure

Construction Declares

Since May 2019:

- Architects Declare: 715 practices
- Building Services Engineers: 63 practices
- Civil Engineers: 62 practices
- Structural Engineers: 120 practices

Architecture Education Declares: 2075 signatories

Range of commitments such as to: "include life cycle costing, whole life carbon modelling and post occupancy evaluation as part of the basic scope of work, to reduce both embodied and operational resource use"; and to "accelerate the shift to low embodied carbon materials in all work".

| 1.5 architecture | Cullinan Studio | James Gr |
|--------------------------------------|-------------------------------------|-------------|
| 10 DESIGN | Cunniff Design | Jamie Fal |
| 1200 Works | Cunningham Heavin | Jamie Fot |
| 2030 Architects | Curl La Tourelle Head Architecture | Jane Dune |
| 3 ideas | Curry-Hyde | Jessop an |
| 31/44 Architects | CZWG architects | Jestico + |
| 4M Group | D'Soto Architects | Jo Cowen |
| 51 architecture | d-on architects | Jo Townsl |
| 5th Studio | D3 Architects | John Brov |
| 6a architects | DaeWha Kang Design | John Foat |
| 7N Architects | Dallas-Pierce-Quintero | John Man |
| A3Associates | DAP Architecture | John McA |
| AAB architects | Darling Associates | John Rob |
| AAVA | Darren Oldfield Architects | JOMA |
| ABQ Studio Architects | David Bishop Architecture | Jonathan |
| acme | David Chipperfield Architects | JTP |
| Adam Khan Architects | David Cox Architects | JWBuckla |
| Adam Richards Architects | David Holland Architect + Designer | K-Archited |
| Adams & Sutherland | David Kohn Architects | KAST Ard |
| ADP | David Leech Architects | keith willi |
| Adrian James Architects | David Morley Architects | Kelsall Are |
| AECOM UK & Ireland | David Simister Architect | Kennedy \ |
| Aedas | De Matos Ryan | Keppie De |
| AHR | De Rosee Sa | Kirkland F |
| Alan Phillips Architects | Deacon + Richardson Architects | Kirsty Ma |
| Alec French Architects | Delvendahl Martin Architects | KLA |
| Alison Brooks Architects | Denhof Design | Knight Are |
| aLL Design | Design International | Knox Bha |
| Allan Curran Architects | Designfarm Architects | Kohn Ped |
| Allford Hall Monaghan Morris | Designscape Architects | KR.eativ:A |
| Allies and Morrison | Dexter Moren Associates | KSS |
| alma-nac | Diamond Architects | L1Archited |
| Alston Architects | DK-CM | Langstaff |
| AL_A | DLA Design Group | Lanyon-H |
| AMA_Andy MacFee Architects | DLG Architects | Latitude |
| Amos Goldreich Architecture | dMFK Architects | Lawray Ar |
| Amy Butt | dn-a architecture | Lawrence |
| Andrew Catto Architects | Donald Insall Associates | LE+Passiv |
| Andris Berzins & Associates | Donald Moir Architect | Lee Evans |
| Ann Bodkin Sustainability Consultant | dRMM | Lees Asso |
| + Architect | DSDHA | LeilaDunn |
| Anthony Carlile Architects | Dyvik Kahlen | Levitate A |
| APG | e-gg | Levitt Ben |
| Apt | EBBA Architects | Lewandov |
| AR Architecture | ECD Architects | Liam Russ |
| Arboreal | ECE Group | Liberata A |
| And Bratesard in | End And Descious Manage Analyticate | 11111 |





BBP Climate Change Commitment

Launched in September 2019, includes:

- Development of net zero carbon pathways by end of 2020 for new & existing buildings including embodied carbon of development, refurbishment and fit-out works
- Annual disclosure of progress against pathways
- Development of guidance for property owners that ensures consistency
- Development of climate change resilience strategies by 2022

23 signatories have >£300bn of real estate assets & >11,000 properties under management





RIBA 2030 climate challenge

Launched in October 2019, includes:

1. Reduce operational energy demand by at least 75%, before UK offsetting

2. **Reduce embodied carbon by at least 50-70%**, before UK offsetting

- 3. Reduce potable water use by at least 40\%
- 4. Achieve all core health and wellbeing targets

RIBA 2030 Climate Challenge target metrics for non-domestic buildings

| RIBA Sustainable Outcome Metrics | Current Benchmarks | 2020 Targets | 2025 Targets | 2030 Targets | Notes |
|---|--|--|---|------------------------------------|---|
| Operational Energy kWh/m²/y | 225 kWh/m²/y DEC D rated (CIBSE TM46 benchmark) | < 170 kWh/m²/y DEC C rating | <110 kWh/m²/y DEC B rating | < 0 to 55 kWh/m²/y DEC A rating | UKGBC Net Zero Framework 1. Fabric First 2. Efficient services, and low- carbon heat 3. Maximise onsite renewables 4. Minimum offsetting using UK schemes (CCC) |
| Embodied Carbon kgCO ₂ e/m ² | 1100 kgCO ₂ e/m² (M4i benchmark) | < 800 kgCO ₂ e/m ² | <650 kgCO ₂ e/m ² | <500 kgCO₂e/m² | RICS Whole Life Carbon (A-C) 1. Whole Life Carbon Analysis 2. Using circular economy Strategies 3. Minimum offsetting using UK schemes (CCC) |

RIBA 2030 CLIMATE CHALLENGE



Sign up to take the RIBA 2030 Climate Challenge at www.architecture.com/2030challenge RIBA





RIBA (2019) 2030 Climate Challenge









in construction. real estate and supply chain

27 based in UK





Numbers accurate as of 18/11/19 - see sciencebasedtargets.org for more information

SBT pathways are not consistent with national sector goals







Figure adapted from Giesekam et al. (2018) Aligning carbon targets for construction with (inter)national climate change mitigation commitments

A net-zero roadmap

Could include:

- 1. Updated assessment of progress against KPIs
- 2. Updated assessment of **mitigation potential** from a range of technologies, including new options
- 3. Includes carbon removal
- 4. Development of a **new scenario** for the built environment in 2050 which is compatible with net zero national emissions
- 5. Refreshed action plan with interventions and milestones
- 6. Program for further routine updates

Should facilitate national, company & project carbon targets and pathway alignment







Thank you

Please get in touch with any queries J.Giesekam@leeds.ac.uk







slides available from www.jannikgiesekam.co.uk