

The Buildings Mission 2030 and the Future Homes Standard

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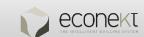
Emerging Context for National Policy for the Built Environment

- UK Net Zero by 2050
- PMs Jodrell Bank commitment to halve all buildings energy use by 2030
- Core Cities, Smart Cities and Local Authorities' ambitions on decarbonisation and electric vehicles
- Requirement for Biodiversity Net Gain on developments
- APPG on Healthy Homes + Buildings; air quality statistics on effects such as cognitive impairment
- NHS England Healthy New Towns the importance of public open space: greening/leisure
- Impact of Grenfell Inquiry and the Each Home Counts review on quality
- Impact of the hottest summer(s) to date; increasing extreme wet weather events
- National Design Quality Guidance; Building Better, Building Beautiful; Future Homes Consultation
- CCC's call to reduce industrial emissions and 'offshoring' of product and materials emissions
- Ambition to design out waste, design with less, and inculcate the circular economy





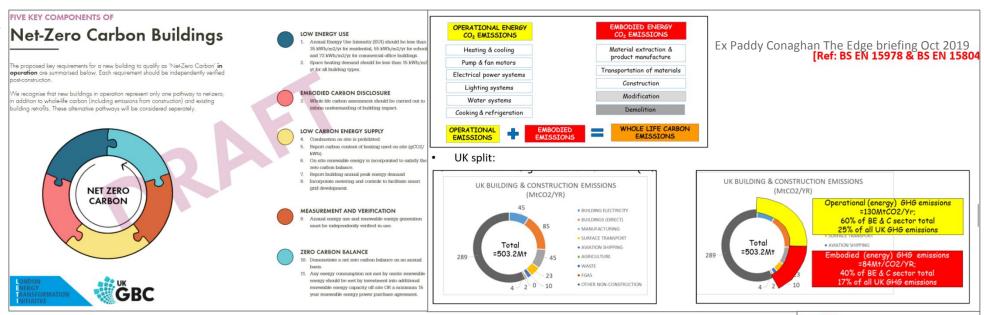




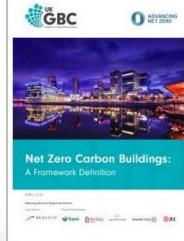




What needs to change:decarbonising operational + embodied energy



- Operational Energy mainly expended in buildings
- Embodied energy mainly expended on infrastructure projects
- Consumption emissions exceed territorial emissions by ~300Mt pa













What needs to change - decarbonisation: demand side and supply side

GreenBiz Analysis Events Videos Circular Economy Energy More + F & in A Q

The biggest resource we don't use: Q&A with Amory Lovins, energy innovator

Amory Lovins (April 2019):

It's quite astonishing to me that most of the conversations, especially in this country, about decarbonization are 99 percent on the supply side, and almost all that electricity, whereas something like two-thirds or more of action is on the demand side.

Golden: How can we conquer that barrier?

Lovins: It's simple and unsatisfactory to say, just pay attention. There are some opinion leaders who could help with this by giving more attention to what's happening in efficiency and realizing that it's not static, it's highly dynamic, and the innovations are not only in technology but at least equally in design, business models and finance.

I don't see a coherent message emerging about the relative importance of efficiency and renewables. Obviously, we need both of them and they reinforce each other, but I think a casual observer might come away thinking that practically all the action is on the supply side, and it's not.













Buildings Mission to halve energy use in NEW buildings by 2030

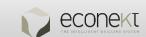
- Tackle demand reduction:
 - energy efficiency
 - systems efficiency
- Deliver real-life energy savings and emissions reduction
 - move to performance in use verification
 - acknowledge that previous regulated/unregulated split is an artificial one

- Need more precision on starting point: understanding breakdown of total energy used at the meter
- Need more confidence in end result: actual outcomes in energy bills, indoor conditions













Buildings Mission to halve energy use in NEW buildings by 2030



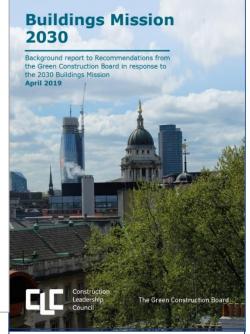








Improvement on typical



NB GCB's Report illustrates how halving newbuild emissions over today's performance is possible through energy and systems efficiencies ie to reduce demand

Identify current benchmark for building typology: aim to halve energy demand: many of our examples were Passivhaus

Built in 2014

60 kWh/m2

Total energy consumption

Improvement on typical

- Use efficient low-carbon building systems: eg MVHR, ASHP
- Then factor in integrated renewables, grid decarbonization, storage, local demand management











Buildings Missions for Retrofit – key lessons for approach

| | Before /m2 | After /m2 | Before House | After house |
|----------------------------------|------------|-----------|--------------|-------------|
| Space heating [kWh] | 162 | 25 | 14,723 | 2,275 |
| Hot water [kWh] | 24 | 19 | 2,145 | 1,729 |
| Lighting, pumps and fans [kWh] | 7.2 | 6.0 | 654 | 546 |
| Electric (home) appliances [kWh] | 24.2 | 20.0 | 2,200 | 1,820 |
| Totaal | 217 | 70 | 19,722 | 6,37011 |

Table showing assumed energy split - Energiesprong Transition Zero document p20 2015

- Identify current benchmark for building typology: aim to halve energy demand: many of our examples were Passivhaus
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Energiesprong aims to be self-financing on the basis of : capitalising future spend on repair and maintenance; continuing income from energy bills based on existing levels; net metering ie not having to front-load bills with standing charge





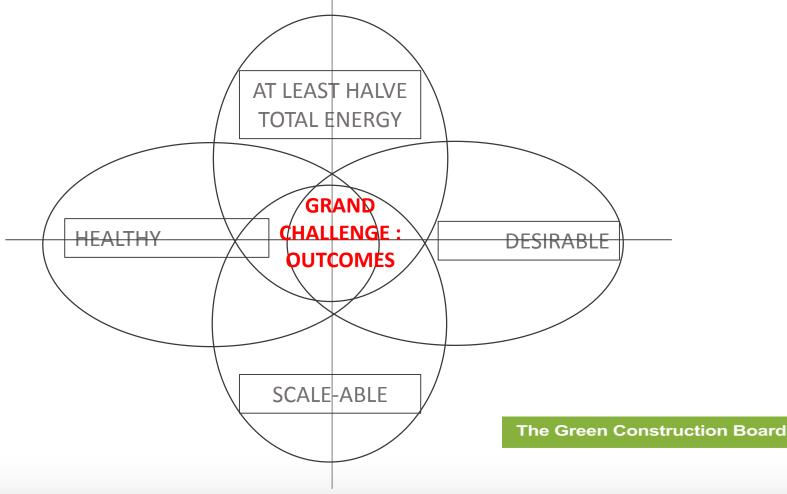






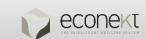
Buildings Mission to halve energy use in NEW buildings by 2030

PATHWAY TO 2050 – RESPONDING TO THE 2030 GRAND CHALLENGE













Halving building (operational) energy use by at least 2030...

PATHWAY TO 2050 – RESPONDING TO THE 2030 CHALLENGE

AT LEAST
HALVE
ENERGY IN
USE BY 2030

All energy in use (not modelled)

 Strategies and choices: demand-side and supply-side

Domestic and Non-Domestic

 Examine Techniques against Outcomes eg Passivhaus, Specific, Zero Positive, Zero Bills, NABERS, Energiesprong

 Define regulatory/fiscal/voluntary drivers

eg Typical newbuild 3bed eg Typical newbuild office house - Zero Net Energy block - 60% reduction eg ACTUAL TOTAL leg ACTUAL TOTAL **CURRENT** NET ZE O IN OFFICE CURRENT **PRACTICE** USE: eg **ENERGY IN USE PRACTICE** Passivhaus **MORE THAN** fabric + on-site **HALVED**: via S Renewables **NABERS DEMAND** and Storage performance k**₩₩**m2 contracting heating cooling ZERO (NET) TOTAL SIDE PV and RV / GS **ENERGY GS** Heat pump SUPPLY and heat

The Green Construction Board



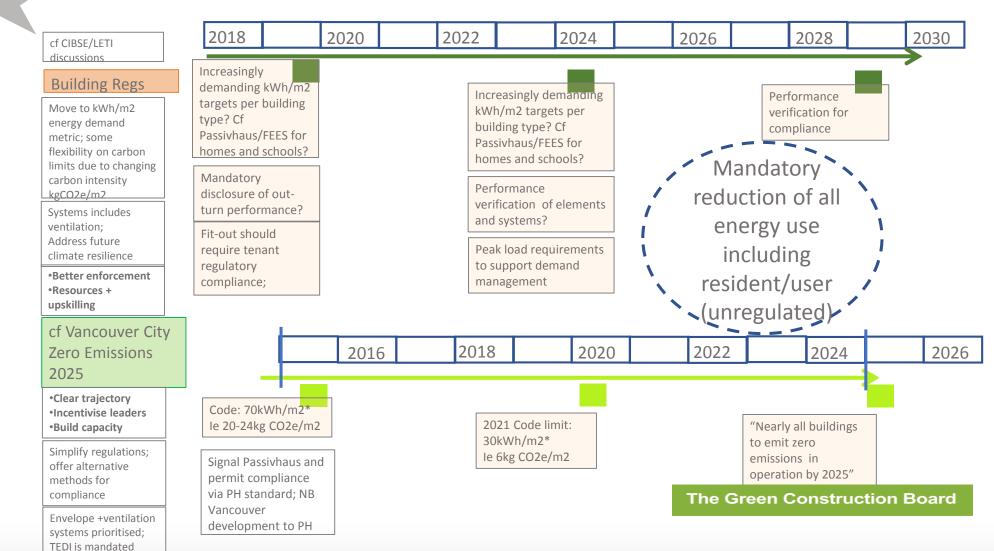








Motivating higher standards in development







(Thermal Energy

ecological
BUILDING SYSTEMS





Motivating higher standards in development

The Green Construction Board

GCB BUILDINGS ENERGY TASKGROUP - SUMMARY OF RECOMMENDATIONS FOR NEWBUILD IN RESPONSE TO 2030 'MISSION'*

2018 2020 2022 2024 2026 2028 2030

Building Regulations Requirements

- · Set out journey/steps to 2030 including change from notional building calculation to prediction and measurement of total energy demand and use in kWh/m2
- Set out forthcoming requirement to verify in-use performance ie eliminate performance gap
- Require Fabric Energy Efficiency to ~2016 Zero Carbon; require lower minimum air leakage (eg 5m3/m2@50Pa)
- Include Review of Ventilation requirements and verification protocols
- Require overheating mitigation measures
- Require tenancy fit-out applications in conformity with standard
- Require building 'passport' for all building regulations applications
- Require submetering compatible with DEC: differentiated total use

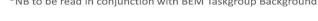
- · Set Thermal Energy Demand limits in kWh/m2 cf Passivhaus for different building typologies
- Require disclosure of performance on completion
- Require Primary Energy calculation and carbon intensity
- · Require Display Energy Certificates for all buildings with regulated/ unregulated use differentiated
- · Set systems energy efficiency performance criteria
- Require peak load prediction and demand profile
- Signal forthcoming requirement for disclosure of halving all energy use with defined kWh/m2 benchmarks including 'unregulated' use
- Require submetering/smart metering disclosing differentiated

- Enable understanding of current and existing building performance through development of 'smarter' Smart Metering ie disaggregation of energy loads ('regulated' and 'unregulated')
- typologies through correlation of existing data and total energy use information from suppliers (also helps generation of building 'passport' for future changes and for as template for retrofit)
- Develop Thermal Energy Demand limits from benchmark data Develop stricter testing regimes for coefficients of performance
- for building technology systems
- Develop portal for building owners to compare energy use with comparable buildings and upload data on voluntary basis (cf DEC)
- · Smart meter development into Home Hub: dataset including air quality information, Relative Humidity, water usage, ambient temperature, room temperature etc
- Generate benchmarks of current building performance of different Develop peak demand prediction techniques to support demand management; differentiated tariffs;
 - Energy storage technologies mainstreamed and space-optimal
 - Improved systems efficiencies of MVHR/ heat pumps etc
 - · Improved energy efficiency of home appliances to enable reduced small power usage
 - · Support development of skills (education and training) for delivery and inform development of digital/industrialised components for verification

Incentives and other drivers

- · Cross-party agreement on objectives
- Enable fast-track planning approval for early adopters of 2025 energy efficiency levels with disclosure of performance on
- Incentivise early adopters with reduced Stamp Duty
- National consumer awareness programme on climate change drivers and energy efficiency
- · Disclosure of building passport part of property marketing
- Consumer awarenesss programme on 'unregulated' energy eg importance of energy efficient home appliances
- · Incentivise building-level energy storage through fiscal/tariff
- Government procures only buildings to 2030 standards

*NB to be read in conjunction with BEM Taskgroup Background Report



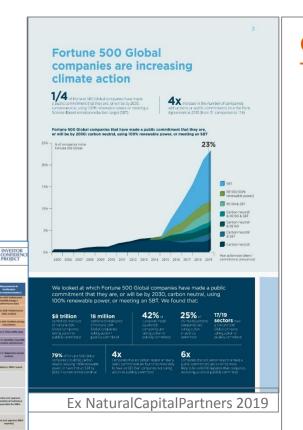






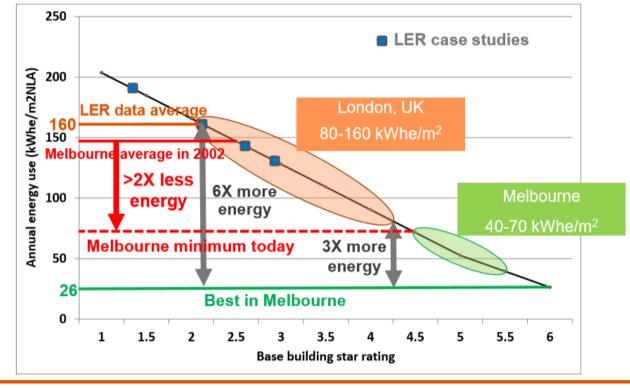


Leadership in decarbonisation – examples in commercial buildings









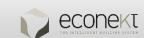






PROJECT DEVELOPMENT SPECIFICATION v2.0









Future Homes - Quality and Performance

- Quality control key to accountability on site or in factory
- Delivering real energy and carbon reductions is not possible without accuracy of prediction and accountability for outcomes
- Required Outcomes for Net Positive gains can be defined and verified on completion: eg air quality, resource footprint, ecological benefits, energy performance

The New Hork Times

Grenfell Fire Inquiry Demands Radical Overhaul of U.K. Building Rules





Government to mandate 'biodiversity net gain'

Defra Press Office, 13 March 2019 - Weekly stories



Credit: Kidbrooke, Berkeley Group.

The Government has today (13 March) confirmed that new developments must deliver an overall increase in biodiversity.

Following our consultation on mandating biodiversity net gain in development last year, the Chancellor confirmed today in the Spring Statement that the government will use the forthcoming Environment Bill to mandate 'biodiversity net gain' - meaning the delivery of much-needed



Building for Life





UK is endangering people's health by denying their right to clean air, says UN

World body urges Conservative government to 'step up and show



Live Raab: staying in EU is better than May's Brexit de



























Thank you

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UK Green Construction Board Member & Taskgroup Chair















ukpassivhaus conference 2019



Thank you...









