National Retrofit Conference, Futurebuild, Excel, London, 5 March 2025

RETROFIT:

Towards a proportionate people-first, approach

Bill Bordass and Robyn Pender

www.usablebuildings.co.uk

Should we be resolving our problems, *or re-examining our premises?*

"We can't solve problems by using the same kind of thinking we used when we created them"

Attributed to A EINSTEIN

"We are suffering from an attempt to know our way into the future, instead of live our way"

W SHARPE

"Altogether, we are failing to deliver, and I think the whole political system is responsible"

LORD DEBEN

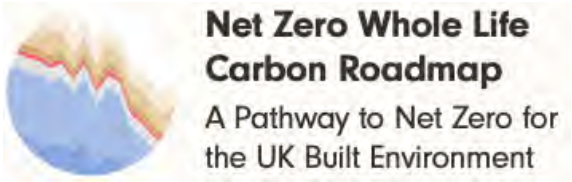
SOURCES: Bill Sharpe, *Three Horizons: the patterning of hope,* Triarchy Press (2020), Lord Deben: *https://www.politicshome.com/thehouse/article/altogether-failing-deliver-chair-climate-committee-lord-deben-warns-dangers-climate-inaction#:~:text="Altogether%20we%20are%20failing%20to,is%20responsible%2C"%20he%20says.*

Can we think differently about retrofit ?

Do we have the imagination and ambition to push the boundaries?

"The opportunity for widespread behaviour change has been considered, with a cautious approach to expectations that occupants will be able to reduce thermostats without improvements to building fabric."

UK GBC



DOES THAT MAKE SENSE IN OUR CLIMATE AND ECOLOGICAL EMERGENCY ?

SOURCE: *Net Zero Whole Life Carbon Roadmap,* UK Green Building Council report (2021).

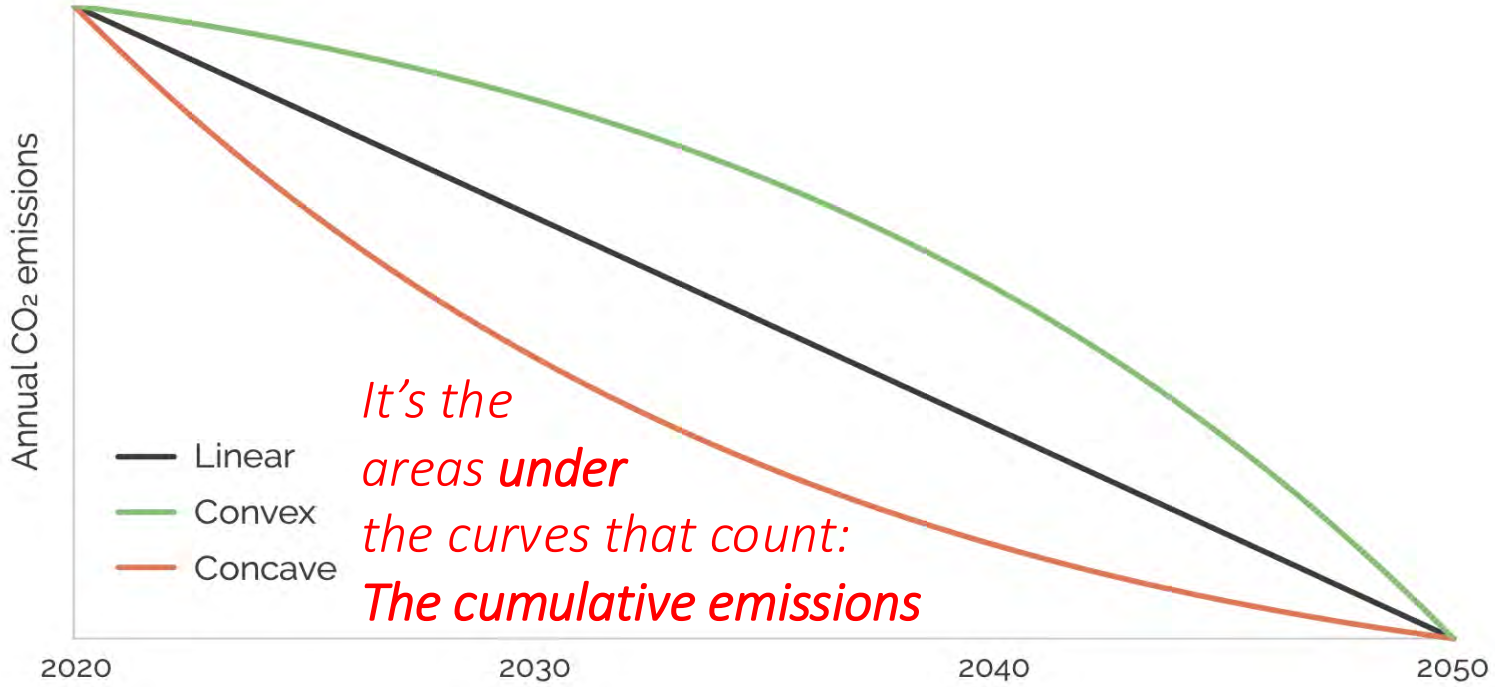
FROM EFFICIENCY TO SUFFICIENCY

“What we’ve got used to,
we’re not necessarily entitled to.”

SOURCE: Quote attributed to architect Bill Gething by publisher Roderic Bunn

Possible Decarbonisation Trajectories

A quick, low-cost start minimises total emissions to 2050



Ref: R Lowe & T Oreszczyn, *Building Transition Decarbonisation Pathways, creds.ac.uk/wp-content/uploads/CREDS-decarb-transitions-brief-2020.pdf*

PEOPLE FIRST: *Comfort standards are socially and culturally determined*

AND also driven by vested interests in promoting things

"People's needs… have social histories of their own …
The [mistaken] distinction between technology … and behaviour.

"Sociology repeatedly demonstrates
the extent to which things … 'script' what people do …

*"[while] dominant paradigms remain … [in the literature] there are fewer references to non-technical barriers and more to sociotechnical change, and … **practices not behaviours**."*

"If current understandings of comfort underpin escalating levels of energy demand, why do we persist with them?"

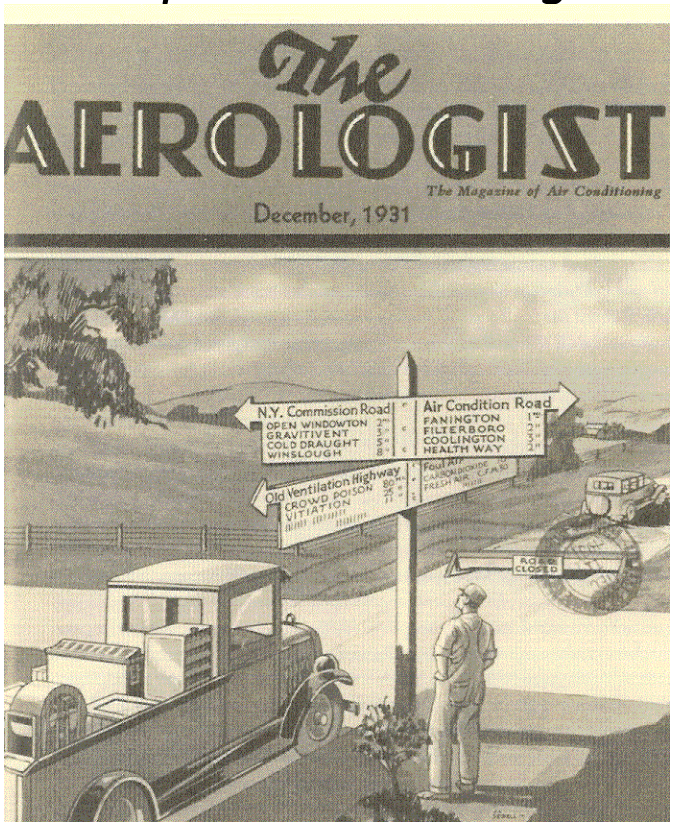
ELIZABETH SHOVE, Sociologist, University of Lancaster

Late medieval Burgundian coats – finally warm enough!

SOURCES: E Shove, *Why social theory is important for energy research and the built environment,* Buildings & Cities (14 Sep 2020).
J Parker, Returning to old ways of staying warm, (2016), *www.traditioninaction.org/Cultural/C042_Warm.htm*

SCRIPTING COMFORT *in the 20th Century:*

Space conditioning was converted into a marketable commodity



"In 1922, the New York State Commission … advocated natural ventilation … The engineering community seriously opposed …

… "The Aerologist journal … argued ***physicians were stepping outside their [professional] boundaries.***

"When natural climate was the ideal, mechanical systems were found wanting, but ***when quantitative standards … became the measure, natural climate was found wanting.***

When no town could deliver an ideal climate, all towns became potential markets."

AND AFTER WORLD WAR 2:
Passive and climate-responsive features of buildings *(verandahs, shutters, shade roofs etc.)* ***were simplified or eliminated, in order to make air conditioning more affordable.***

SOURCE: G Cooper, *Air-conditioning America,* Johns Hopkins University Press (1998), pages 69-79 and cover illustration.

ENERGY SUFFICIENCY:

Avoid unhealthy environments, allow escape from crises of discomfort

PRINCIPAL METHODS:

1. Review appropriate standards *and promote adaptive comfort*
2. Control draughts, air movement, radiant heat gains and losses
3. Wear the right clothing and have suitable furniture etc.
4. Consider local and personal heating and cooling systems
5. Have accessible, responsive user-friendly controls
6. Improve personal thermoregulatory fitness where practicable
7. ADD thermal refuges, *both hot and cold, local and communal.*
8. ***Plan to avoid health and moisture-related unintended consequences.***

"He gets so dramatic when I lower the thermostat."

P C Vey cartoon from the New Yorker (1 April 2019).

These all save energy and carbon much more quickly and cheaply than heavy capital investment.

MORE AT: *www.usablebuildings.co.uk/UsableBuildings/Unprotected/BeyondSpaceHeatingAndCooling.pdf*
See also S Roaf, Cool and Cosy Corners, www.bdonline.co.uk/opinion/buy-your-gran-a-cosy/cool-corner-for-christmas/5120354.article

Local heating can be very effective:
Experiments with 16-zone thermal manikin

Indicative Watts to increase personal comfort by 1°C:

250	Local convector heater
100	Local radiant panel
35	Local foot warming mat
<10	Heated chair or cushion

* S Kohn, *Development of a Personal Heater Efficiency Index,* MSc Thesis, University of California, Berkeley (2017).

Recent research results:

from a people-first co-creation project in Belgium

BUILDINGS & CITIES

SPECIAL COLLECTION: ENERGY SUFFICIENCY IN BUILDINGS AND CITIES

RESEARCH

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ubiquity press

https://journal-buildingscities.org/articles/10.5334/bc.444

Recent research results:
from a people-first co-creation project in Brussels

- 3-year project with 23 households.
- Co-creation of measures: householders, meetings, enabling researchers.
- Mean indoor temperatures fell from 19 to 15 C.
- Main adaptations used were clothing and personal comfort systems (PCSs).
- PCSs were used less as the project continued – *we have found this in other projects** – *when people know they have the agency to avoid a "crisis of discomfort" when it occurs, they become more tolerant of conditions.*
- Energy consumption for heating was halved, with no electricity increase.

"The widespread use of central heating may be suspected of inhibiting other forms of adaptation"

* For example W Bordass, K Bromley & A Leaman, *Comfort, Control and Energy-Efficiency in Offices,* BRE Information Paper 3/95 (February 1995).

People-first projects underway:

in Yorkshire, in 85 churches
and recently started in 10 houses.

More about the church project in the Sheffield Diocese will become available at www.cheribimapp.com

We should be able to run some buildings cooler, *but what about moisture?*

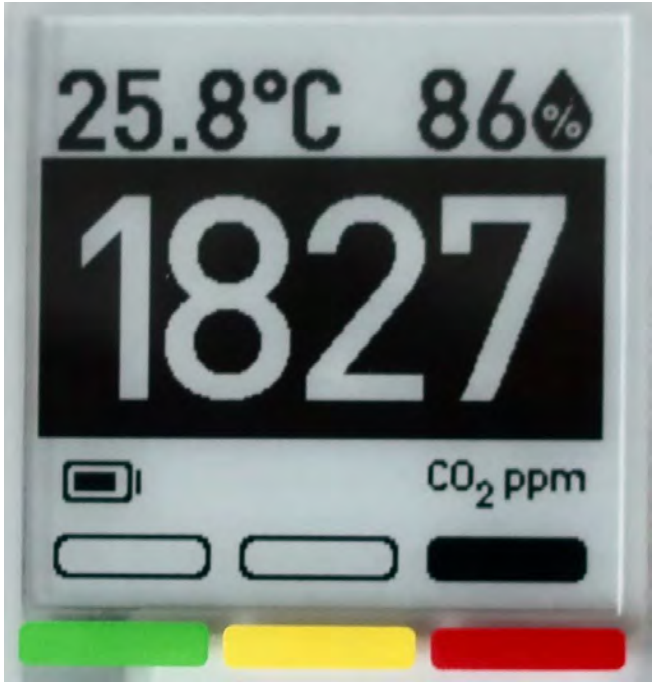
DAMPNESS IS A MAJOR SOURCE OF ILL HEALTH FOR PEOPLE AND BUILDINGS, DIRECTLY AND INDIRECTLY:

- Water penetration, leaks – *needs maintenance*
- People – *ventilation must be adequate*
- Kitchens, bathrooms etc. – *extract at source*
- Insulation – *can make things worse.*

ALL ENERGY SAVING STRATEGIES MUST INCLUDE EFFECTIVE MOISTURE MANAGEMENT

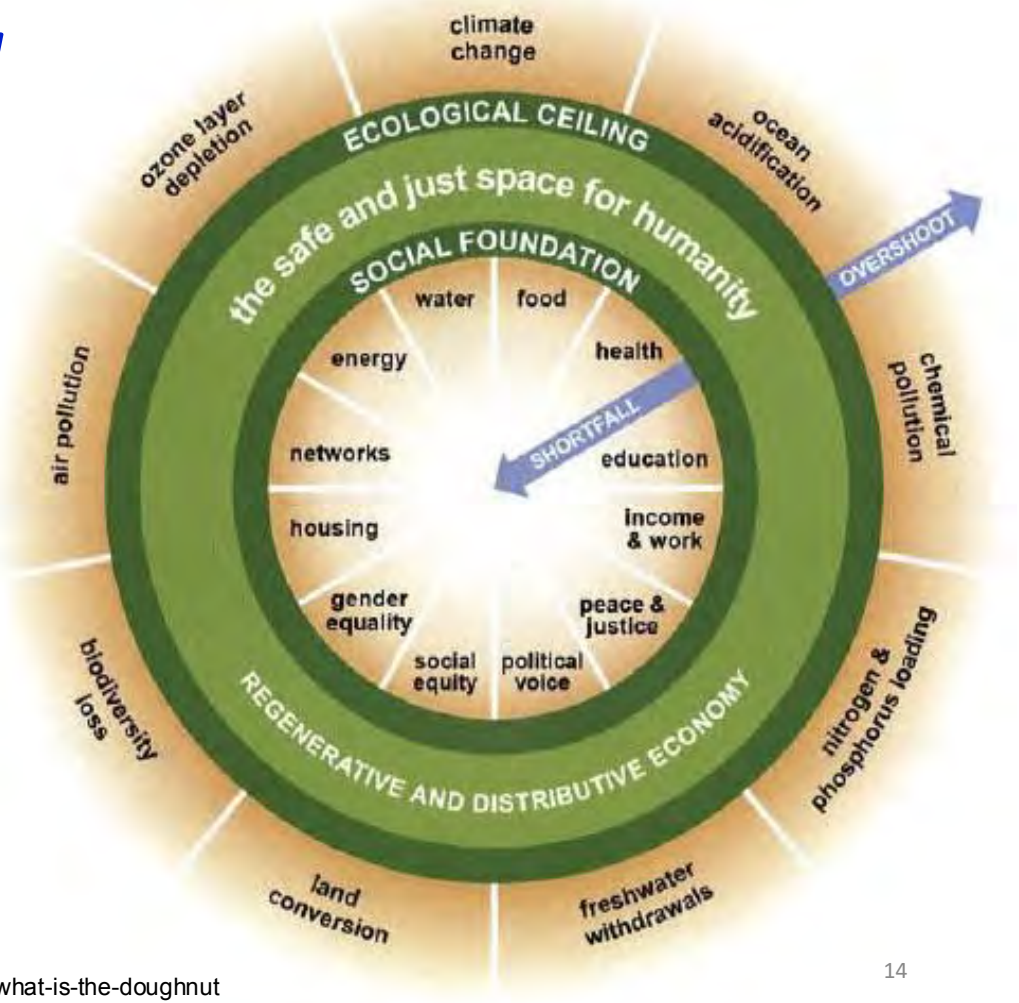
Need for careful survey work and low-cost monitoring.

And fabric-first needs to be ***fabric maintenance first***



CLIMATE JUSTICE *and* *Doughnut Economics*

We need to seek the appropriate balance for a particular context



SOURCE: https://doughnuteconomics.org/about-doughnut-economics#what-is-the-doughnut

Different levels of energy and carbon-saving retrofit

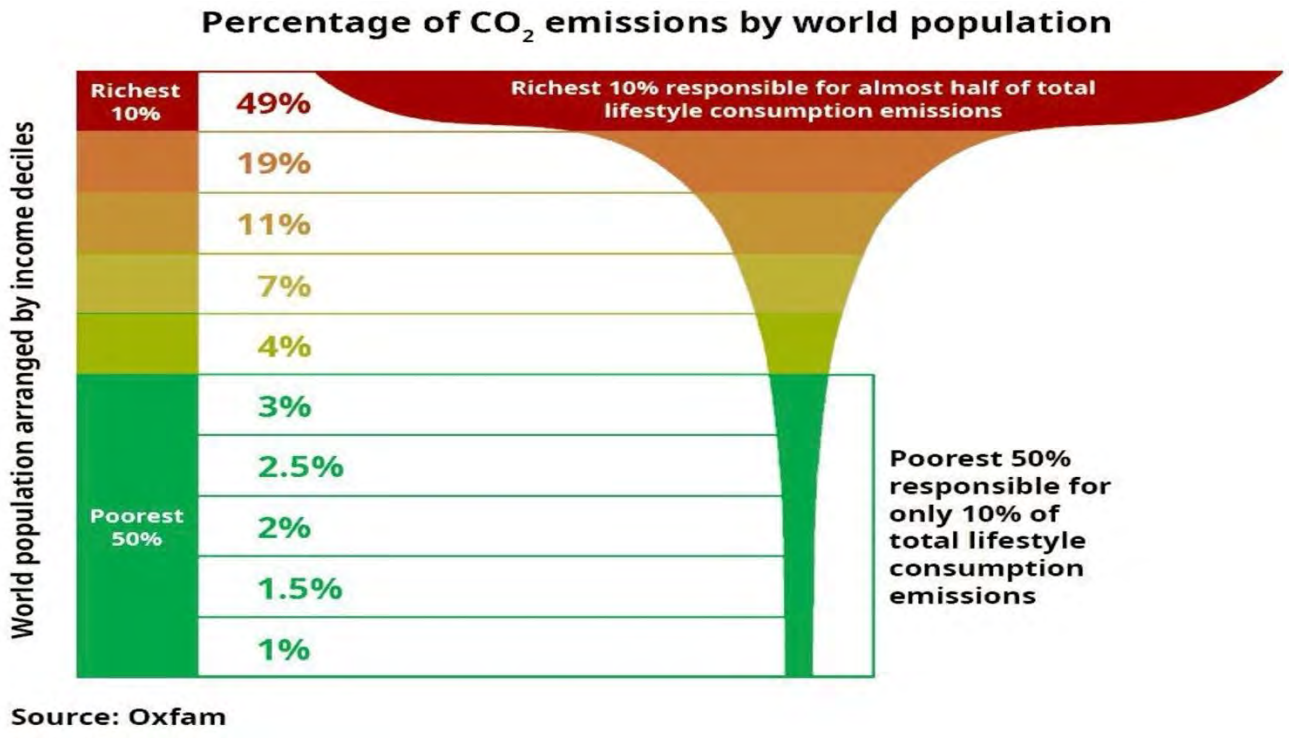
TYPE	COMMENT	APPROX COST*	INGREDIENTS	NOTES
1. DEEP *EnerPHit or LETI Exemplary*	The mantra, at least until recently.	£ 100,000	Full suite of measures.	Nice work if you can get it, but rare.
2. GOOD PRACTICE *e.g. AECB*	More practical and economic.	£ 50,000	Reduced set of measures.	Still relatively costly *and needs capacity.*
3. COST EFFECTIVE AT SCALE *Needs R, D and D*	Pareto optimum? *80% of the way with 20% of the cash.*	£ 20,000	Pragmatic fabric *to halve annual heat requirement from today's 130 kWh/m² median.*	Might include highly simplified MVHR an ASHP.
4. "SOFT" RETROFIT *People first*	A rather different mindset, *and missing from retrofit plans*	£ 5,000 or less	Work out to the fabric, rather than in from it. *Particularly useful for heritage.*	Quick and simple, but novel ingredients
5. BASIC ENERGY SAVING	Simple, *but too often still not done.*	£ 1,000 or less	Personal comfort measures + basic insulation, draught proofing, control tweaks.	Often absent from retrofit plans. *Advisers needed!*

**** Costs are per typical 90 m² dwelling and exclude any necessary repairs to the fabric***

REFERENCE for Level 3: Retrofit at Scale: A call to action (2024), https://sdfoundation.org.uk/news/retrofit-at-scale

"A constrained world cannot afford the rich "

GEORGE MONBIOT



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