

Marianne Heaslip

URBED

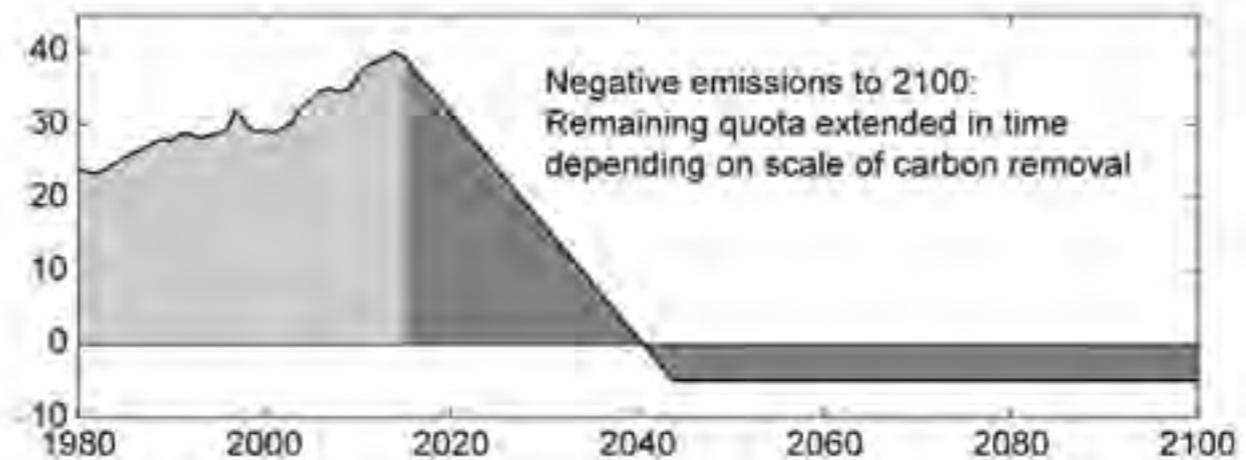
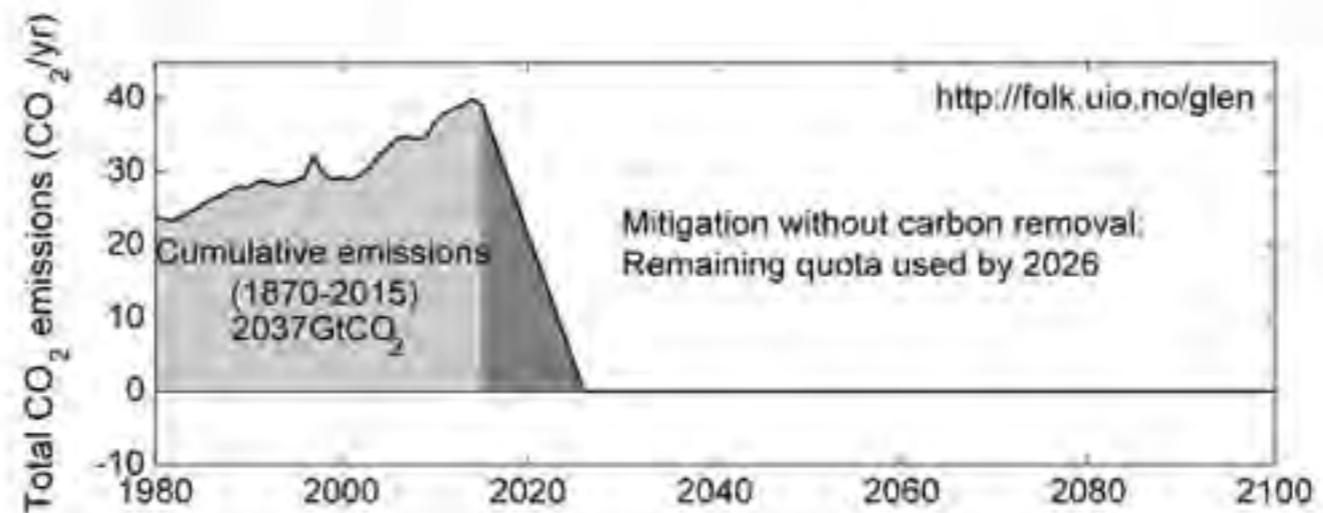
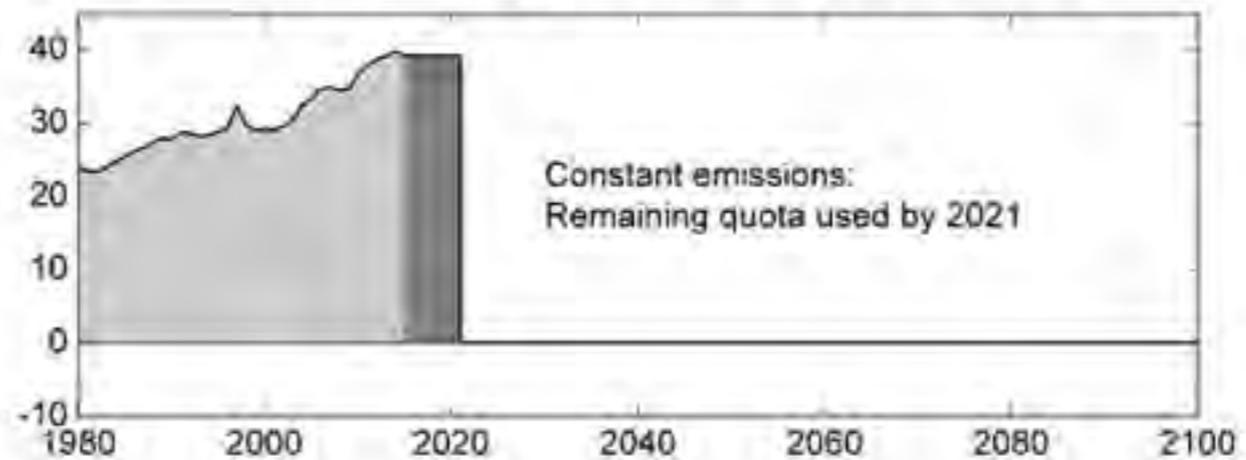
22 August 2018





Things I worry about....

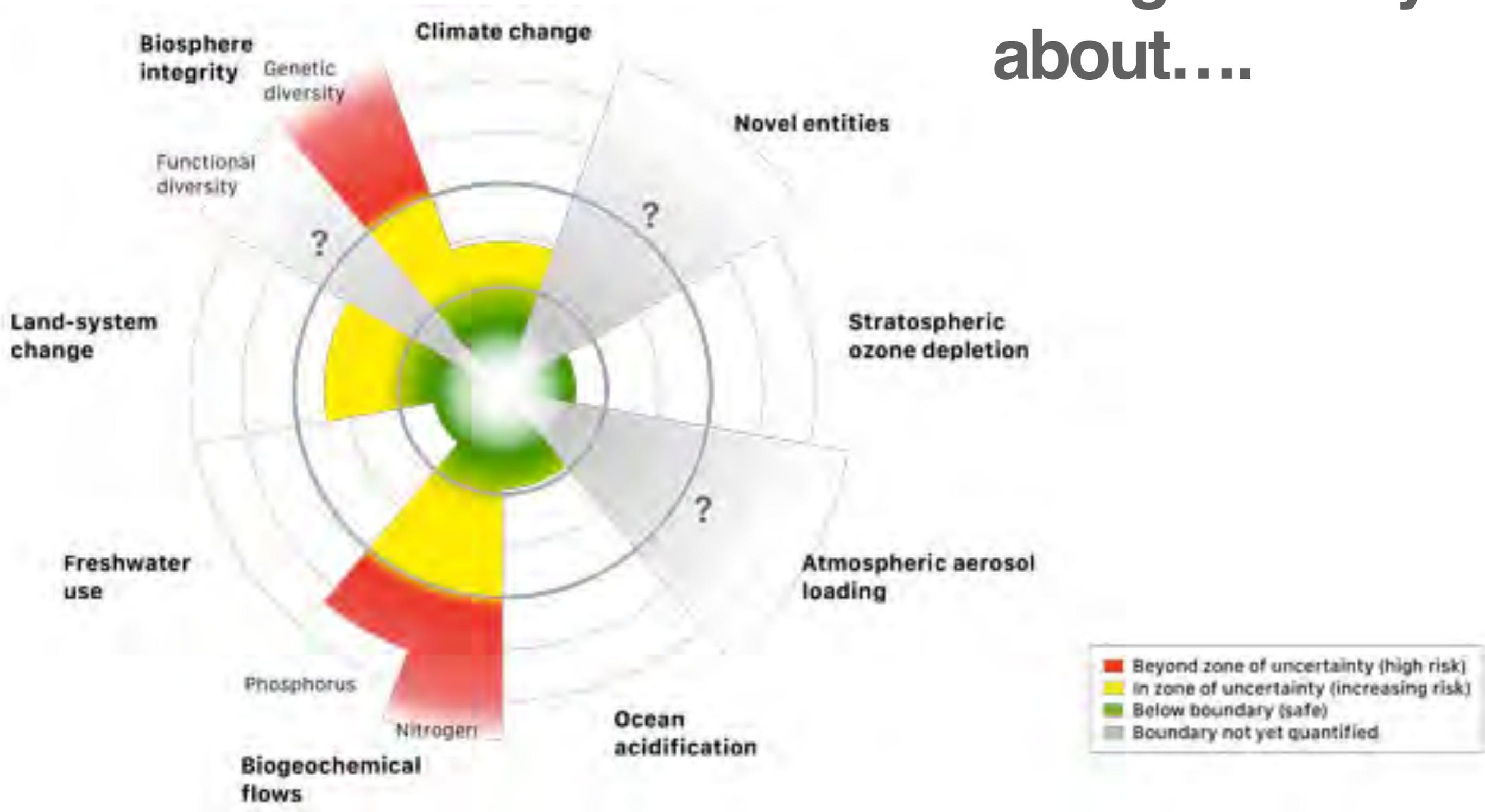
Can emit about 210GtCO₂ from 2016 for a 66% chance at 1.5C



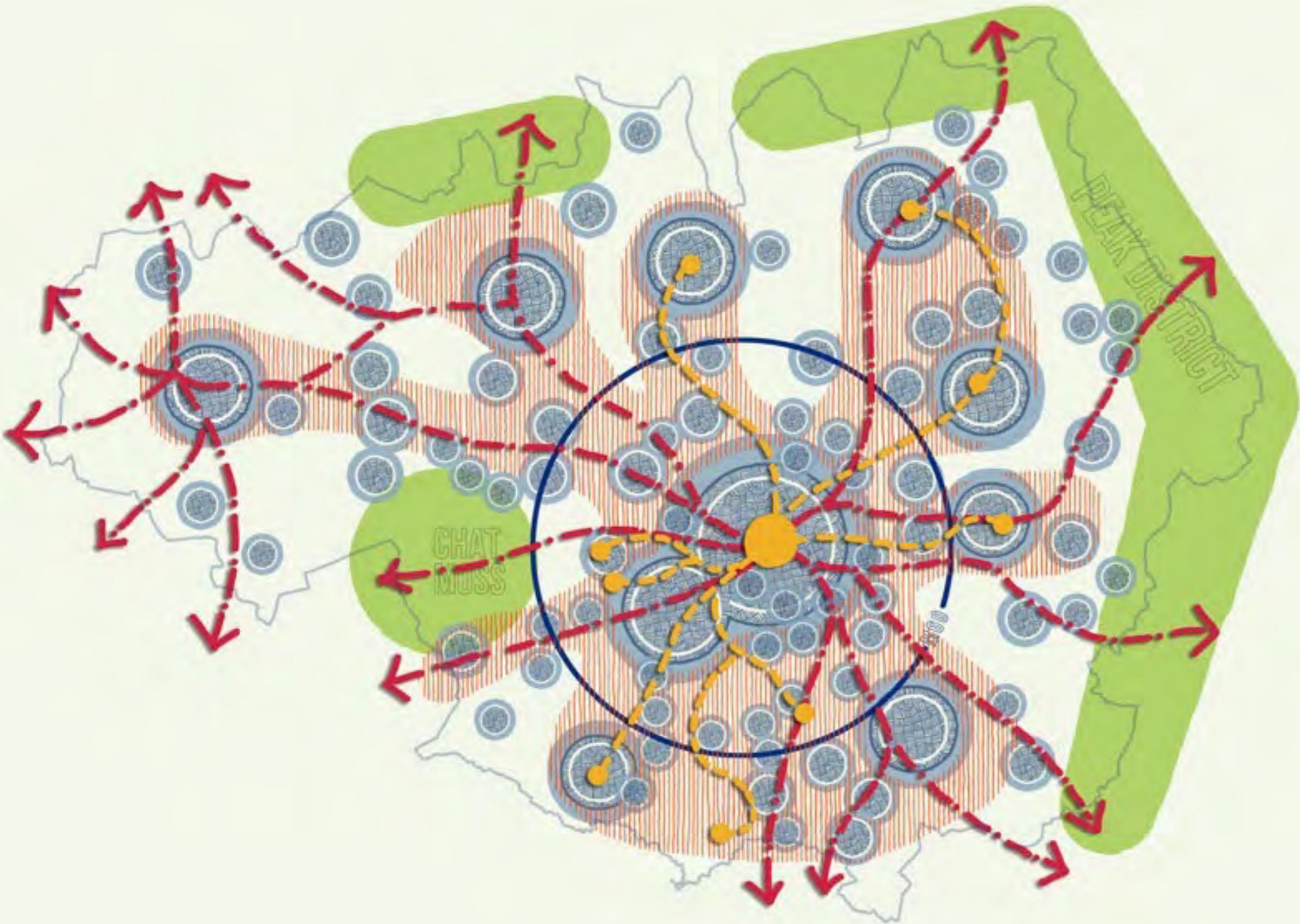
After Paris -

Graphs: Glen Peters, based on IPCC projections via <http://www.vox.com/2016/10/4/13118594/2-degrees-no-more-fossil-fuels>

Things I worry about....



1. Right location



2. Density



2. Density

The density gradient

	Units /ha	Persons /ha	Source
Low density detached – Hertfordshire	5	20	Urban Initiatives
Average net density Los Angeles	15	60	Newman and Kenworthy
Milton Keynes average 1990	17	68	Sherlock
Average density of new development in UK 1981-91	22	88	Bibby and Shepherd
Minimum density for a bus service	25	100	Local Government Management Board Sustainable Settlements Guide (assuming that the housing is occupied to capacity)
Private sector 1960s/70s – Hertfordshire	25	100	Urban Initiatives
Inter-war estate – Hertfordshire	30	120	Urban Initiatives
Raymond Unwin 1912	30	120	Nothing gained by overcrowding
Tudor Walters 1919	30	120	Local Government Board's Manual on the preparation of state-aided housing schemes
Private sector 1980s/90s – Hertfordshire	30	120	Urban Initiatives
Hulme – Manchester 1970s	37	148	Hulme guide to development
Average net density London	42	168	Newman and Kenworthy
Ebenezer Howard - Garden city 1898	45	180	Tomorrow: A peaceful path to real reform
Minimum density for a tram service	60	240	Local Government Management Board Sustainable Settlements Guide
Abercrombie - Low density	62	247	Greater London Plan 1944
RIBA	62	247	Homes for the future group
New town high density	64	256	Urban Initiatives
low rise – Hertfordshire			
Sustainable Urban density	69	275	Friends of the Earth
Hulme – Manchester Planned	80	320	Hulme guide to development
Victorian/Edwardian	80	320	Urban Initiatives
Terraces – Hertfordshire			
Abercrombie – Medium density	84	336	Greater London Plan 1944
Central accessible urban density	93	370	Friends of the Earth
Holly Street – London 1990s	94	376	Levitt Bernstein Architects
Holly Street – London 1970s	104	416	Levitt Bernstein Architects
Abercrombie - High density	124	494	Greater London Plan 1944
Sustainable Urban	124	494	URBED
Neighbourhood (maximum)			
Hulme – Manchester 1930s	150	600	Hulme guide to development
Average net density Islington - 1965	185	740	Milner-Holland
Singapore planned densities 1970s	250	1,000	Scoffham and Vale
Kowloon actual	1,250	5,000	Scoffham and Vale

<https://usa.streetsblog.org/2011/08/09/alex-steffen-says-dense-cities-are-the-only-way-to-reduce-emissions/>

1. The grey boxes show the source figure from which the density has been calculated
2. An average dwelling size of 4 bedspaces has been assumed throughout this table

2. Density >>>> Form Factor

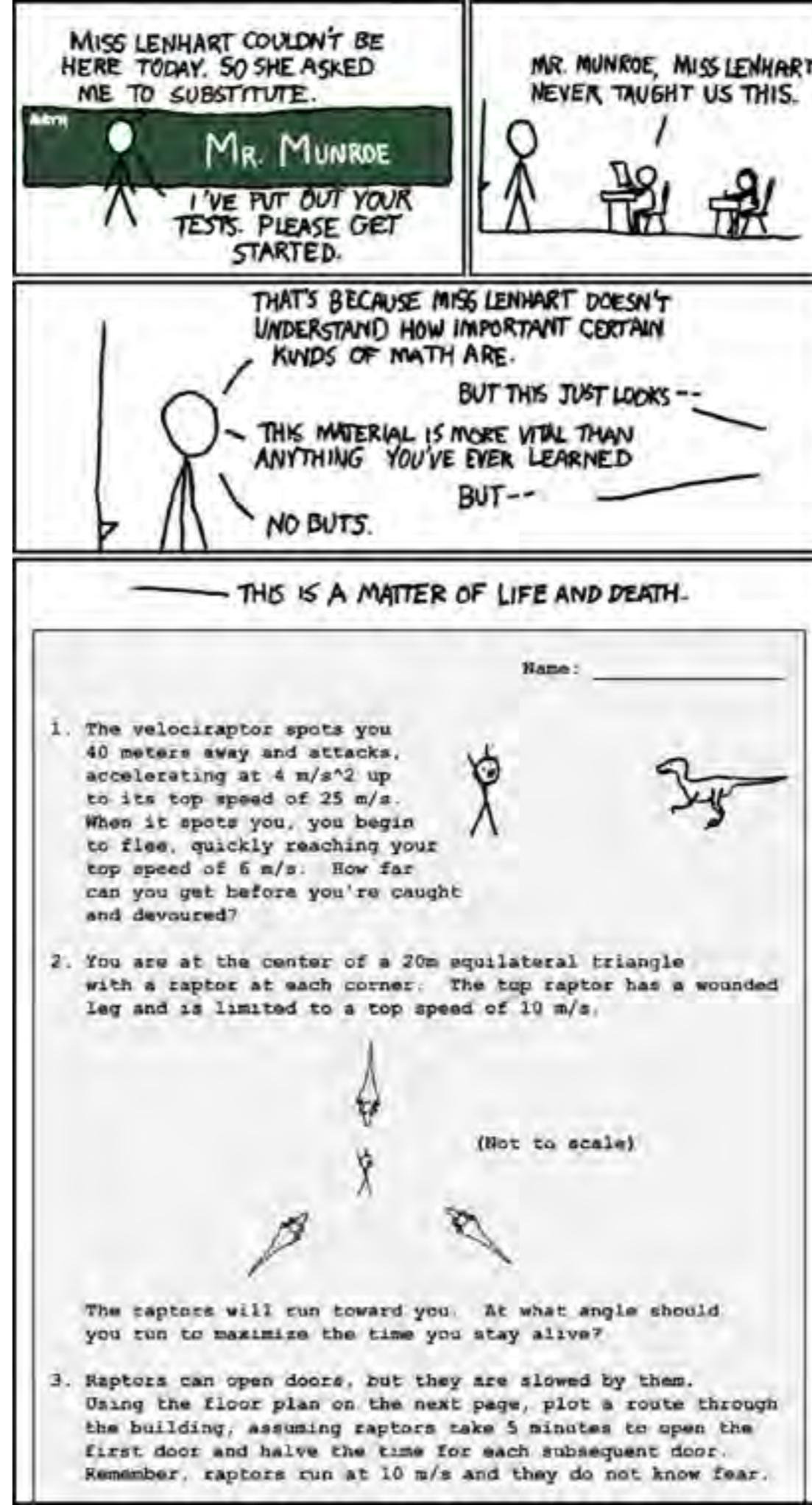
	Type	Form Factor	Efficiency
	End mid-floor apartment	0.8	Most efficient 
	Mid-terrace house	1.7	
	Semi-detached house	2.1	
	Detached house	2.5	
	Bungalow	3.0	Least efficient

Figure 4 The types of home and their Form Factors

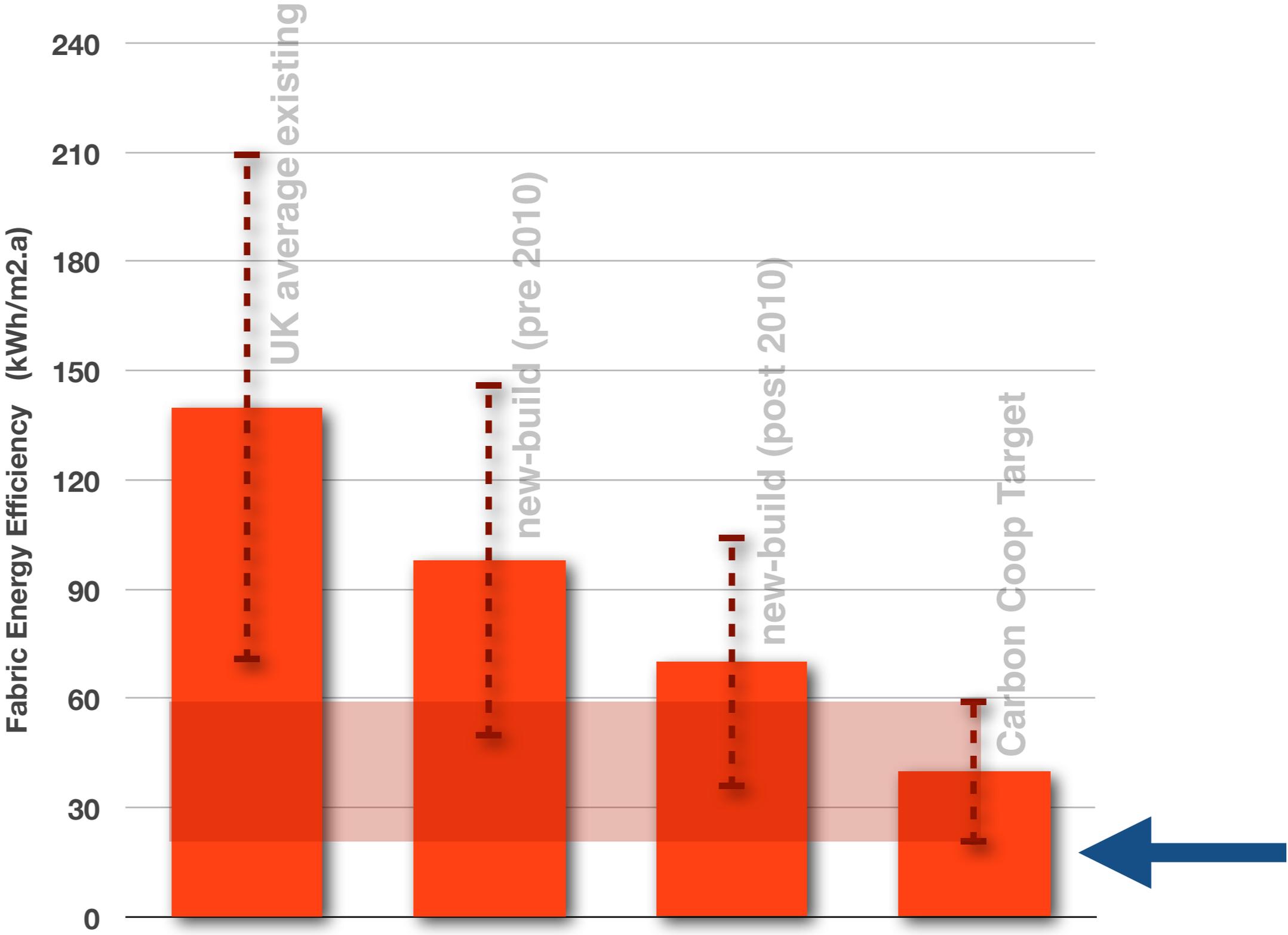
<http://www.theenergycollective.com/david-k-thorpe/2393565/how-changing-building-shape-and-form-can-slash-energy-use>

3. Quantitative assessment is key!*

*But not everything that matters is about numbers.



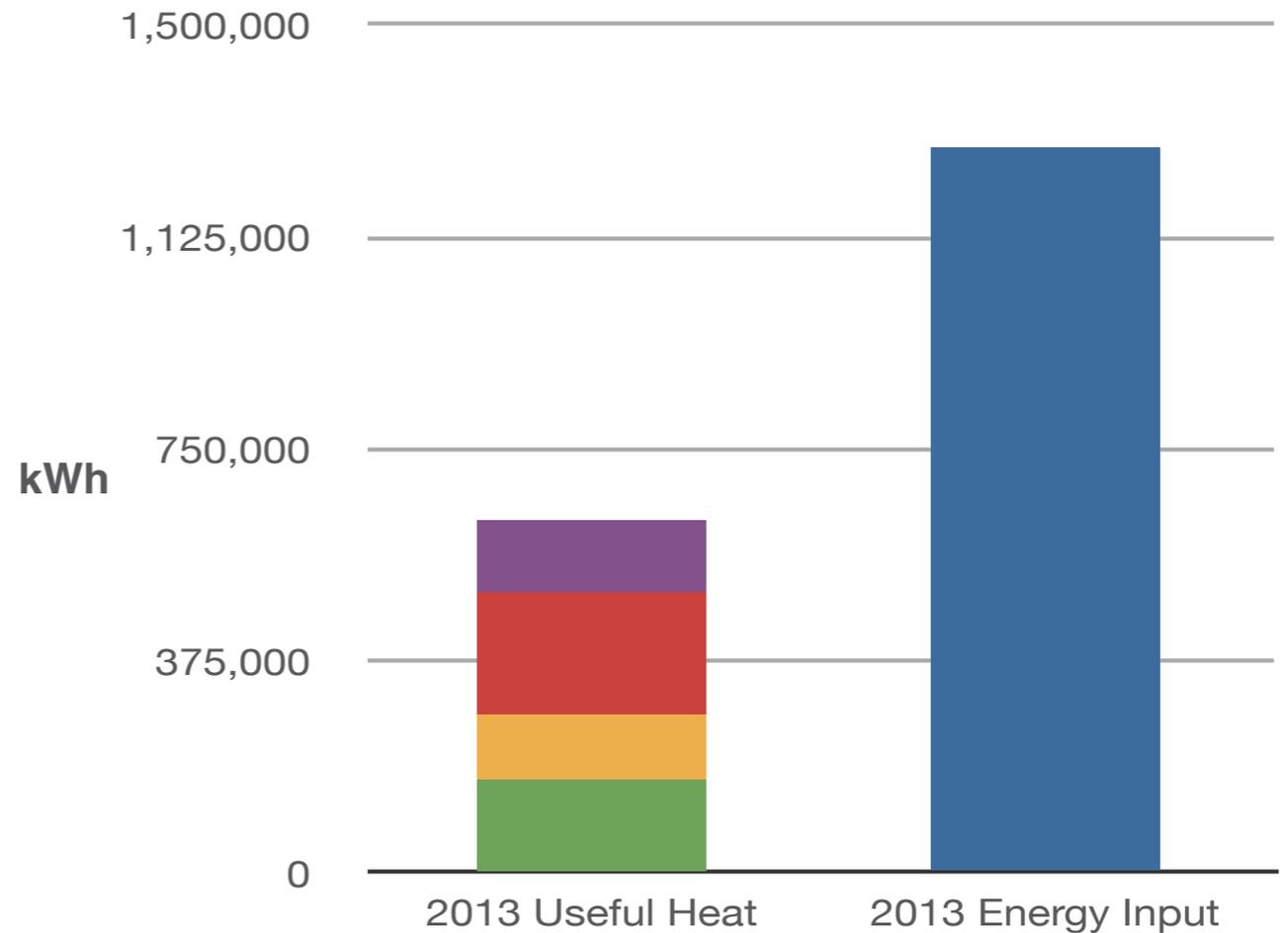
....because by measuring we understand what we need to worry about.



There are no 'silver bullets' and nothing is inherently 'green'.

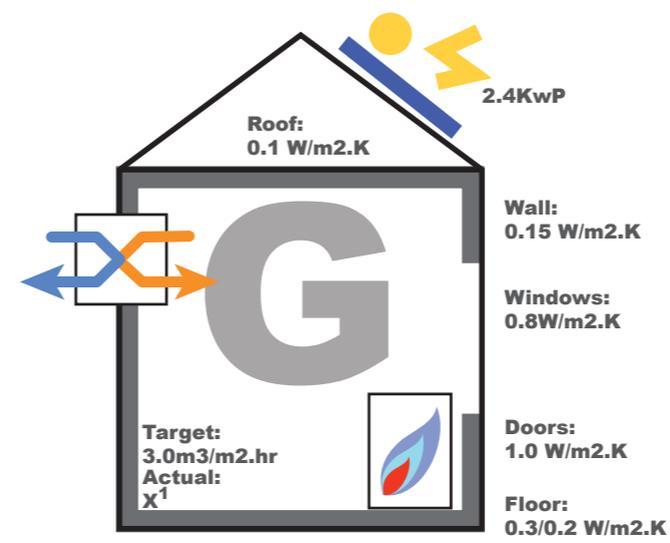
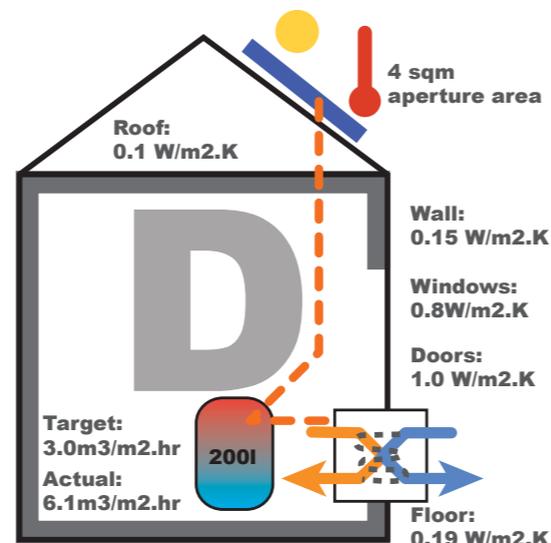
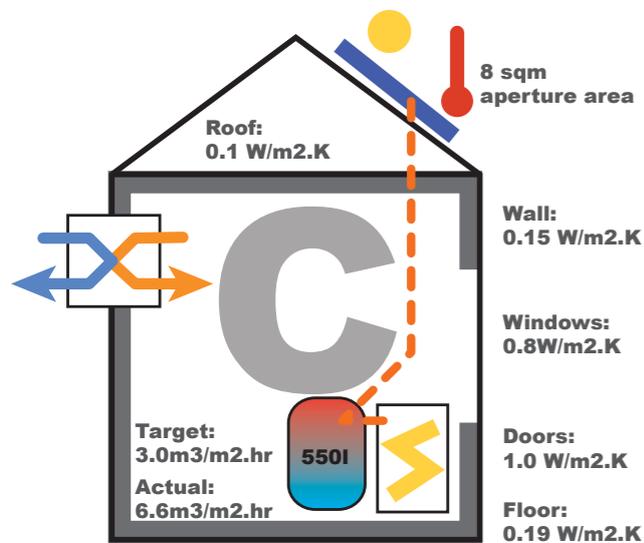
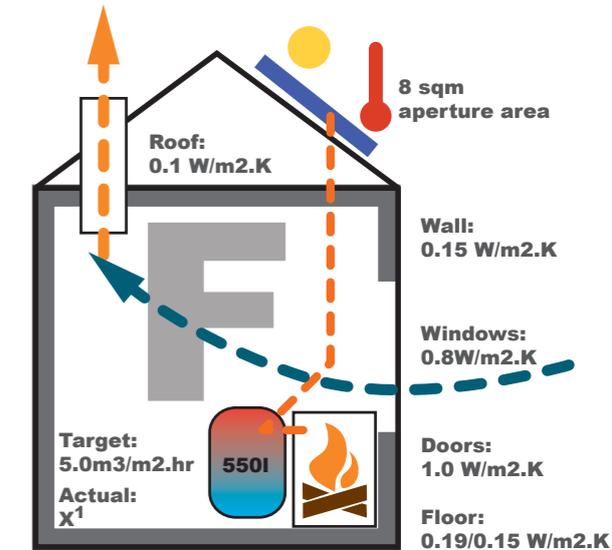
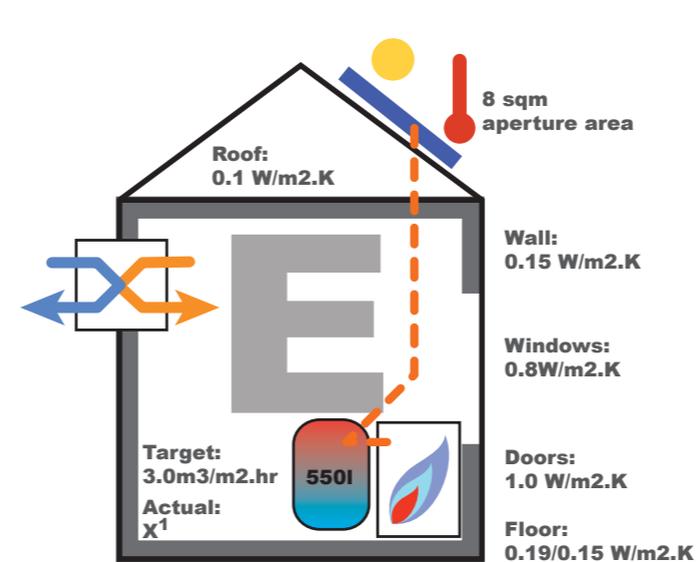
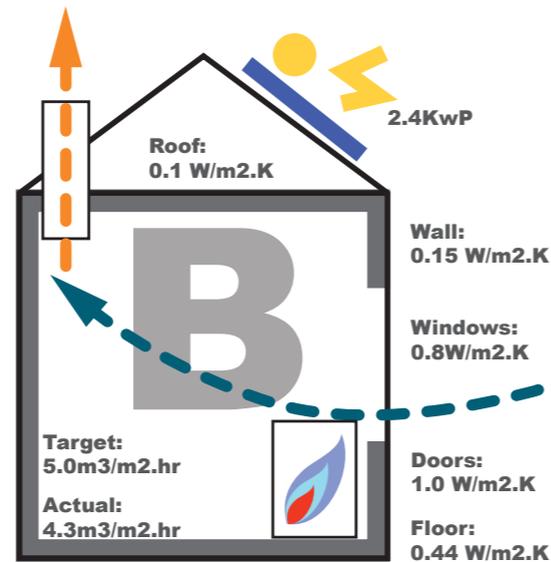
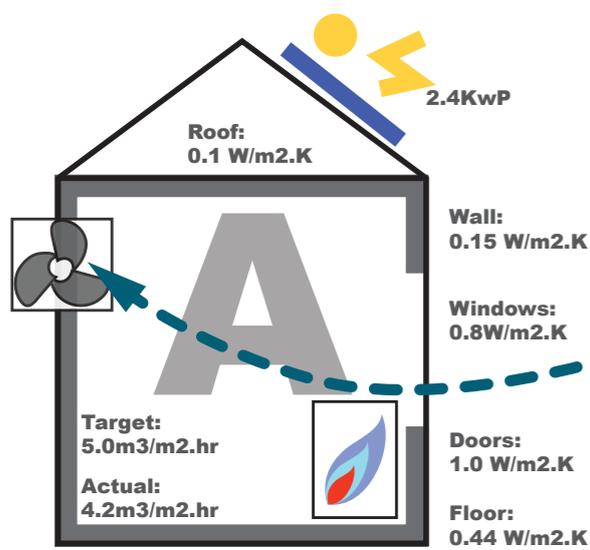
Evidence is key.

Useful heat energy vs energy input to district heating system.



4. Avoid 'eco-bling'





Key

- A: Condensing combi gas boiler; window trickle vents and mechanical extract fans; solar PV.
- B: Condensing combi gas boiler; passive stack vents; solar PV
- C: Electric boiler; MVHR; solar thermal.
- D: Exhaust air source heat pump/MVHR; solar thermal.
- E: Condensing gas boiler; MVHR; solar thermal.
- F: Log burning stove w. back boiler; passive stack vents; solar thermal system.
- G: Condensing combi gas boiler; MVHR; solar PV system. (see appendix for further details)

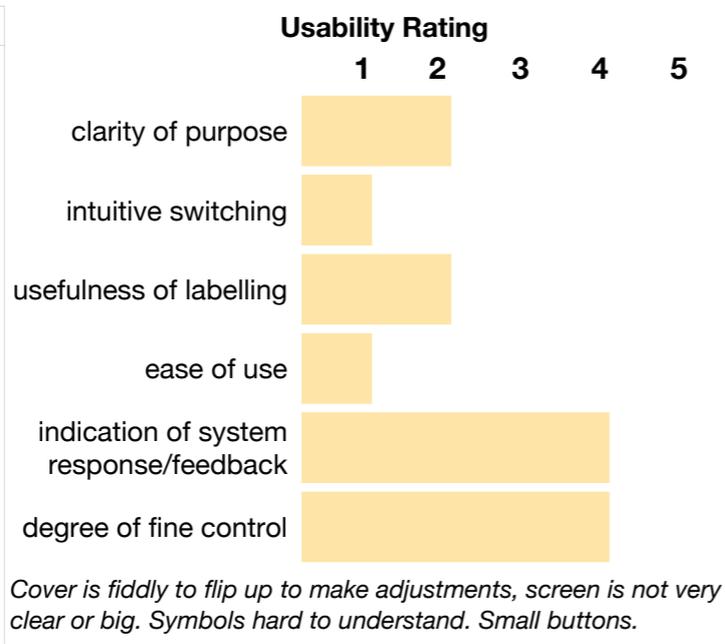
NOTES:

- 1. Data unavailable

This is from my MSc thesis , which was written up as a book chapter here: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781118273463.ch15> - email me if you want to know more.

Control/Interface

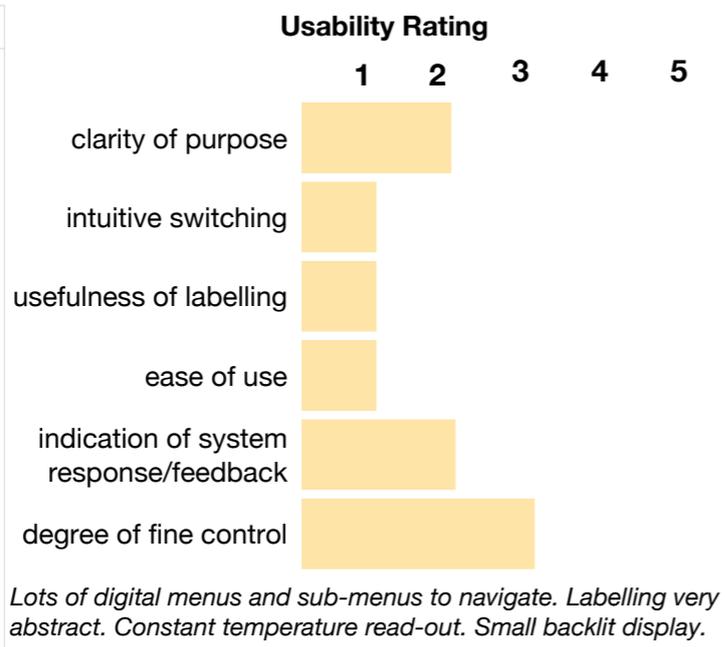
Central Heating Control



House	Comment on Resident Use
A	Residents don't use timer, just flick on and off as needed, using thermostat as a limit, but often switching off before this temp is reached.
B	
C	
D	
E	
F	
G	Use manual control and thermostat with thermostat as limit.

Control/Interface

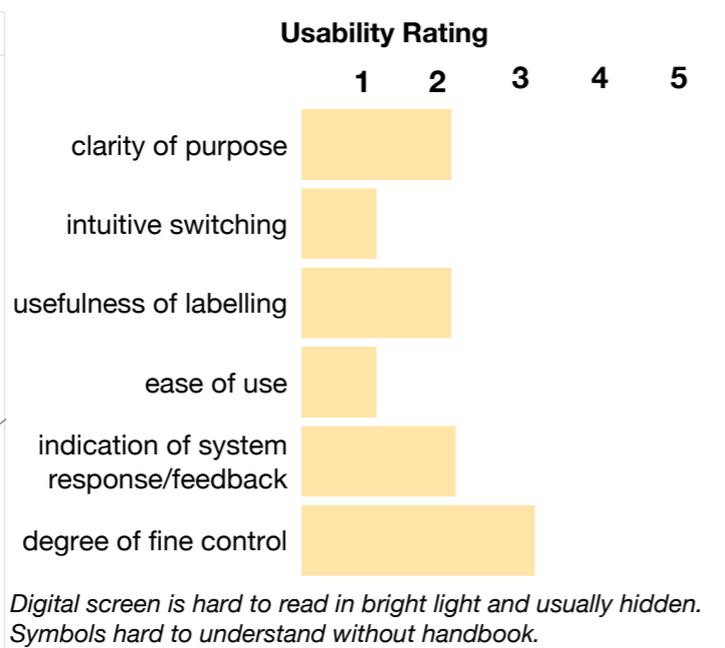
Central Heating/ Solar Control



House	Comment on Resident Use
A	
B	
C	Understand some settings, but don't like not being able to switch 'off'.
D	
E	Understand some settings, but only use to adjust temp up and down a bit.
F	Very good understanding of system, navigates menus to control as needed.
G	

Control/Interface

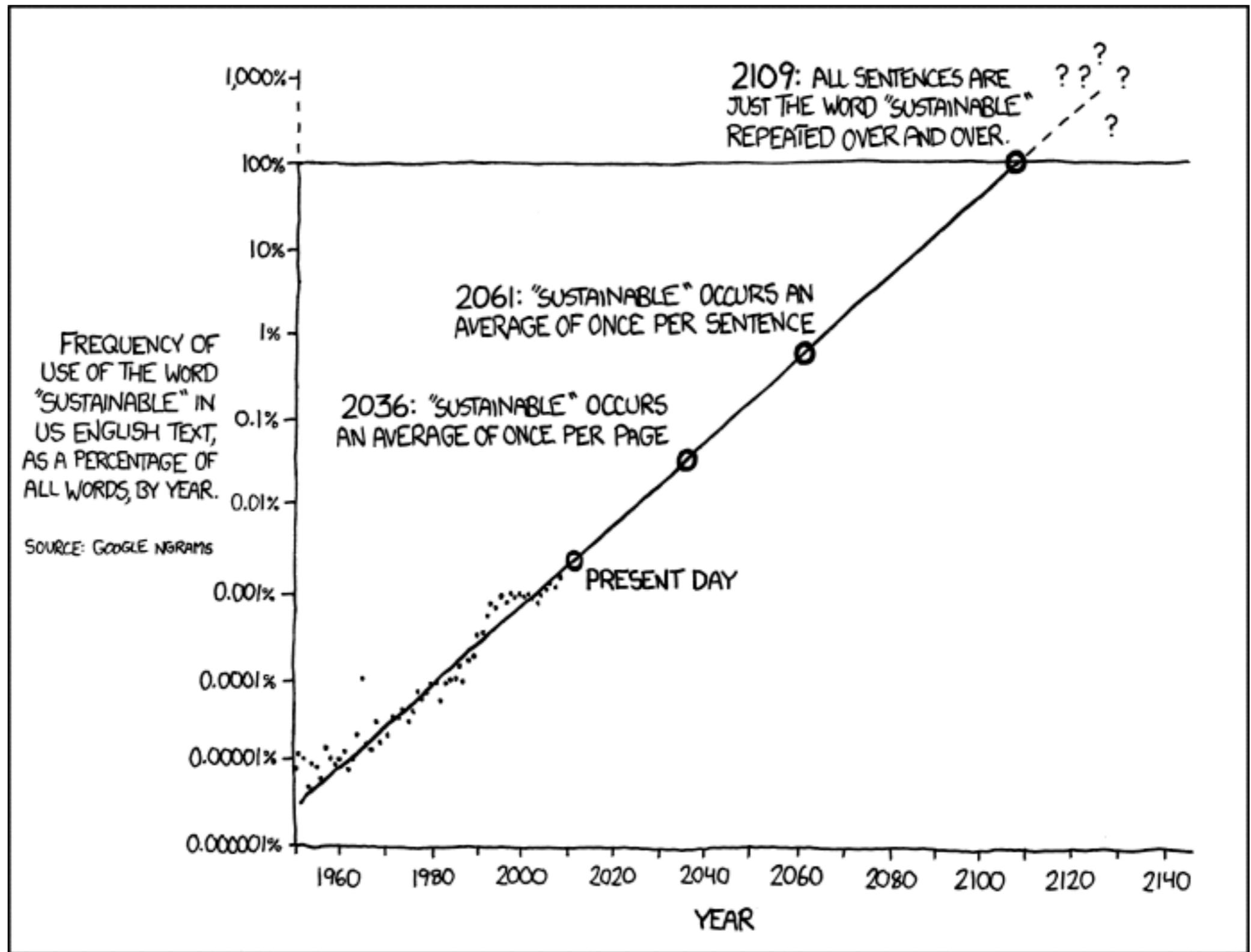
Central Heating/ Heat Pump Control



House	Comment on Resident Use
A	
B	
C	
D	Very good understanding of system, including adjusting 'heatcurves' etc.
E	
F	
G	

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Beware greenwash....



THE WORD "SUSTAINABLE" IS UNSUSTAINABLE.

Metrics and measurement of embedded impacts are less well developed than 'in use' impacts. Some useful resources:

BRE Green Guide: <https://www.bre.co.uk/greenguide/podpage.jsp?id=2126>

ICE Carbon Index: <http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html#.W36RHZNKifU>

<https://www.ukgbc.org/ukgbc-work/embodied-carbon-practical-guidance/>

<https://www.ellenmacarthurfoundation.org/assets/downloads/Built-Env-Co.Project.pdf>

<https://www.sciencedirect.com/book/9781856175371/the-ecology-of-building-materials>

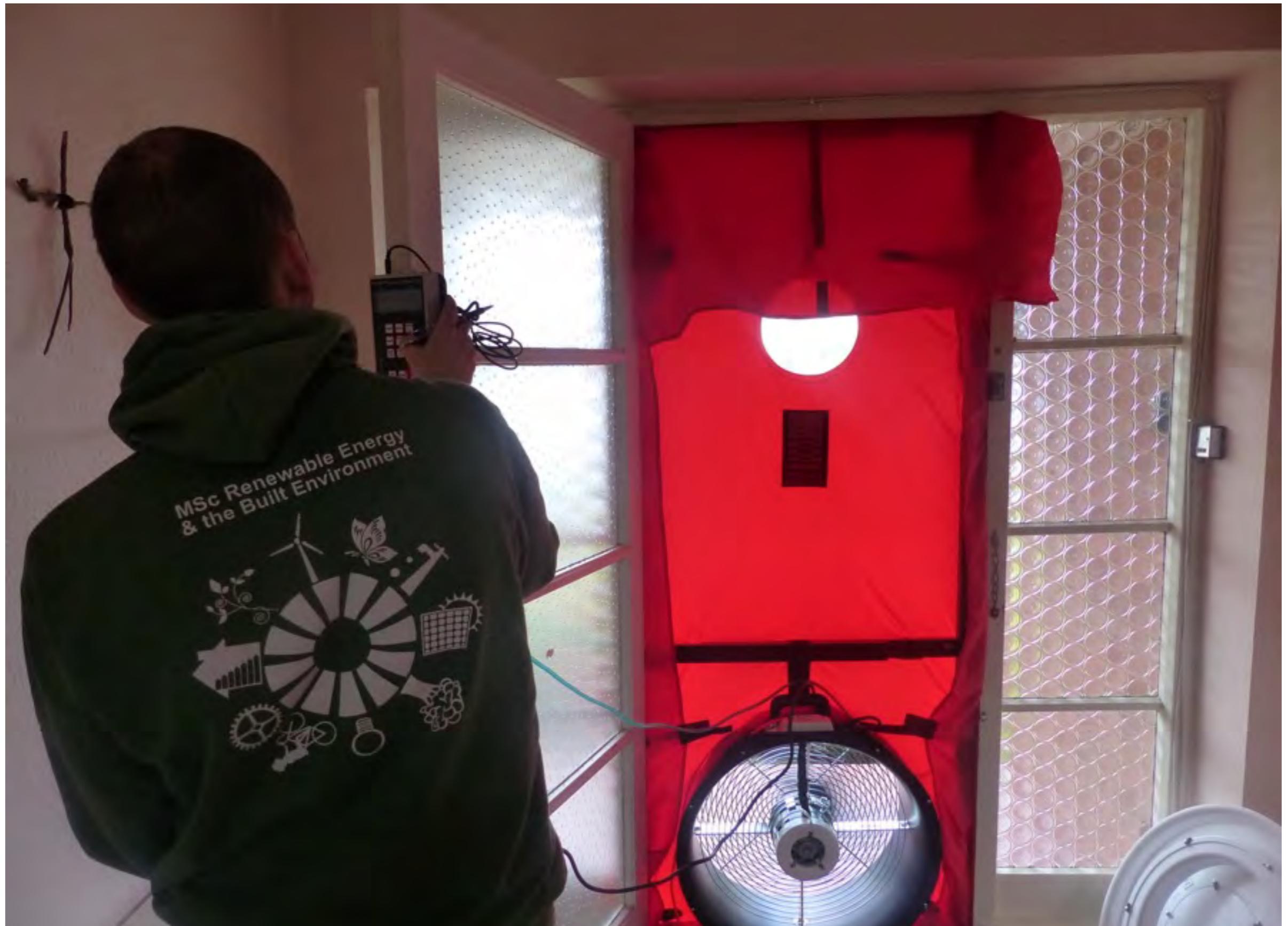
<http://www.rics.org/uk/shop/Methodology-to-calculate-embodied-carbon-19955.aspx>



MEGRAME EXPORT
GREEN LINE

ECO-FRIENDLY WINDOWS AND DOORS

and follow through with on site quality...



Is 100% renewable energy realistic? Here's what we know.

Reasons for skepticism, reasons for optimism, and some tentative conclusions.

By David Roberts | @drvox | david@vox.com | Apr 7, 2017, 9:10am EDT

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In Colorado, a glimpse of renewable energy's insanely cheap future

Even with storage, new renewables beat existing coal.

By David Roberts | @drvox | david@vox.com | Jan 16, 2018, 2:00pm EST

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Shutterstock

This month, energy nerds are very excited about a utility bid solicitation.

Wait, hear me out. It really is exciting!

Usually, when we talk about how renewable energy will evolve in the next five years, we rely on analysts and projections. This is different.

There is hope...

....esp if we see buildings as part of the energy system.





....but it's not just about buildings and physical infrastructure (which is why CLT's are great!).

Some further reading:

- The climate change big picture - <http://www.vox.com/2016/10/4/13118594/2-degrees-no-more-fossil-fuels>
- TSB/InnovateUK Building Performance Evaluation Programme: Studies of a large range of domestic and non-domestic low energy buildings. Lots of good published info on 'lessons learned'.
- Carbon Buzz - website with building case studies comparing 'designed' and 'as built' performance.
- Low Energy Buildings Database - repository of projects developed by AECB with InnovateUK/ TSB funding logging designed and 'as built' performance.
- PROBE studies - older now, but lots of useful learning still, especially on user perceptions and performance gap. Published in *Building Research and Information*
- Usable Buildings Trust - Resource rich website developed by those involved in the PROBE studies.
- Householder perspectives on the potential of the 'smart grid': <http://www.carbon.coop/blog/zapaman/community-smart-grid-prosumer-perspective> and here: <http://carbon.coop/blog/jonathan/smart-grid-aggregation-dashboard-prototype> - and some info on their 'green shift' smart grids project here: <http://carbon.coop/content/nobel-grid>
- Better Buildings Partnership, CIBSE, UK Green Building Council all have lots of useful documentation on 'real life' performance.
- You can follow the work of PROJECT SCENE here: <http://www.projectscene.uk/>