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Building Utopia

What if every building performed perfectly

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3 Key Documents

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Work
Non-Domestic

- http://www.worldgbc.org/activities/health-wellbeing-productivity-offices/

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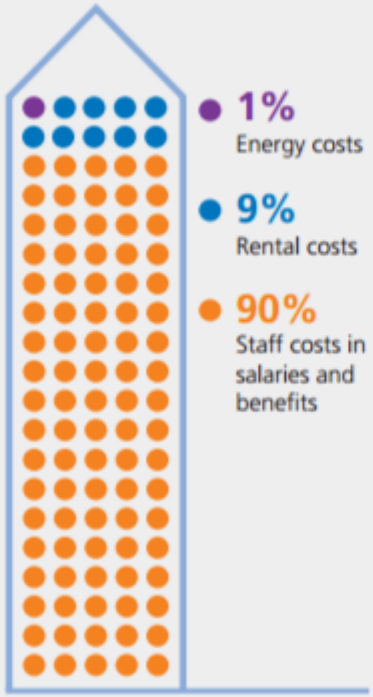
A healthy, happy workforce is a vital component of a productive, successful business in the long-term.

Typical business operating costs[1]



- 1% Energy costs
- 9% Rental costs
- 90% Staff costs in salaries and benefits

10% Variation

A 10% variation applied equally to each cost has a far from equal impact

+/– 0.1%
Energy costs

+/– 0.9%
Rental costs

+/– 9.0%
Staff costs

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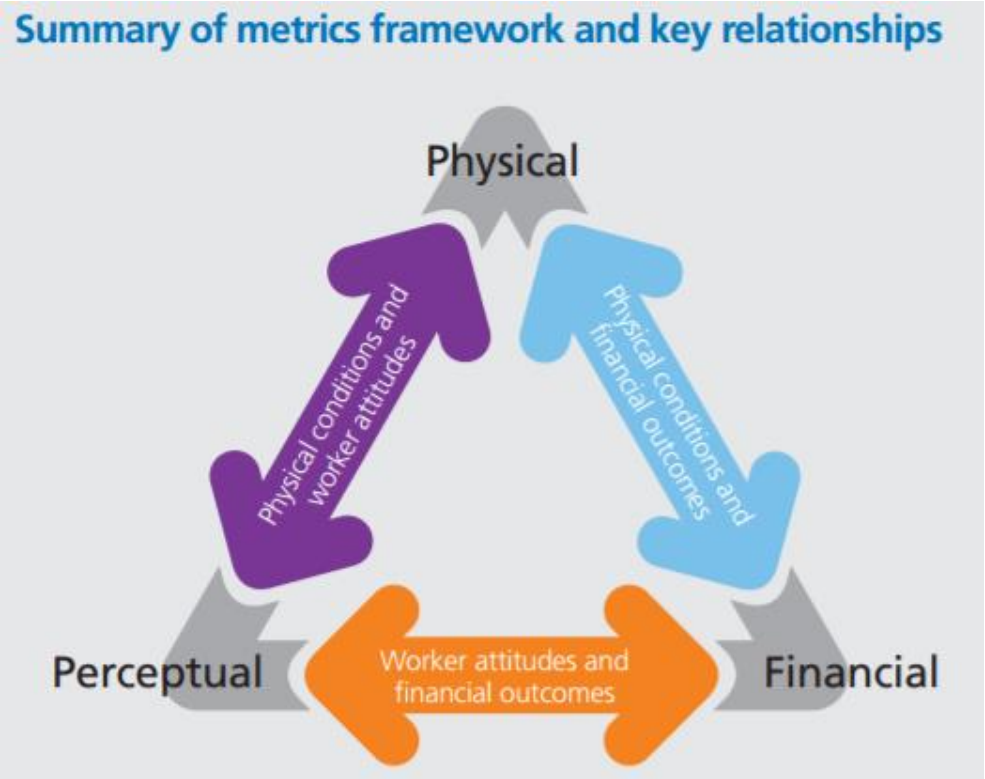
The Virtuous Circle of Higher Quality Buildings

World GBC
Health and Wellbeing
Productivity in Offices



This shows the importance of ongoing product and systems innovation to increase energy efficiency and improve the experience for occupiers; and the need for the real estate sector to help drive grid decarbonisation through installation of renewables and community-scale low carbon solutions

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Fuel poverty also adversely affects mental health. More than 1 in 4 adolescents living in cold homes are at risk of multiple mental health problems compared to 1 in 20 adolescents who have always lived in warm housing.

Costs of ill-health vary by sector and country, and are rarely comparable, but the impact is clear:

- The annual absenteeism rate in the US is 3% per employee in the private sector, and 4% in the public sector, costing employers $2,074 and $2,502 per employee per year respectively[2]
- Poor mental health specifically costs UK employers £30 billion a year through lost production, recruitment and absence[3]
- The aggregate cost to business of ill-health and absenteeism in Australia is estimated at $7 billion per year, while the cost of 'presenteeism' (not fully functioning at work because of medical conditions) is estimated to be A$26 billion[4].

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Can we improve and what is the value of doing so

USA study by Fisk on ventilation offices quantified the benefits in offices of changing ventilation rates

- Increase from 8 to 10l/s per person. $13bn benefit
- Increase from 8-15l/s per person $37.5bn benefit
- Decrease from 8-6.5l/s per person -12.1bn cost
- Maintain 8l/s per person- add economisers when absent $32.9bn benefit

We need to agree what ‘performing perfectly’ means but clearly there are benefits to be unearthed

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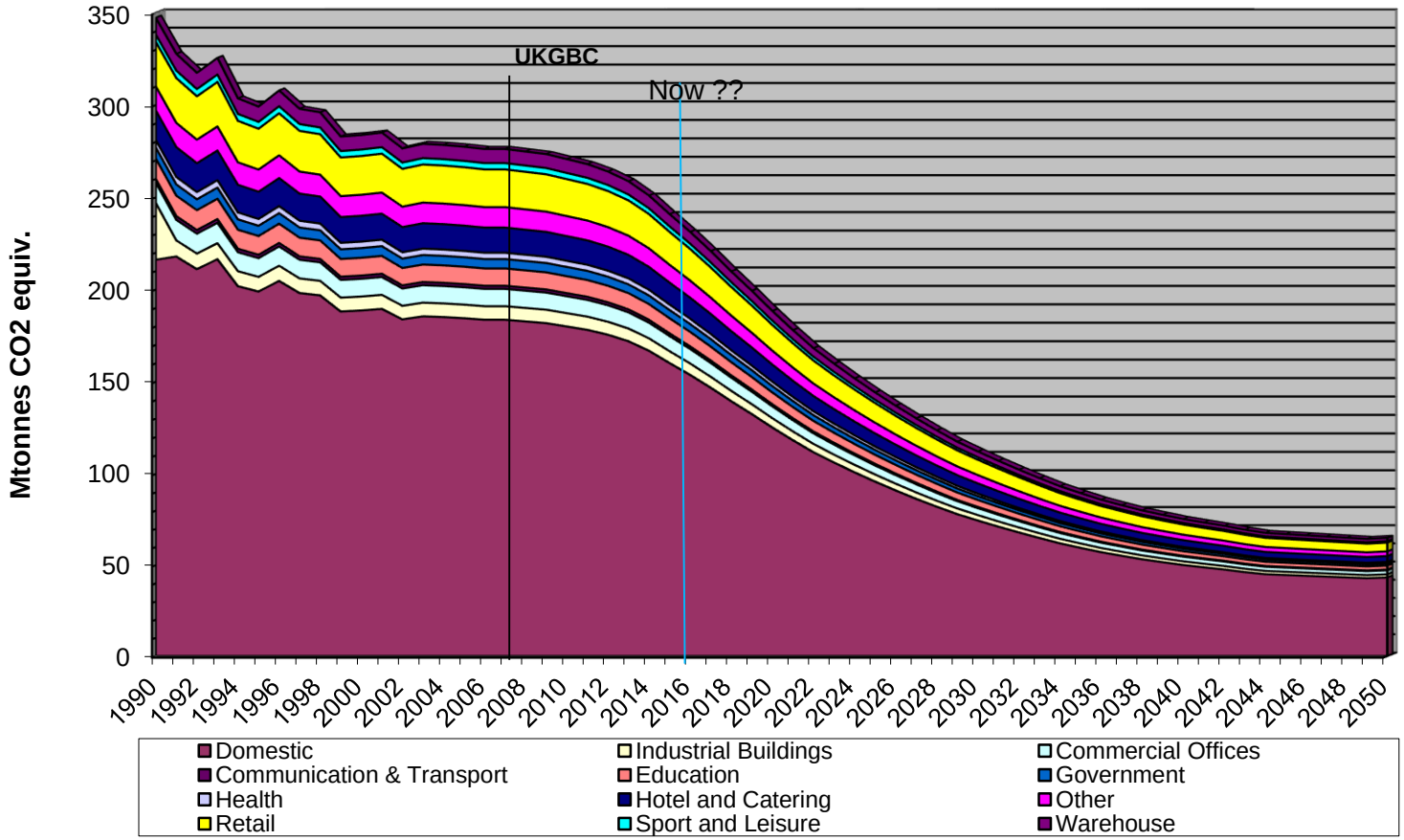
Time for a decadal review ?



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4th Carbon Budget 2012

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Homes as Infrastructure

The idea is catching on

Lobbying the G20

We call on G20 Finance Ministers to commit to:

- ✓ Reclassify investment in energy efficiency as a public infrastructure priority;
- ✓ Undertake an assessment of the structural reforms needed to address financing barriers and grow markets for improving energy productivity, thus enabling the G20 Energy Efficiency Action Plan to be implemented in a way best-suited to each G20 economy;
- ✓ Commit to delivering sufficient public funding to ensure equal access to finance among householders and to leverage the large scale of private finance needed to repair and enhance our building infrastructure.

September 2015

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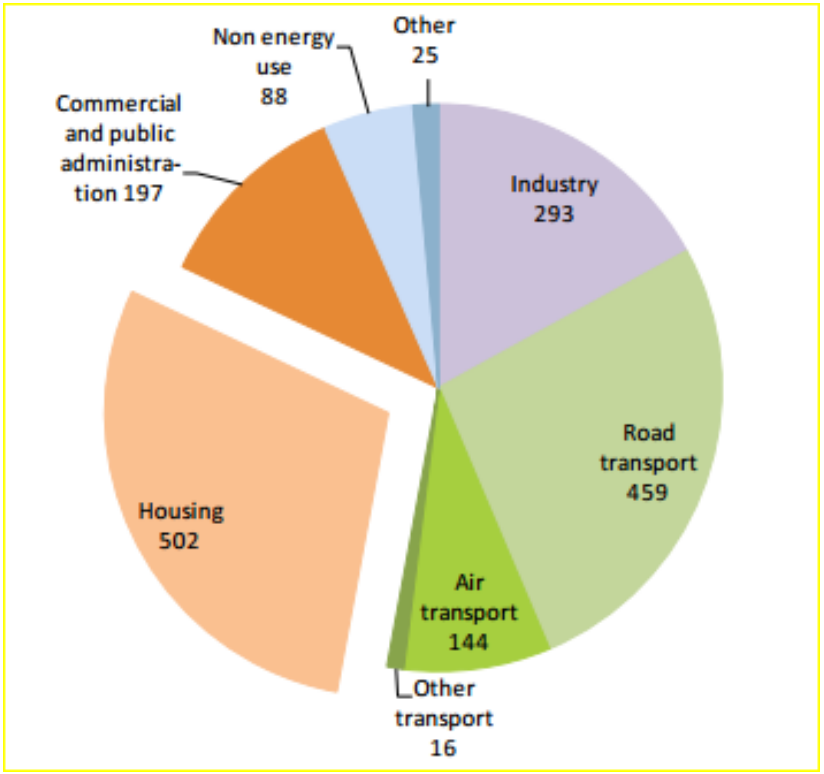
Energy

Consumption by sector TWh

Total 1724 TWh



UK Housing Energy Fact File

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21,200,300 dwellings in England in 2014

Dwellings by tenure in England

Year	Owner Occupied	Privately rented	Social rented - Housing Association	Social rented - Local Authority
2003	14,752,000	2,549,000	1,651,000	2,457,000
2004	14,986,000	2,578,000	1,702,000	2,335,000
2005	15,100,000	2,720,000	1,802,000	2,166,000
2006	15,052,000	2,987,000	1,865,000	2,087,000
2007	15,093,000	3,182,000	1,951,000	1,987,000
2008	15,067,000	3,443,000	2,056,000	1,870,000
2009	14,968,000	3,705,000	2,128,000	1,820,000
2010	14,895,000	3,912,000	2,180,000	1,786,000
2011	14,827,000	4,140,000	2,255,000	1,726,000
2012	14,754,000	4,286,000	2,304,000	1,693,000
2013	14,685,000	4,465,000	2,331,000	1,682,000
2014	14,709,000	4,588,000	2,343,000	1,669,000

Source: DCLG Housing Statistics, Table 104, Live Tables on Housing Stock,

23.4 million homes in the uk

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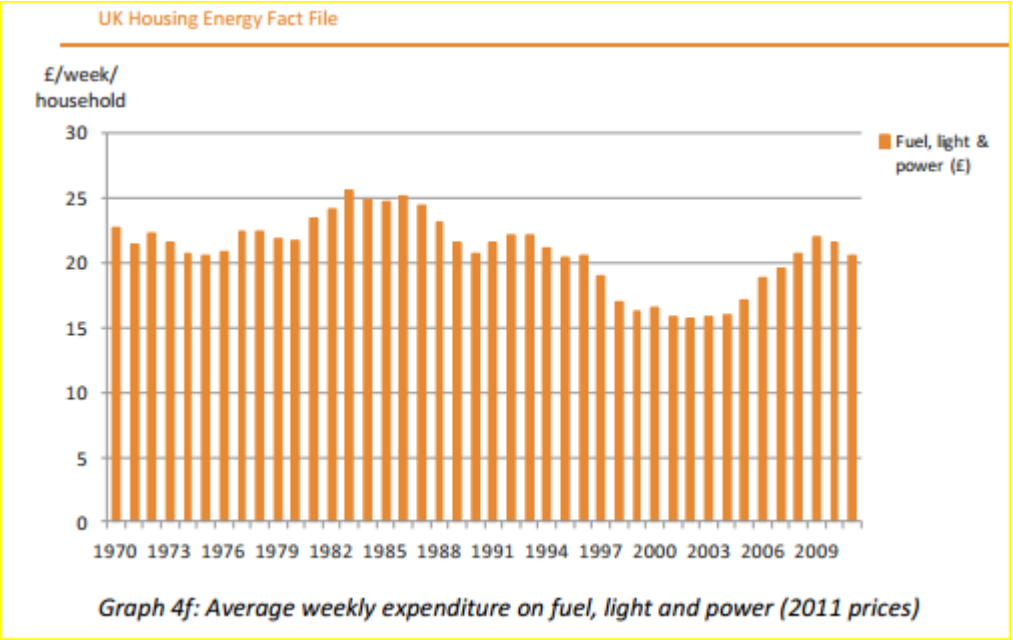
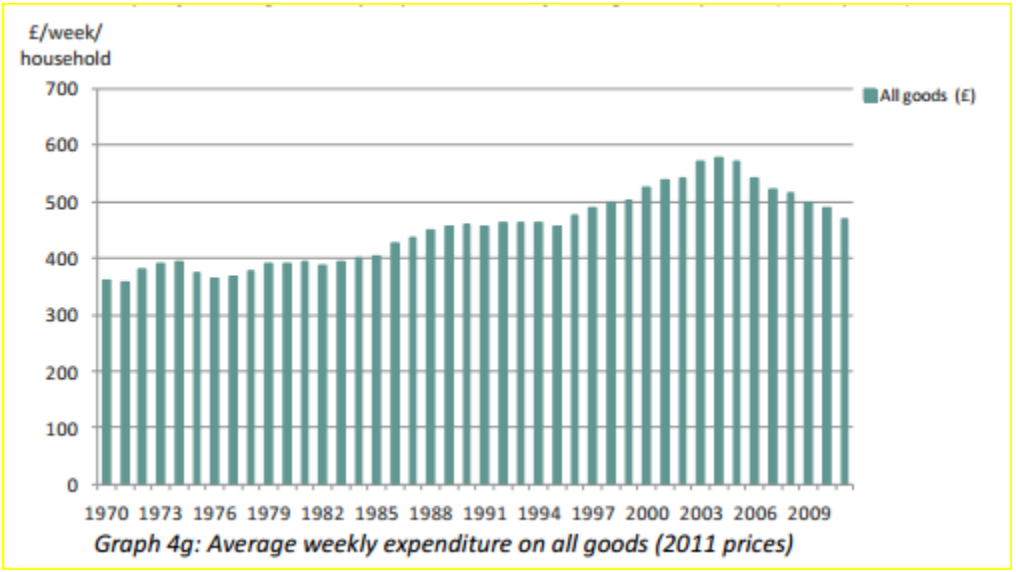
£ 1100 Fuel bill
Average PA

£25,480 Expenditure
Average PA



Graph 4f: Average weekly expenditure on fuel, light and power (2011 prices)



Graph 4g: Average weekly expenditure on all goods (2011 prices)

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Health

Housing is up there with Smoking

Risk factor	Total cost burden to NHS
Physical inactivity	£0.9 - £1.0 billion
Overweight and obesity	£5.1 - £5.2 billion
Smoking	£2.3 - £3.3 billion
Alcohol intake	£3.2 - £3.2 billion
Housing	£1.4 - £2.5 billion*

£1.4bn = poor housing, England. £2.5bn = all homes with significant HHSRS hazards, UK (with Wales, Northern Ireland and Scotland figures extrapolated from Table 1)

Non housing costs are taken from Scarborough et al

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Not all of this is building just ~ £1 Billion
And payback of the majority 7 years

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Table 2: The costs, and benefits to the NHS, of reducing HHSRS Category 1 hazards to an acceptable level (using median harm proportions and revised cost estimates)

Hazard	Number of Category 1 Hazards	Average repair cost per dwelling (£)	Total cost to rep (£)	Savings to the NHS per annum if hazard fixed (£)	Payback (years)
Excess cold	1,325,088	4,574	6,061,192,123	848,398,538	7.14
Falls on stairs	1,352,837	857	1,159,516,031	207,099,936	5.60
Falls on the level	543,848	780	424,061,206	127,832,318	3.32
Falls between levels	239,930	927	222,382,484	84,308,287	2.64
Fire	128,590	3,632	466,975,191	25,082,026	18.62
Collision and entrapment	74,054	692	51,274,568	15,789,110	3.25
Falls - baths	78,132	521	40,679,153	15,739,628	2.58
Dampness	53,349	7,382	393,817,237	15,585,129	25.27
Hot surfaces	107,168	2,436	261,065,812	15,061,744	17.33
Lead	112,051	1,661	186,099,748	13,883,487	13.40
Entry by intruders	47,284	1,063	50,244,016	13,179,469	3.81
Radon	107,603	1,126	121,124,474	9,028,719	13.42
Sanitation (Personal hygiene)	35,222	1,154	40,639,168	4,086,230	9.95
Food safety	32,283	2,461	79,460,523	3,742,720	21.23
Pests (Domestic hygiene)	28,355	1,921	54,481,109	3,401,754	16.02
Overcrowding	23,871	16,100	384,325,757	2,295,332	167.44
Noise	6,161	1,411	8,691,034	1,751,983	4.96
Carbon monoxide	15,336	506	7,753,023	1,489,008	5.21
Structural collapse	15,394	812	12,507,557	1,324,343	9.44
Electrical problems	9,204	2,360	21,722,172	1,230,900	17.65
Ergonomics	8,201	483	3,963,825	985,487	4.02
Un-combusted fuel gas	7,545	489	3,688,692	713,935	5.17
Lighting	5,453	1,947	10,619,508	624,548	17.00
Water supply	4,894	1,202	5,882,826	606,428	9.70
Excess heat	1,369	470	642,918	129,321	4.97
Explosions	–	–	–	–	–
Any	3,472,765	2,875	10,072,810,155	1,413,370,381	7.13

£ 869,040,782 PA
Mostly excess cold

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Happiness

2.9 million in fuel poverty

15000 excess winter deaths

Fuel Poverty

England uses a Low Income High Costs (LIHC) indicator to define fuel poverty. A household is fuel poor if they have above average fuel costs and are left with a residual income below the official poverty line.

"The UK has one of the highest excess winter death levels in Europe despite our moderate climate."

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Every Building in the UK to be Passivhaus Standard by 2050

‘Enabling cities where human beings live comfortable and fu lives with the minimum adverse impact on our environment’

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Every Building in the UK to be
Passivhaus Standard by 2050

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Infrastructure is the backbone of any modern, successful and competitive economy

National Infrastructure Plan 2013 (HMT)

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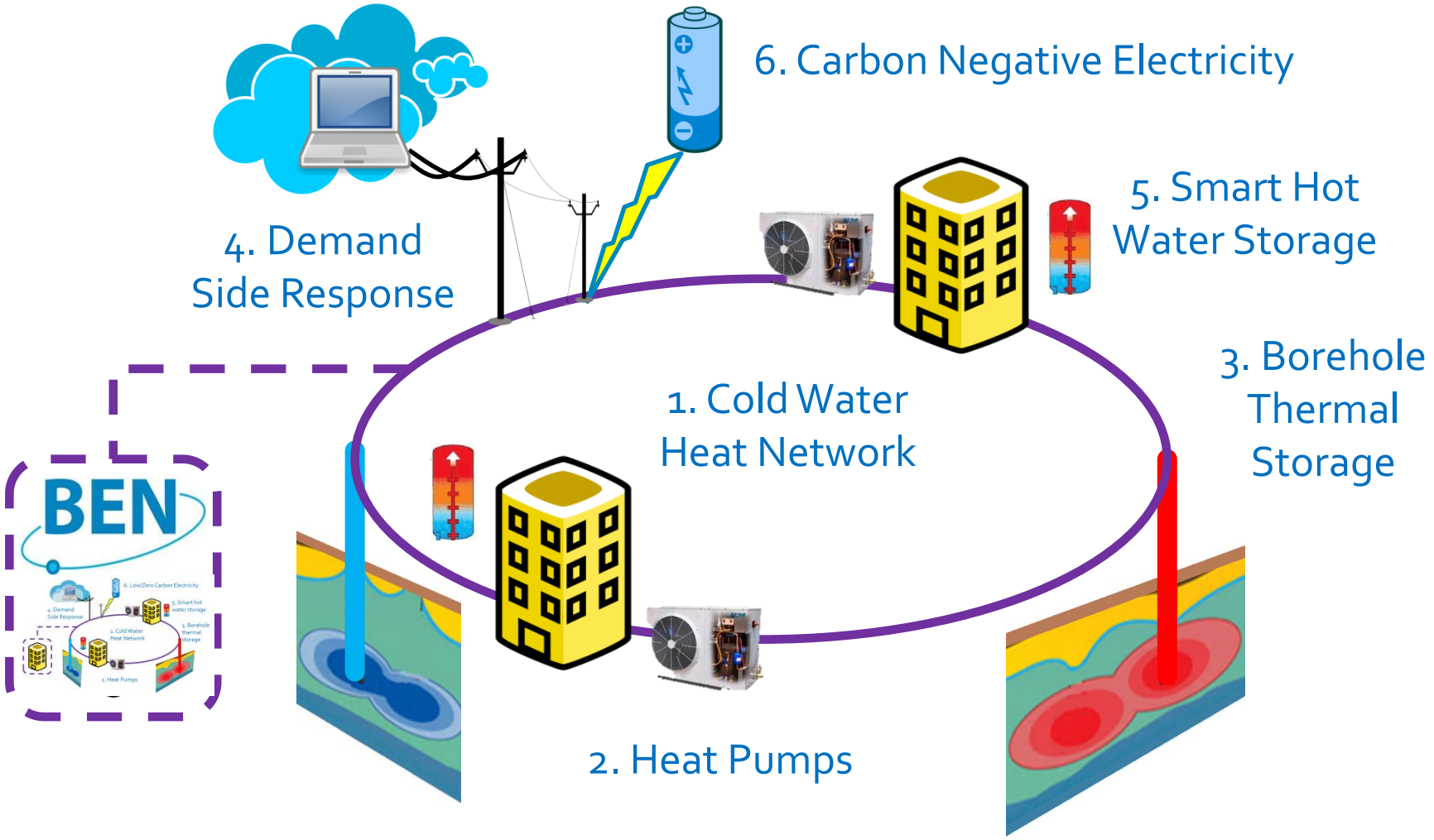
Balanced Energy Networks



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