The Implications of Low Energy Sustainable Building Standards for Innovation, Products and Technology

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The 2010-2020 Challenge

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Known Changes in Standards	All new Housing Corp & English Partnership funded homes at Level 3 or bettog of CSH		CSH Level 3 General efficiency of residential 20% better than in 2000. Govt Depts to	Demand for SC & SBS	Central Government's office estate to be Carbon Neutral.	CSH Level 4		Standard for Ti	CSH Level 6 uly Sustainable	Buildings??		_···
			increase energy efficiency / m2 by 15%.	Skills?		andards for Nev uild Housing?	→ /.		·· /*	s s	tandards for N Non-Domestic Buildings?	
Possible / Likely Changes in Standards	Code for Sustainable Buildings Expected			Code for Sustainable Buildings Level 3??		All Public Sector Buildings Level 4 of CSB??		Code for Sustainable Buildings Level 4??	All Public Sector Buildings Level 5 of CSB??		All new Public Sector Buildings Level 6 of CSB??	All Buildings Level 6 of CSB??
Initiatives	Carbon Challenge Competition underway 1st phase Ech Towns proposals	Carton Challenge developments being built	20	06 Building R	egs Part L stan	dards					. — —	
Direct Demand for Sustainable Construction and Building Services		Carbon Challenge (Level 6) developments being built	¦ 10 + Eco		velopments: Upton	. Harlow North, Si	erford, etc.			Standards for the Existing Stock?		
Skills		Sustainable sch	ools as a UK sta	ndard?								

UK Reality Check

- Stamford Brook (Leeds Met Uni): <u>actual</u> build quality does not even reach <u>current</u> Building Regs energy performance;
- BSF 'Green Schools' (Usable Buildings Trust): not designed to be low energy buildings;
- BREEAM & 'Zero Carbon' Definitions: being reworked into more energy-intelligent forms – i.e. BREEAM 'Excellent' <u>not</u> = Low Energy Building;

UK v's Global Perspective

UK focus on BREEAM, CSH and SAP ...

Global focus is now on kWh/m2 ...

Passivhaus as a global benchmark:

- Based on building physics;
- 20 years of experience;
- Methodology based on accurate predictions not notional buildings (SAP);
- Has created a market for Passivhaus Certified products;

Sustainable Building Standards

Passivhaus

Minergie

Super-E

AECB Gold & Silver Standards

GreenStar

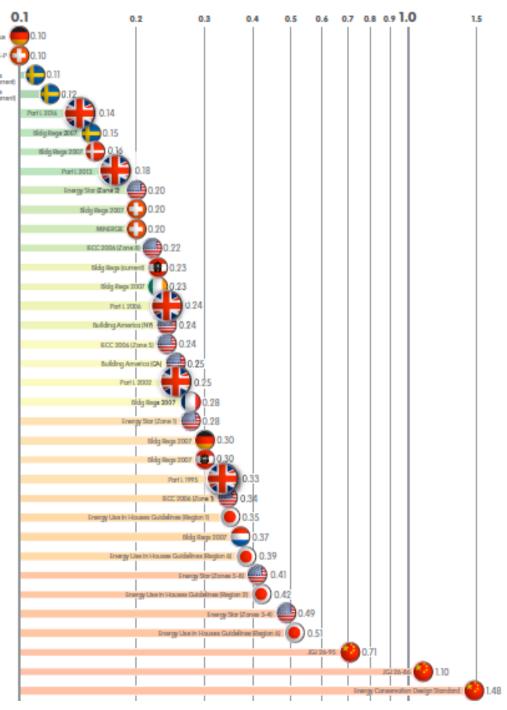
LEED

Code for Sustainable Homes

BREEAM

Figure 3

Averaged U-values for floors, roofs and walls (W/m²K)

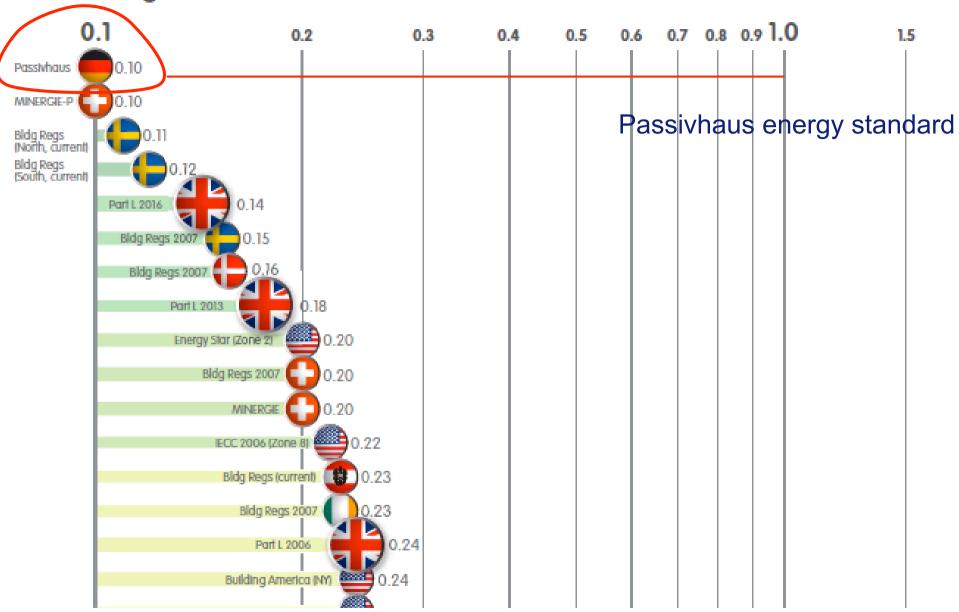


Zero Carbon Compendium NHBC Foundation

A comparison of energy efficiency standards around the globe

Published September 2009

Averaged U-values for floors, roofs and walls (W/m²K)



Overview of PassivHaus buildings

- world-leading energy efficient construction standard
- designed and built using a step-by-step approach
- use efficient components and a whole house ventilation system to achieve ultra low running costs
- are comfortable, healthy and sustainable
- typically achieve an energy saving of 90% compared to existing housing.
- approx 17,000 PassivHaus buildings worldwide total floor area over 200,000sqm.

Source: BRE website

The LC Refurb Agenda

LC Refurb = driver for innovation & product development

- 500,000 homes/year up to 2050
- 7 million C80 homes by 2020

Which in C80 refurb completions equals:

- 2,500 per day / 333 per working hour
- Or 5.5 per minute

In the South East:

- 45 / hour
- £1million spend / hour

The LC Refurb Agenda

LC Refurbishment standards will soon be with us ...

- EST Hard to Treat Homes project:
 - U-values: 0.30 or better?
- External insulation systems (mainly for the 'big boys'?) v's internal insulation systems v's mixtures of both
- Windows & doors; MVHR; envelope products and air-tightness products; thermal bringing; etc

Product Information & Certification

Certification:

BRE Green Guide to Specification

GreenSpec

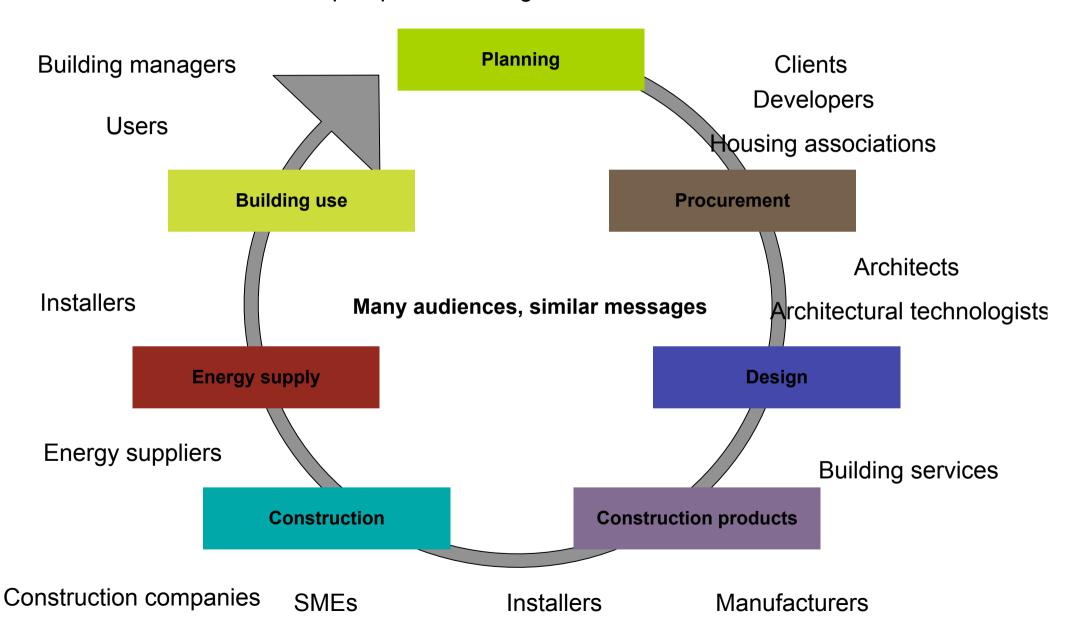
Information:

Bath University – Inventory of Carbon & Energy (ICE)

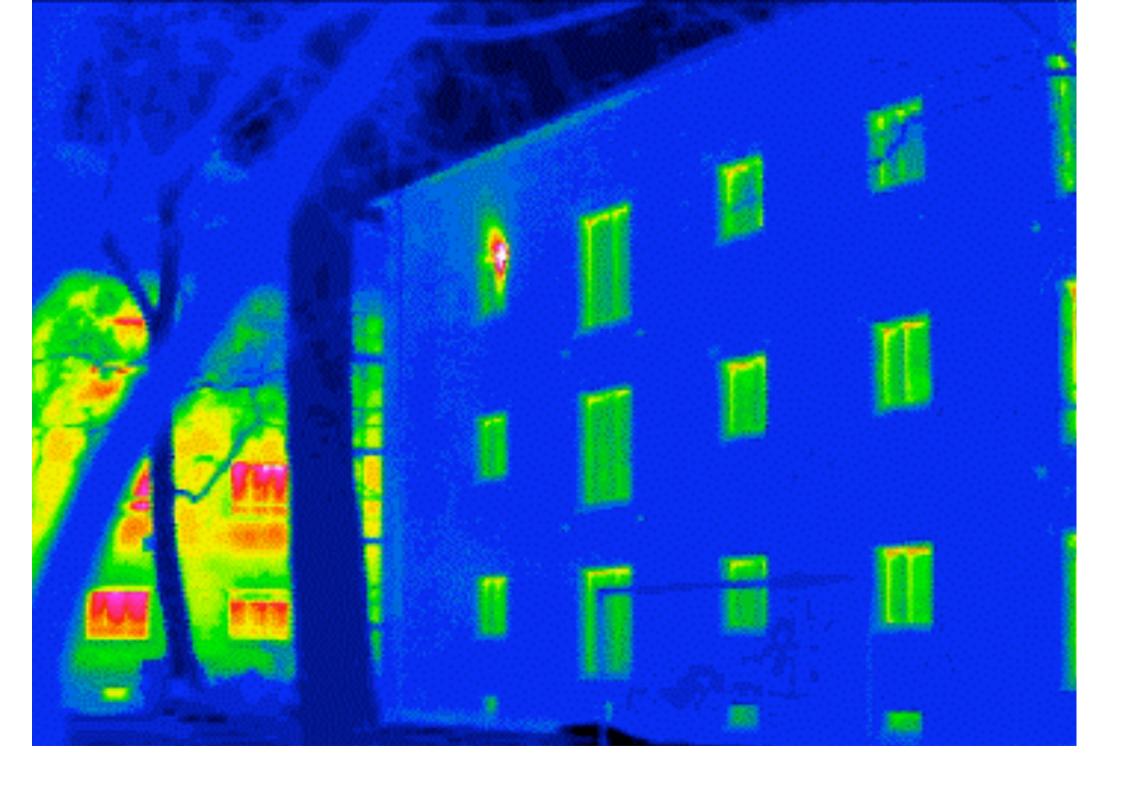
CAP'EM (simplified life cycle assessment for eco materials for SME manufacturers)

Lots of parties need an education...

Transport planners English Heritage











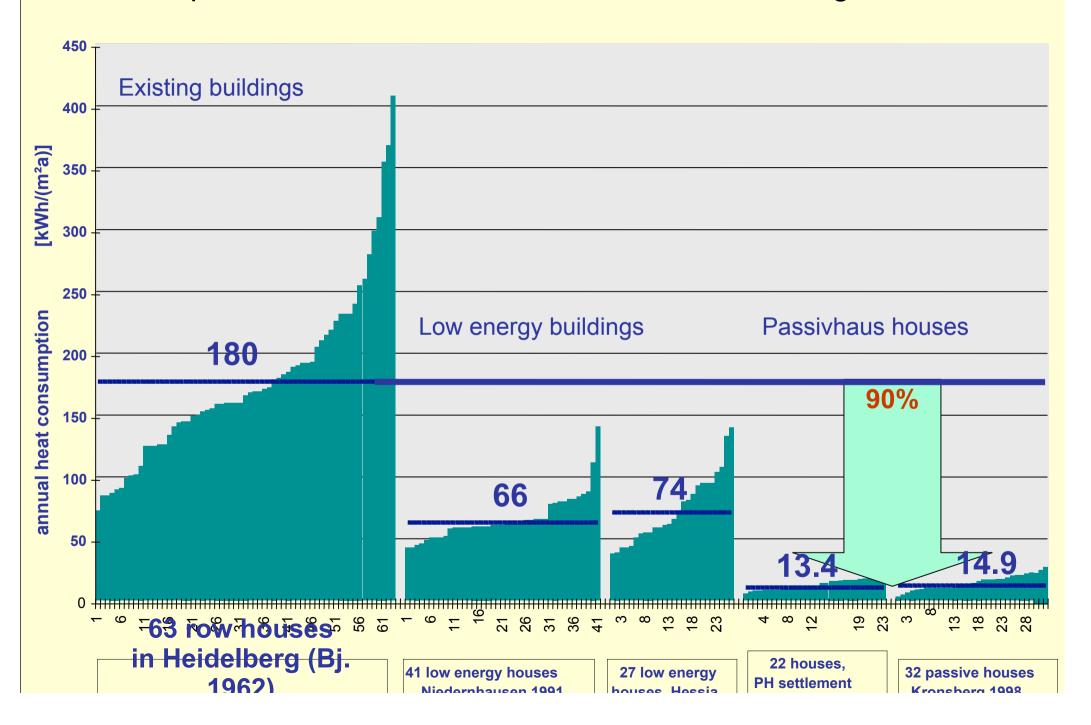
kWh/(m².yr) actual

Heating 11

Total 32

....a 90% reduction on average consumption levels

Occupant behaviour makes a difference: the average matters



Disability Essex, Rochford



Just completed

Gentoo Housing Association - Racecourse Estate Houghton-Le-Spring, Tyne and Wear



25 homes under construction

The first officially PH certified UK building - training centre/ offices, Machynlleth







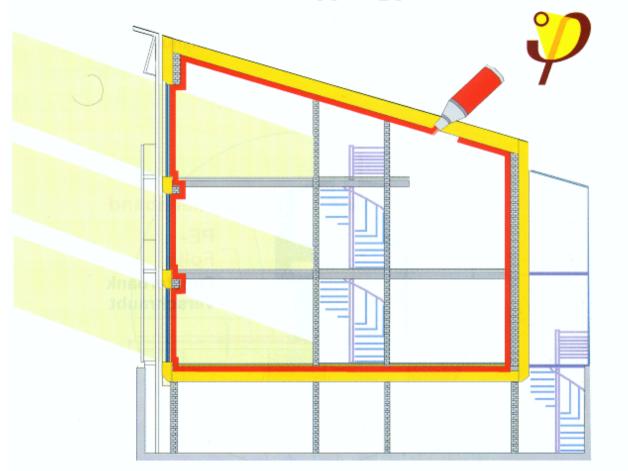
Before (1869 - 2008)



After its 100 year service (2008-2009)



Airtightness – the red pencil line



Source: PHI Darmstadt

Designing and installing a continous airtightightness layer is essential

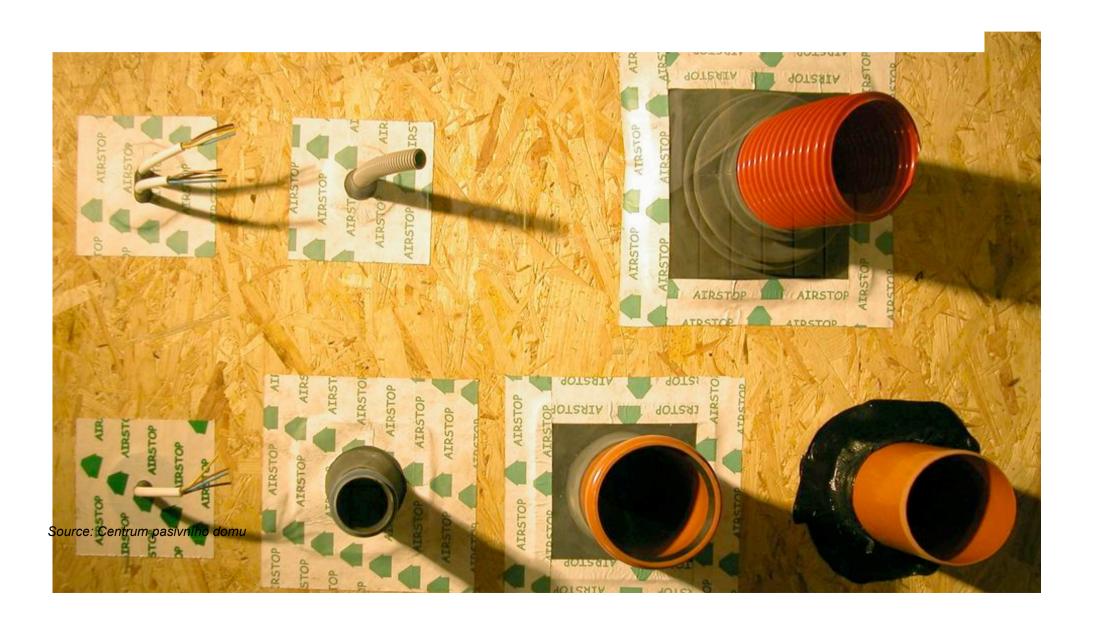
Careful sealing of window-to-wall iunctions is essential



- use special tapes to seal the render to the airtightness membrane
- angles / corners needs to be sealed with special mastic

Keep breaks in the fabric to a

Any services penetrations in the fabric should be sealed by cable or hose bushings, pipe sleeves or butyl rubber tapes

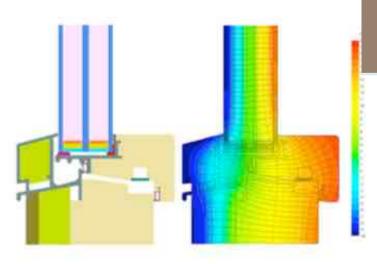


green building store

And we need more passivhaus products readily available in the UK









Value Chains Pyramid for Low Carbon Building Product & Technology Sector

Low / Zero Carbon **Building Product & Technology Sectors** Create value chains in all key areas **Demonstration Bldgs, Technol &** All levels of the Value **Product Showcasing** Chain Pyramid need to be put in place and Supply Chain & SME **Needed:** in all regions connected up. development & support Innovation + Research / R&D Training, Knowledge, Skills & Learning **Capacity Building, Networking & Finance** Housing & Food & Eneray & Access & Learning &

Known Problems or Challenges?

Knowledge:

- of energy and buildings in the UK is very poor;
- distorted knowledge: new build over existing stock; focused on Codes, etc not performance.

Skills:

- (virtually) no body has a complete picture;
- trade based, not team or multi-skill based;

Scale of Issue:

- very large sector, numerous players, complex, huge number of subbies & small builders;
- Existing homes: 27 million to low-to-zero carbon;

Predictable Trends

'sorting the wheat from the chaff'

Standards
Certification schemes
Building design and construction methodologies
Products
Technologies
Product+Technology combinations

General Trends:

Next 5 years – focus on reduction in operational (in-use) energy use, water use and carbon emissions

Within 5-10 years – shift towards impact = (operational + embodied) x energy, carbon and water impacts

Predictable Trends

'sorting the wheat from the chaff'

Energy and Carbon performance data increasingly critical for products + software for easy understanding

Product/technology certification for high performance standards

Removal of barriers to entry for quality products and technologies

High investment in R&D and product development and improvement

Competent persons certification for high performance products

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