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The Privatisation of Knowledge: Pitfalls and Opportunities for CO2 reduction

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The Background: Knowledge and Carbon In the Built Environment

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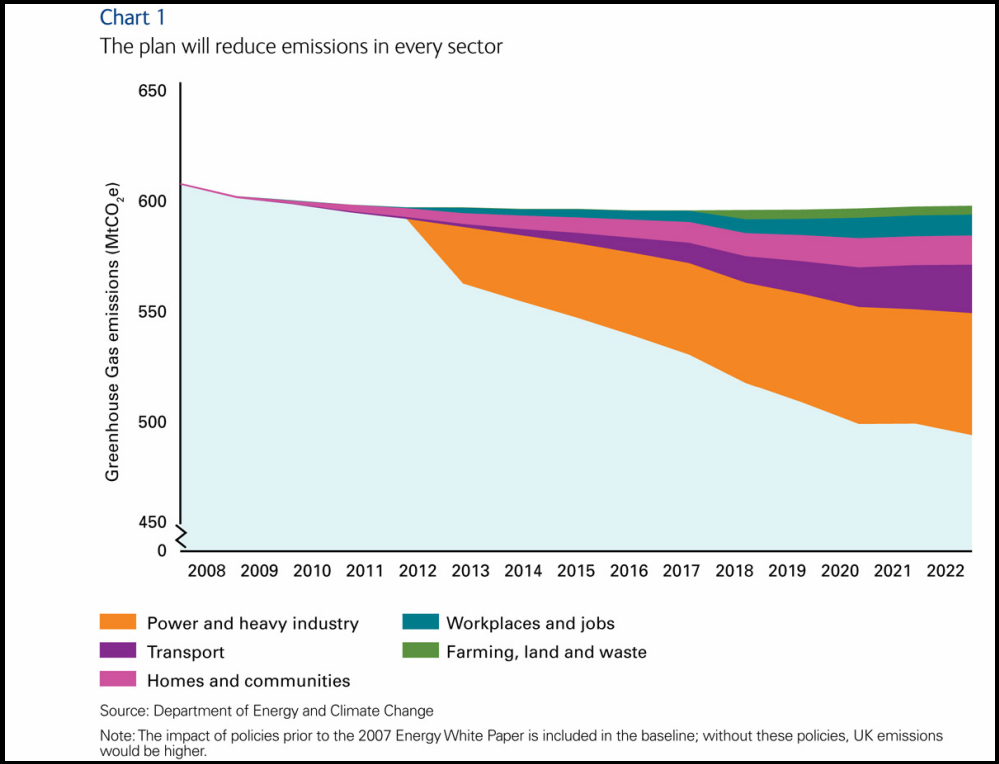
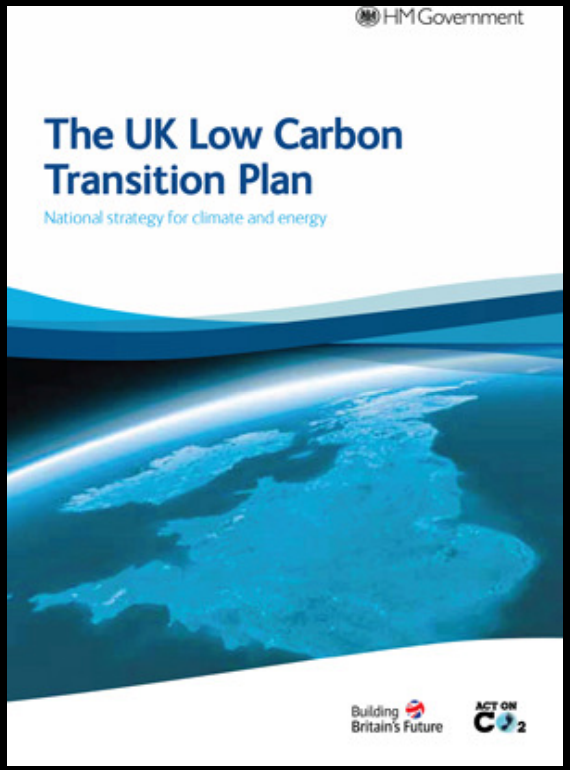
1. Know where the carbon is, to identify actions for reductions





The Background: Knowledge and Carbon In the Built Environment

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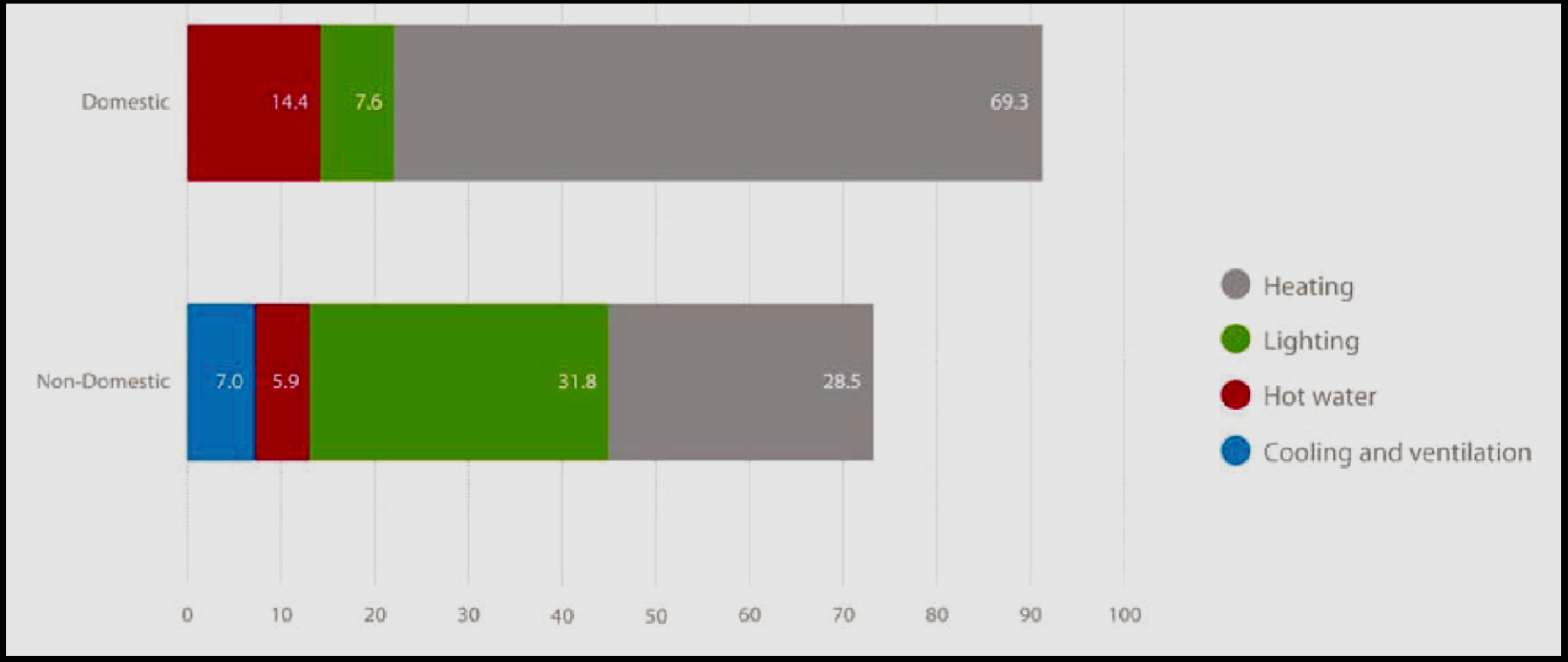
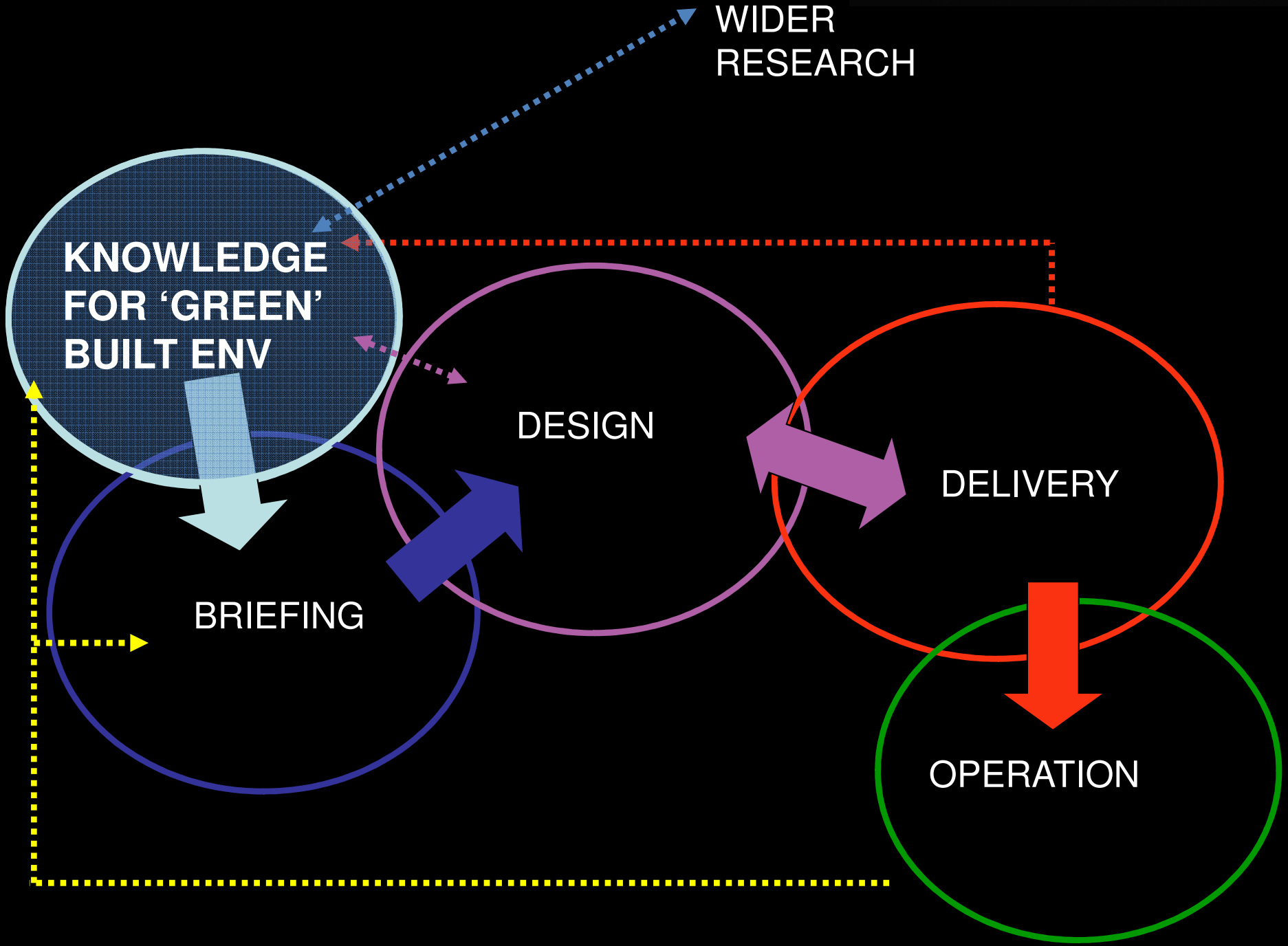
1. In 'Construction' the GCB's Routemap allows us to scenario plan for carbon reductions to 2050

"a structured and logical Routemap by which to view the timeline... Of key interventions, and associated contributions in carbon reduction "

"to achieve the target by 2050, emissions from the built environment will need to decrease to 46 million tonnes, or an additional 77% from 2010 levels"



GCB Year On Report: Fig 2 Total carbon use domestic and non-domestic sectors (MtCO2e)


WIDER
RESEARCH
KNOWLEDGE
FOR 'GREEN'
BUILT ENV
DESIGN
DELIVERY
BRIEFING
OPERATION

The Background:GCB Knowledge and Skills

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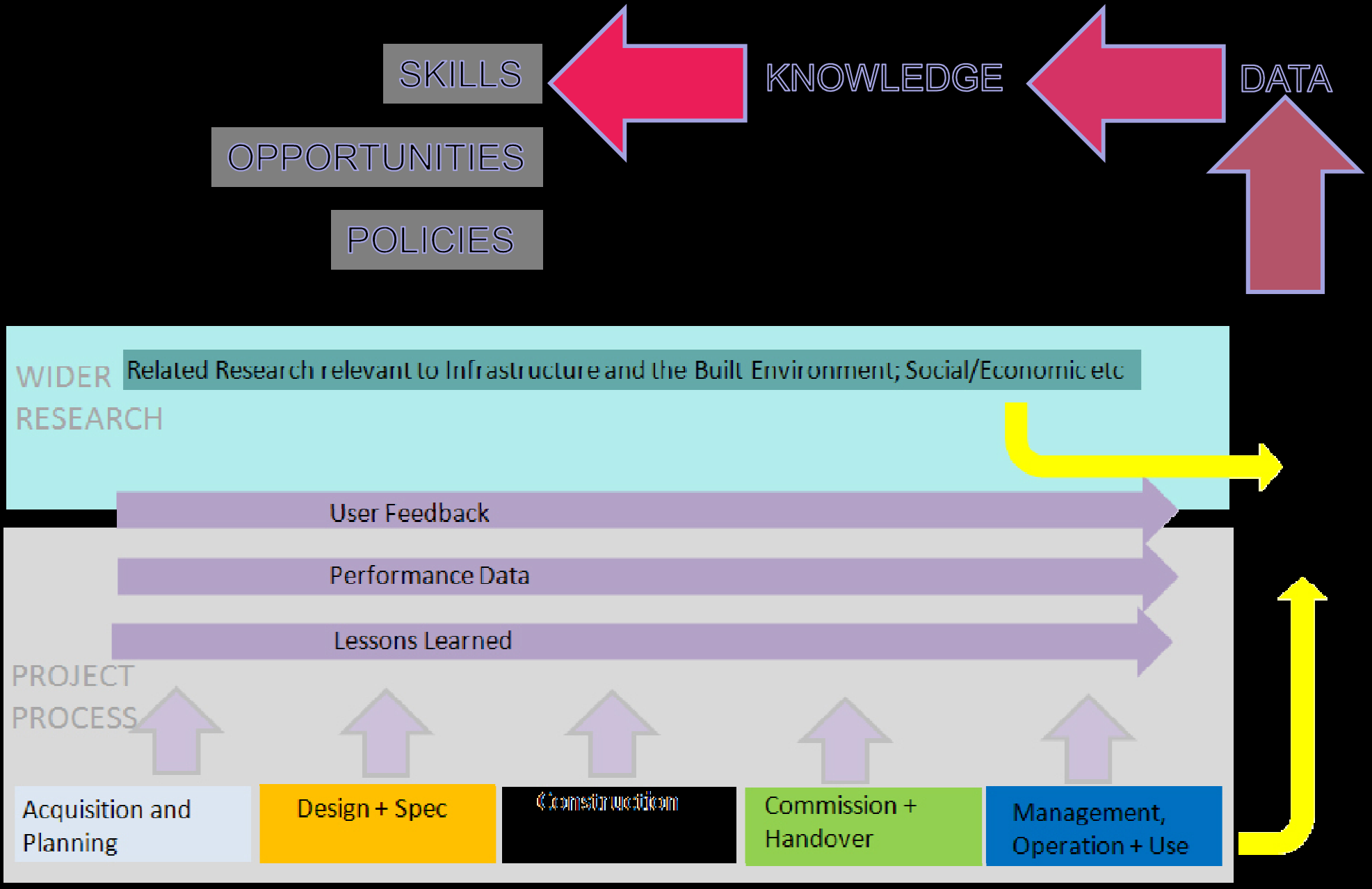

The Background: Knowledge and Skills

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Knowledge hub promoting understanding (and a suite of protocols for data collection)

To develop and document a common language that defines a green built environment

To develop a single structure by which to coordinate all relevant learning and skills programmes

To rapidly create a pool of education and training practitioners expert in the learning required

Identify specific needs and skills - and numbers?

To stimulate those outside formal networks to persuade them of market opportunities

The Background: Knowledge and Skills

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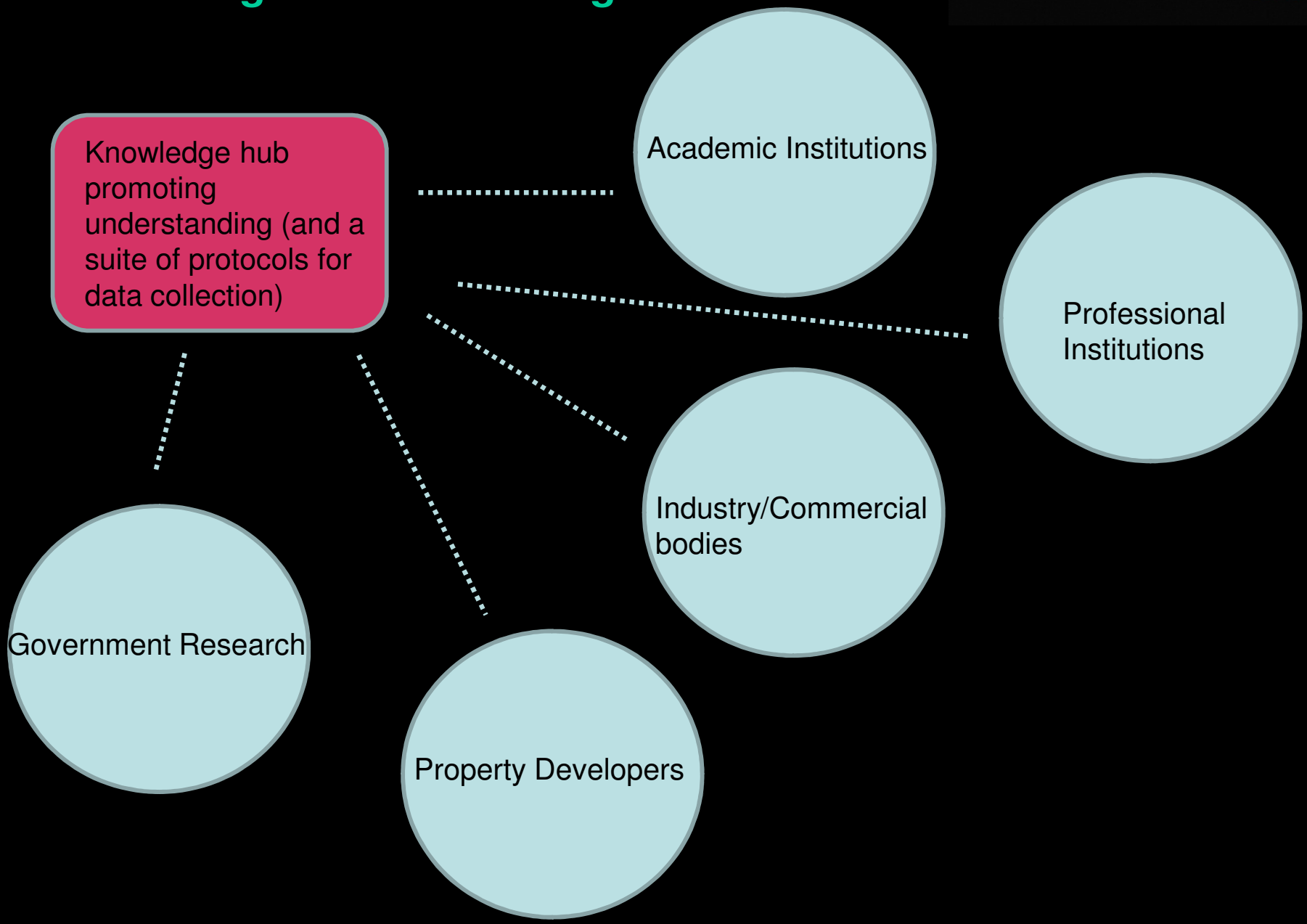

In whose interest is greater disclosure??

The user!
Those who wish to upskill!... And differentiate

The Background: Knowledge and Skills

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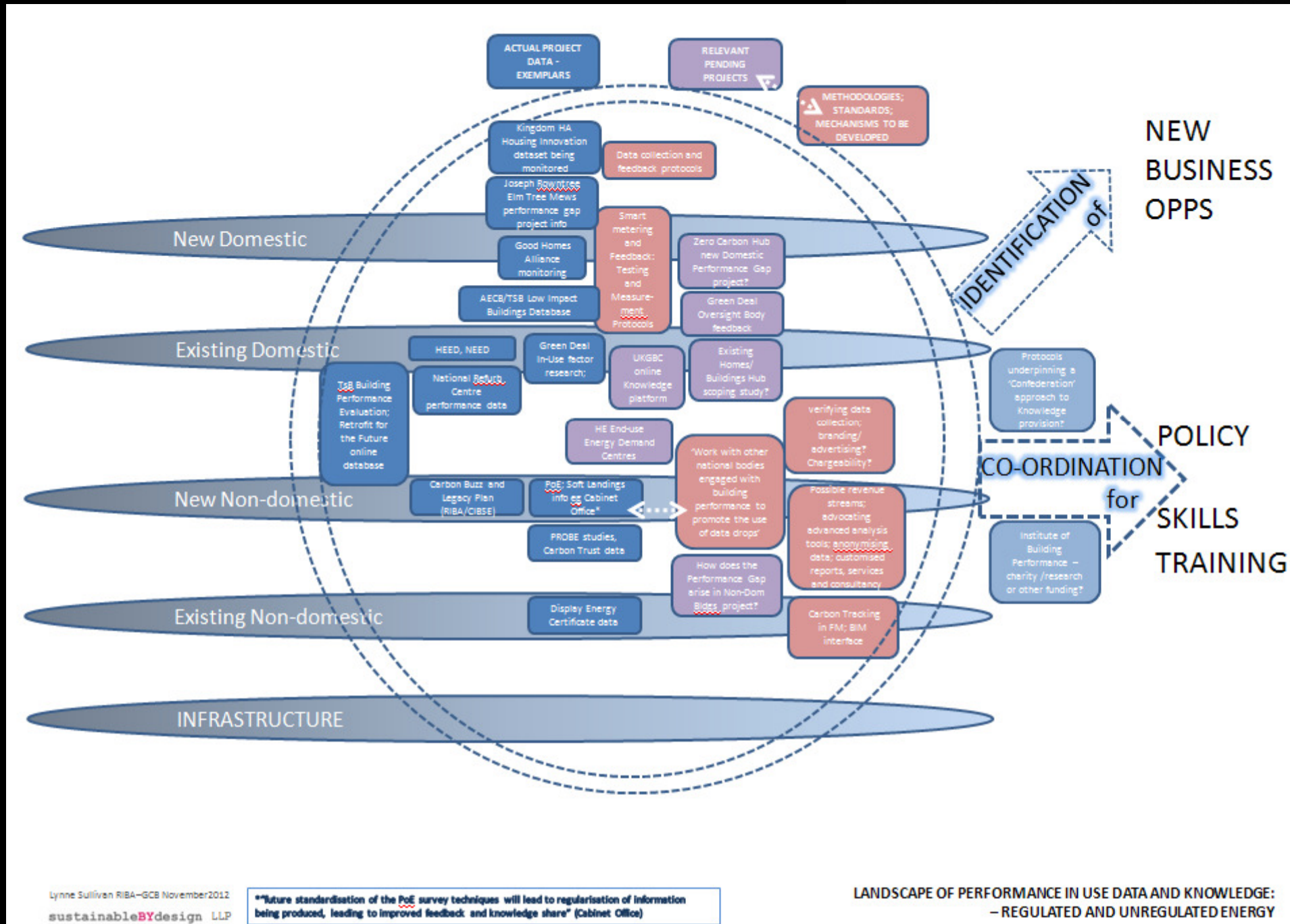

Lynne Sullivan RIBA–GCB November2012

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**"future standardisation of the PoE survey techniques will lead to regularisation of information being produced, leading to improved feedback and knowledge share" (Cabinet Office)

LANDSCAPE OF PERFORMANCE IN USE DATA AND KNOWLEDGE:
– REGULATED AND UNREGULATED ENERGY

Concerns re ‘Performance Gap’

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The Green Construction Board’s Routemap identifies emission ‘leakage’ as an important issued to be addressed to improve returns from building projects, reduce risk and give greater confidence to investors and owners

Performance Gap	Current	By 2050?
Non-domestic	30-35%	5-10%
Domestic	10-35%	5-10%

... Arguably self-builders are ideally placed to address this issue and could become an important model for delivering healthy and energy efficient homes which deliver in use

Concerns re 'Performance Gap'

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The Green Deal/ECO in use factors: "(only) a proportion of the in-use factor is recognition of the behaviour of the occupant"...

Annex A: List of Measures and In-Use Factors that Government proposes to attach as a Schedule to the ECO Order

The in-use factors proposed to be used for these measures within ECO are:

Measure	*In-use factor*
Cavity wall insulation (including insulation of hard to treat cavities)	35%
Connection to a district heating system	10%
Draught proofing	15%
External solid wall insulation for a mobile home	25%
Flat roof insulation	15%
High performance external doors and passageway walkthrough doors	15%
Loft or rafter insulation (including loft hatch insulation)	35%
Pipework insulation	15%
Room in roof insulation	25%
Secondary or replacement glazing	15%
Solid wall insulation for a solid brick wall built before— (a) 1967, if situated in England or Wales; (a) 1965, if situated in Scotland	33%
Solid wall insulation for— (a) a solid wall which is not built of brick; (b) a solid brick wall built in— (i) 1967 or later, if situated in England or Wales; (ii) 1965 or later, if situated in Scotland	25%
Under-floor insulation	15%

Passivhaus as a Knowledge Community:

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Passivhaus projects have been monitored and the design tool has been shown to closely calibrate to the out-turn energy performance – both on newbuild and retrofit – eg reduction of 90% at Tevezstrasse:

EnerPHit

Quality-Approved
Energy Retrofit with
Passive House Components
Dr. Wolfgang Feist

Existing heating demand	>200 kWh/m^2.year	~£1,000/year equivalent
New heating demand with EnerPHit	<25kWh/m^2.year	~£100/year equivalent

Passivhaus as a Knowledge Community:

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Accredited Passivhaus buildings provide a benchmark for good practice

Average heating energy consumption in UK is estimated at 160kW/m2 compared with 15kWh/m2 in Passivhaus ...

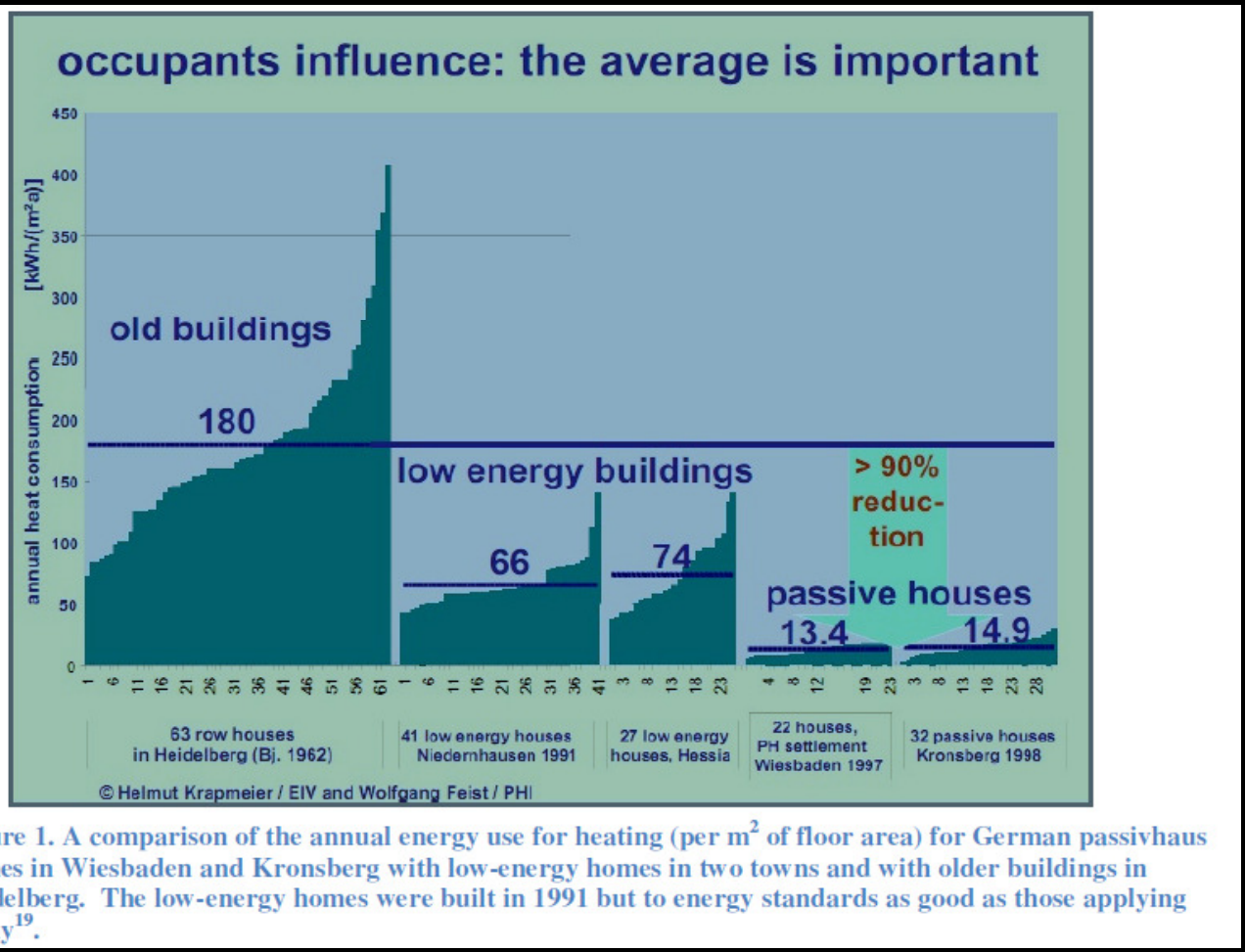

Figure 1. A comparison of the annual energy use for heating (per m^2 of floor area) for German passivhaus homes in Wiesbaden and Kronsberg with low-energy homes in two towns and with older buildings in Heidelberg. The low-energy homes were built in 1991 but to energy standards as good as those applying today[19].

Slide from Passivhaus Institute, Passipaedia/ Build with CaRe UEA

Carbon Buzz anonymised data:

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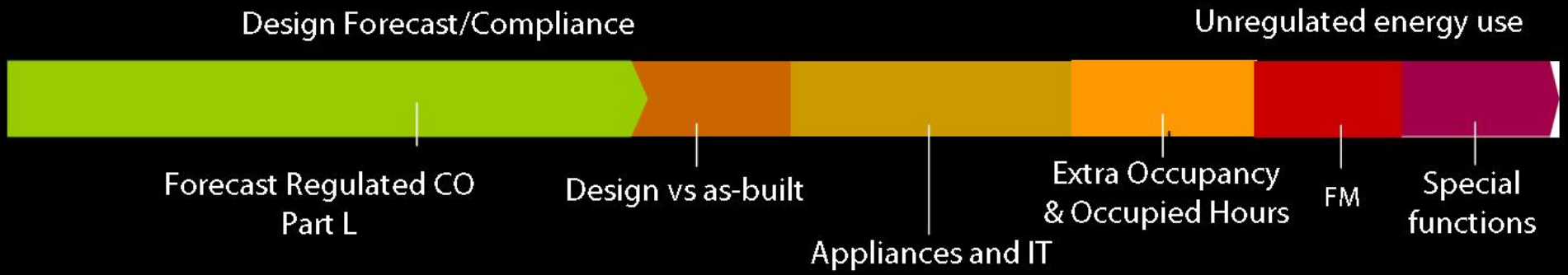

"…the regulatory framework is expected to produce the necessary improvements in building performance…" Low Carbon Construction IGT Report

Regulated Energy Use includes: fixed building services, heating, hot water, cooling, ventilation, lighting
Unregulated Energy Use includes: plugload, server rooms, security, external lighting, lifts etc
Special Functions include: trading floors, server rooms, cafeteria etc.

CarbonBuzz an RIBA CIBSE platform

Aedas R&D

Findings from BPE research by TsB

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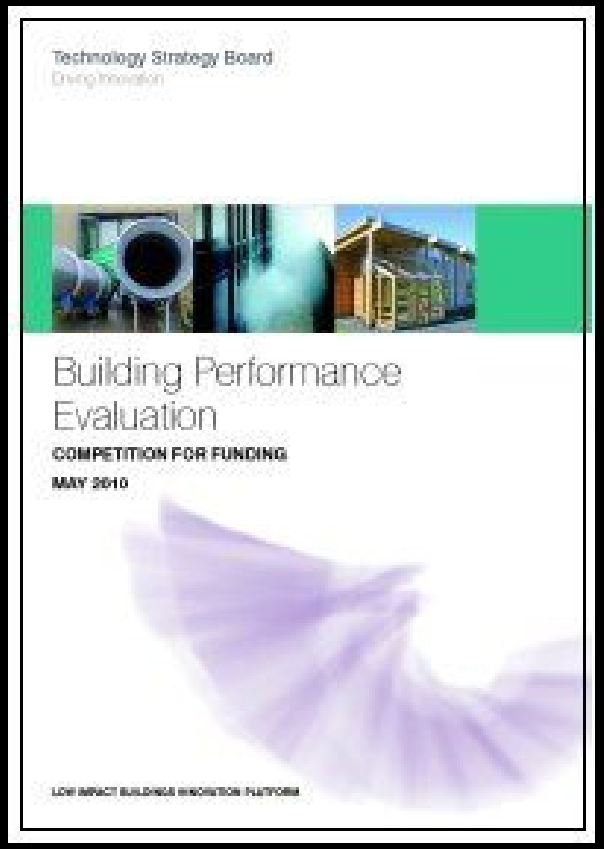
A Good Homes Alliance seminar in April 2013 will showcase The Technology Strategy Board Building Performance Evaluation Programme which is now producing early hard empirical evidence about performance in new build homes. Their presentation will show initial findings comparing as-designed and actual energy performance from a selection of the **55** domestic projects in the programme.



Various sources of data/knowledge....

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Kingdom HA Housing Innovation dataset being monitored

Joseph Rowntree Elm Tree Mews performance gap project info

Housing Associations/ Charitable Trusts

Carbon Buzz and Legacy Plan (RIBA/CIBSE)

Professional Institutions

AECB/TSB Low Impact Buildings Database

TsB Building Performanc e Evaluation; Retrofit for the Future online database

Government and Charitable Trust

Good Homes Alliance monitoring

National Refurb Centre performance data

Industry Bodies

PoE; Soft Landings info eg Cabinet Office*

PROBE studies, Carbon Trust data

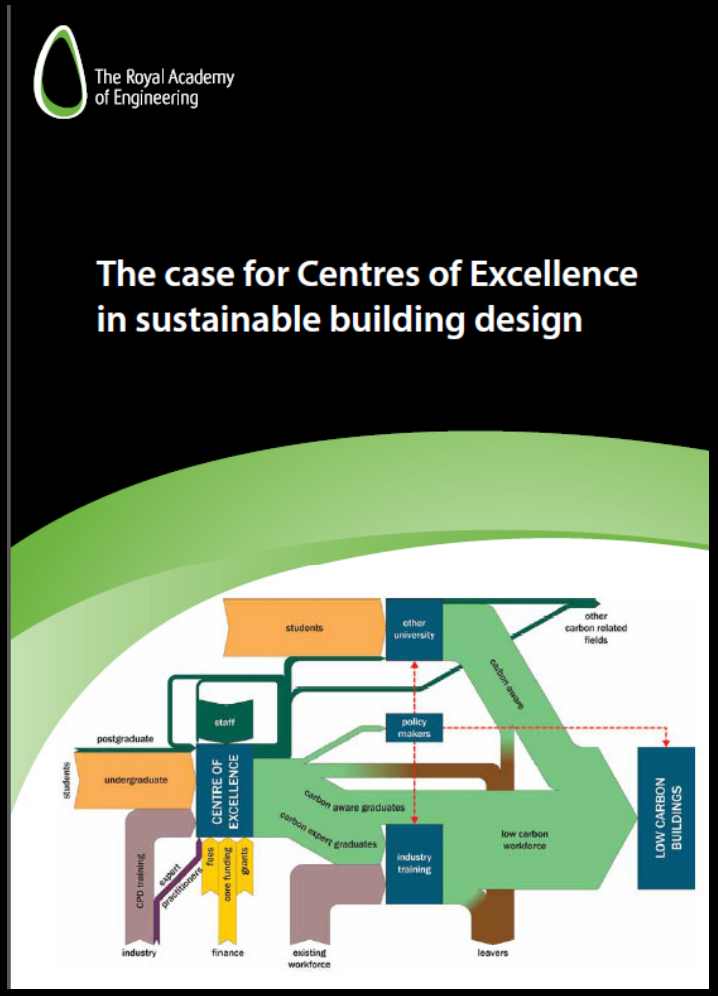
HEED, NEED

Green Deal In-Use factor research;

Government / national statistical data

Display Energy Certificate data

Vs Guidance.....



The preparation of the report was supported by funding from CWCT, The Chartered Institution of Building Services Engineers, The Happold Trust, King Shaw Associates Ltd, The Ove Arup Foundation, The Royal Academy of Engineering

Can Data can be ‘public’; Knowledge ‘private’?

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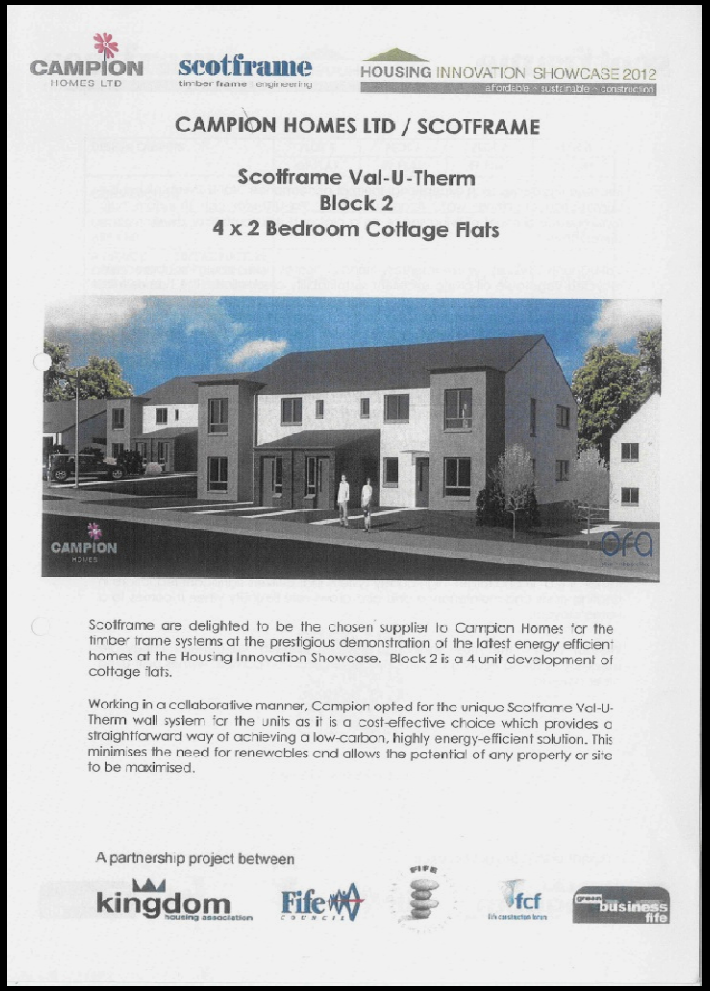
- **A Green Construction Board Project** is being launched which will establish a standard set of data collection protocols which could underpin voluntary/ (?regulated) declaration...
- **This could lead to ‘genuine’ case studies** where data is collected and potentially knowledge, tailored for interested parties, different skills sectors, etc. can be generated.

Kingdom are carrying out a comprehensive monitoring and evaluation study over a long term period.

The outcomes will enable them to compare the “as built” performance against the predicted design outputs and obtain tenant feedback.

Stage 1 - Post Construction & Early Occupancy

Stage 2 - In use and Post Occupancy



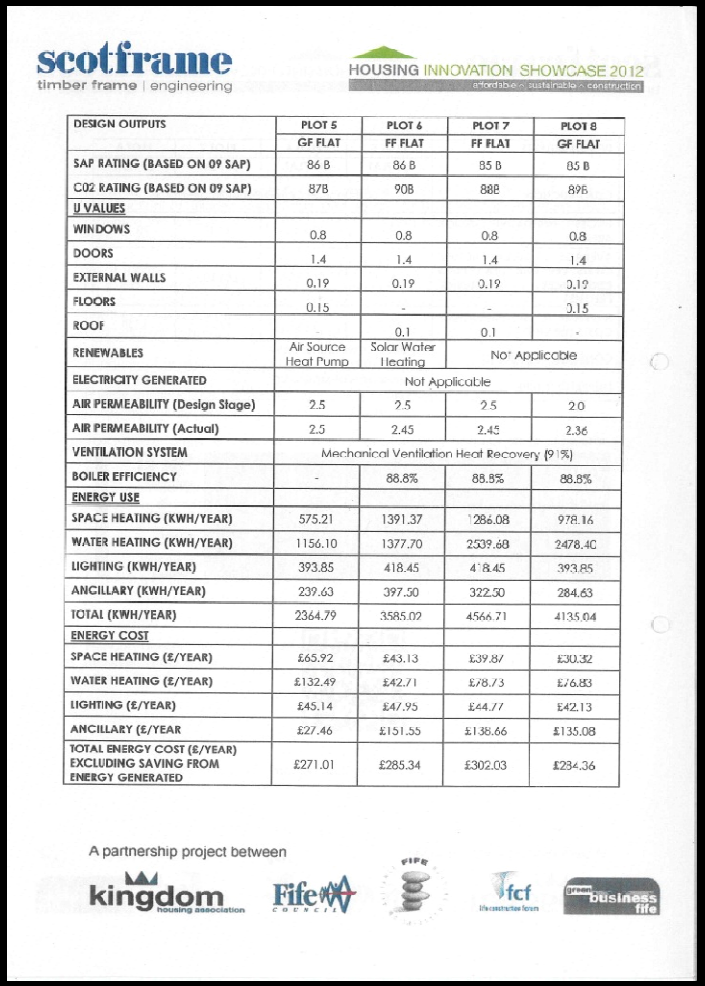
CAMPION HOMES LTD / SCOTFRAME

Scotframe Val-U-Therm
Block 2
4 x 2 Bedroom Cottage Flats

Scotframe are delighted to be the chosen supplier to Campion Homes for the timber frame systems at the prestigious demonstration of the latest energy efficient homes at the Housing Innovation Showcase. Block 2 is a 4 unit development of cottage flats.

Working in a collaborative manner, Campion opted for the unique Scotframe Val-U-Therm wall system for the units as it is a cost-effective choice which provides a straightforward way of achieving a low-carbon, highly energy-efficient solution. This minimises the need for renewables and allows the potential of any property or site to be maximised.

A partnership project between



DESIGN OUTPUTS	PLOT 5 GF FLAT	PLOT 6 FF FLAT	PLOT 7 FF FLAT	PLOT 8 GF FLAT
SAP RATING (BASED ON 09 SAP)	86 B	86 B	85 B	85 B
CO2 RATING (BASED ON 09 SAP)	87B	90B	88B	89B
U VALUES				
WINDOWS	0.8	0.8	0.8	0.8
DOORS	1.4	1.4	1.4	1.4
EXTERNAL WALLS	0.19	0.19	0.19	0.19
FLOORS	0.15	-	-	0.15
ROOF	-	0.1	0.1	-
RENEWABLES	Air Source Heat Pump	Solar Water Heating	Not Applicable	
ELECTRICITY GENERATED	Not Applicable			
AIR PERMEABILITY (Design Stage)	2.5	2.5	2.5	2.0
AIR PERMEABILITY (Actual)	2.5	2.45	2.45	2.36
VENTILATION SYSTEM	Mechanical Ventilation Heat Recovery (91%)			
BOILER EFFICIENCY	-	88.8%	88.8%	88.8%
ENERGY USE				
SPACE HEATING (KWH/YEAR)	575.21	1391.37	1286.08	978.16
WATER HEATING (KWH/YEAR)	1156.10	1377.70	2509.68	2478.40
LIGHTING (KWH/YEAR)	393.85	418.45	418.45	393.85
ANCILLARY (KWH/YEAR)	239.63	397.50	322.50	284.63
TOTAL (KWH/YEAR)	2364.79	3585.02	4566.71	4135.04
ENERGY COST				
SPACE HEATING (£/YEAR)	£65.92	£43.13	£39.87	£30.32
WATER HEATING (£/YEAR)	£132.49	£42.71	£78.73	£76.83
LIGHTING (£/YEAR)	£45.14	£47.95	£44.77	£42.13
ANCILLARY (£/YEAR	£27.46	£151.55	£138.66	£135.08
TOTAL ENERGY COST (£/YEAR) EXCLUDING SAVING FROM ENERGY GENERATED	£271.01	£285.34	£302.03	£284.36

A partnership project between

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Thank you

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