ZERO CARBON HUB

HBF Technical Conference

Closing the design vs as-built performance gap

Rob Pannell, Director, Zero Carbon Hub


FIREFIGHTERS'
OPERATION

The new DCLG Ministerial team

Secretary of State for Communities and Local Government – The Rt Hon Eric Pickles MP

Minister of State (Housing): Mark Prisk MP

Housing, Local Growth, Cities and Regeneration
High Streets, Town Centres and Markets

Parliamentary Under-Secretary of State – The Rt Hon Don Foster MP

- Housing (supporting Mark Prisk)
- *Building Regulations*
- *Climate Change and Sustainable Development*
- Integration and Race Equality
- Localism, Decentralisation and Community Rights

Parliamentary Under Secretary of State (Planning) – Nick Boles MP

- Planning and Development
- Local Growth (supporting Mark Prisk)
- Deregulation

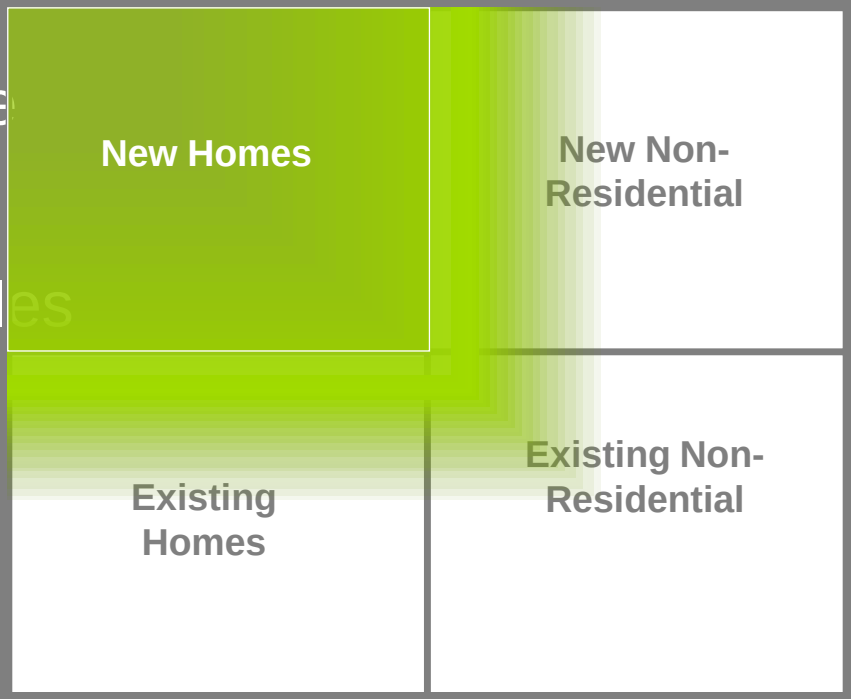
The Zero Carbon Hub

ROLE OF THE ZERO CARBON HUB

PURPOSE AND STRATEGIC OBJECTIVES

Facilitate the mainstream delivery of low and zero carbon homes

- Provide leadership and create confidence
- Reduce risk and clear obstacles
- Disseminate information



2016 TIMELINE

Programme Delivery Timeline Report No.		1	2	3	4	5	6	7	8	9	10	11
Date		Oct 2008	Jan 2009	Apr 2009	Oct 2009	Jan 2010	Nov 2010	Mar 2011	Jun 2011	Sep 2011	Nov 2011	Jan 2012
OVERALL PROGRAMME STATUS		A	A	A	A	A	A	A	A	RA	RA	RA
General comments				AG	AG	AG						
EPBD				A	A	G						
Definition of Zero Carbon				A	AG	(See below)						
Fabric Energy Efficiency Standard (FEES)						G	G	G	G	G	G	G
Carbon Compliance						AG	G	G	G	AG	AG	A
Allowable Solutions						R	RA	RA	R	R	R	R
National Calculation Methodology - SAP				AG	RA	RA	RA	RA	R	R	R	R
Low carbon pre-production homes	Scaling up examples of low carbon and zero carbon homes			AG	AG	AG	AG	AG	A	A	A	A
Zero carbon prototype homes				AG	AG	AG						
Scale-up				AG	RA	RA						
Knowledge and Skills				A	A	A	AG	AG	A	A	A	A
Miscellaneous				AG	AG	AG						
Community energy and infrastructure enabling actions							A	A	A	A	A	A

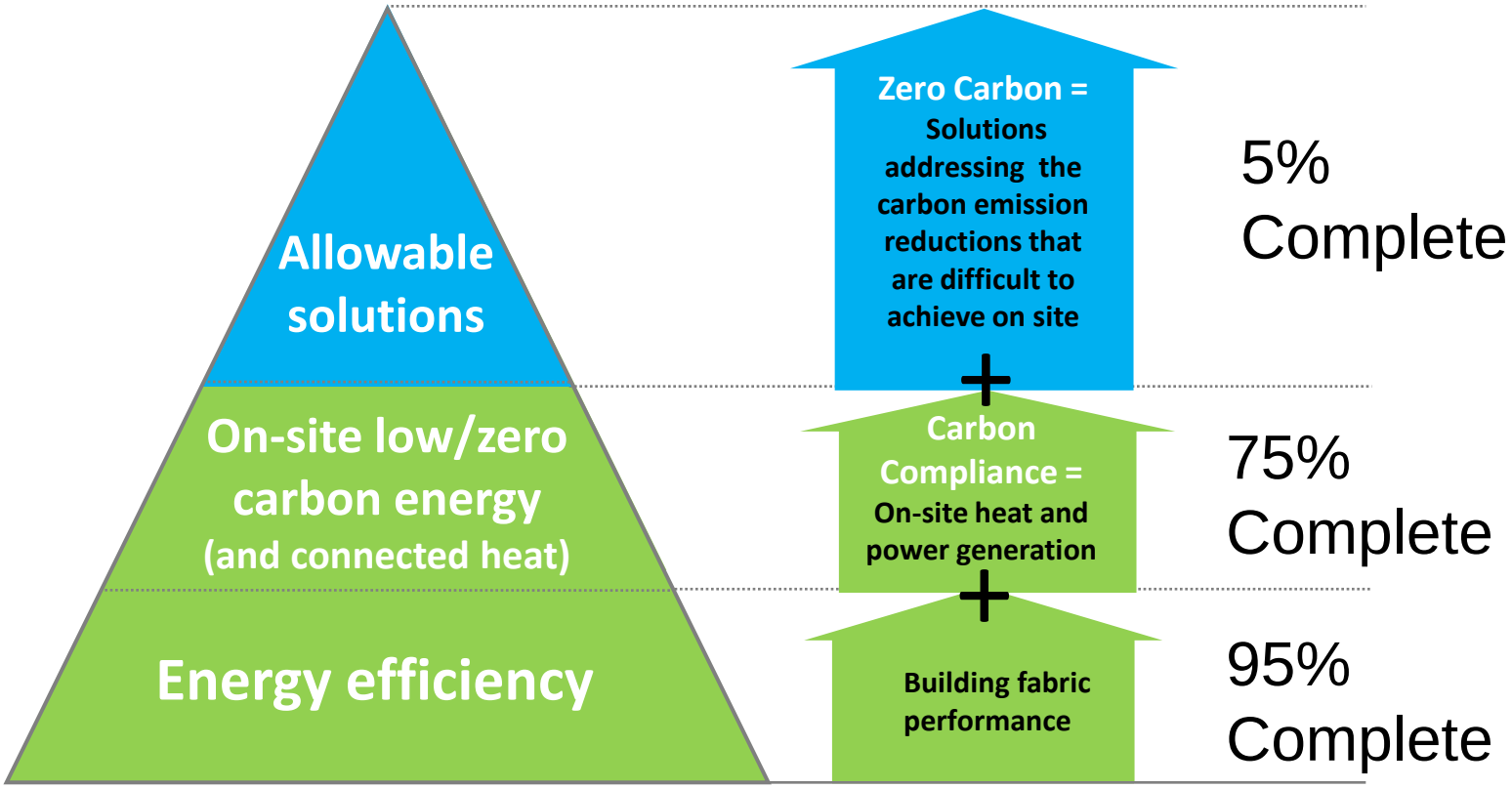
VIABILITY

UK Government Policy & the Zero Carbon Agenda

CARBON CULPRITS

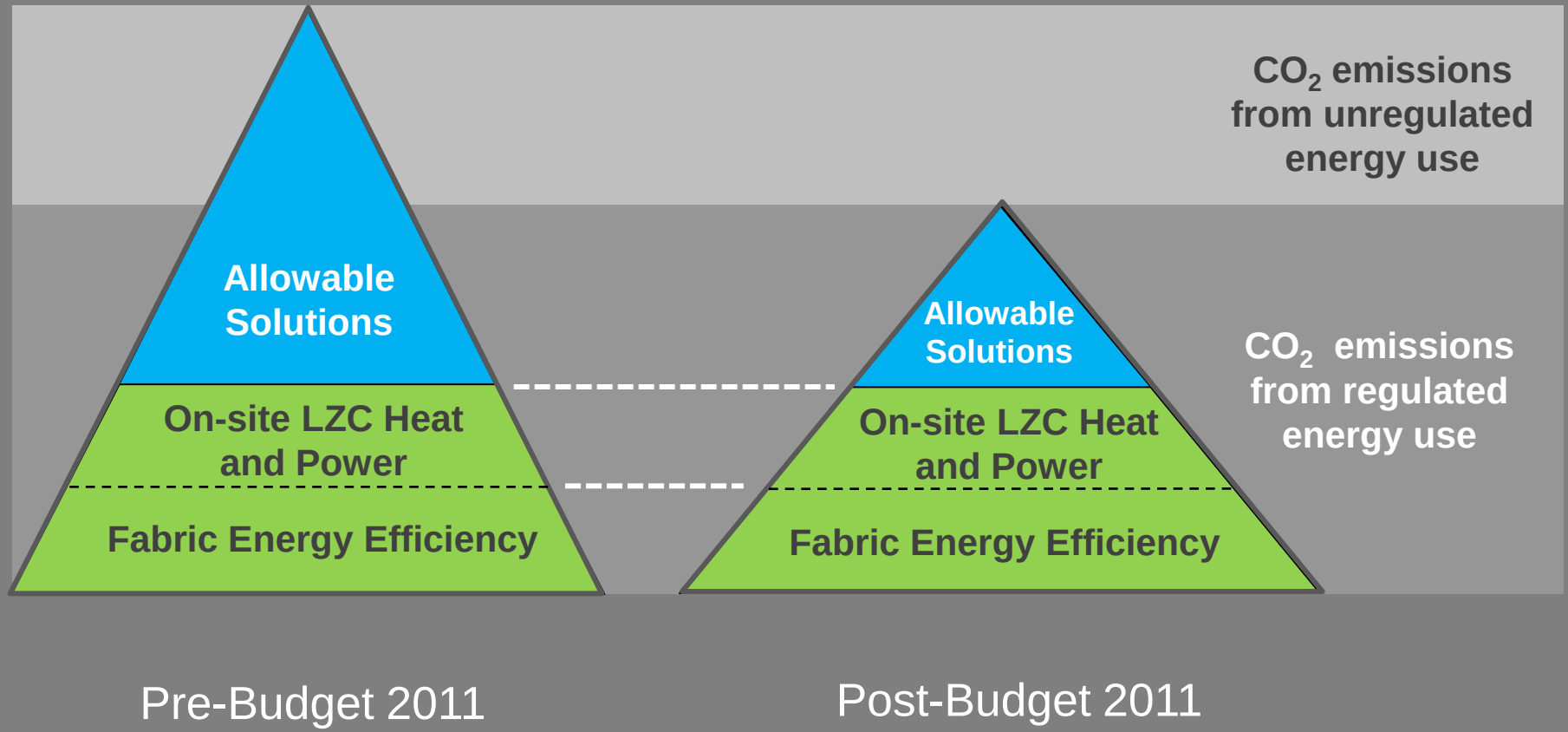
Culprits: most CO2 from buildings stems from heating. Houses are particularly energy-inefficient

ZERO CARBON HIERARCHY



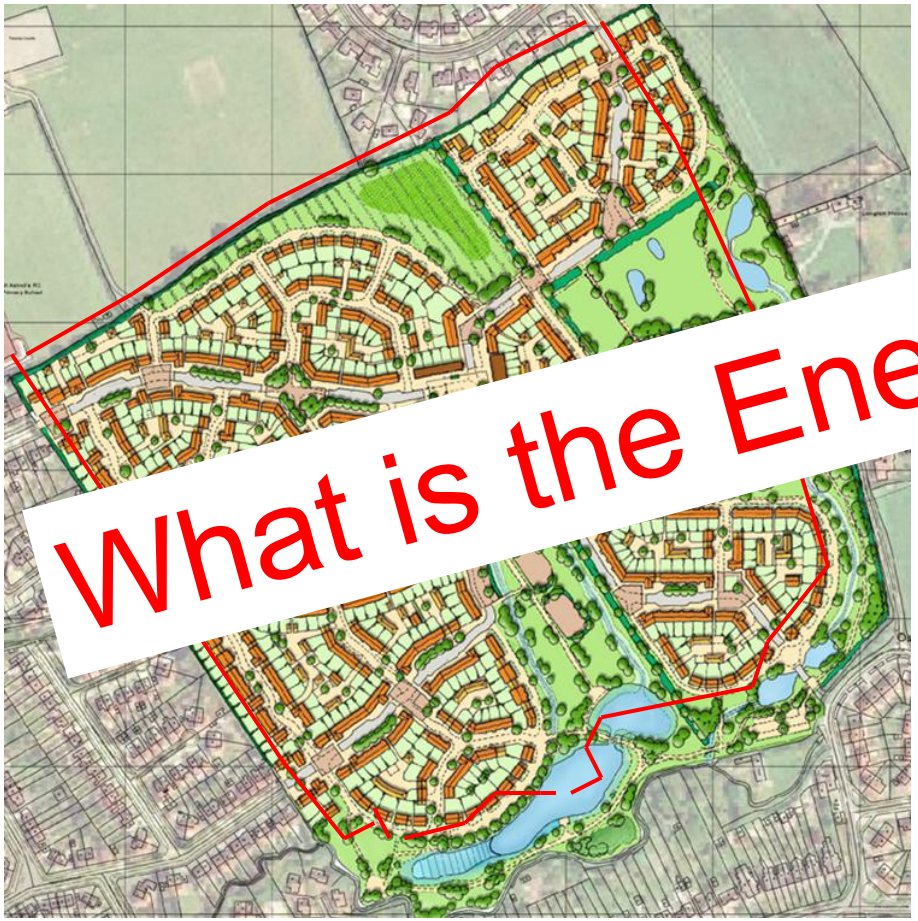
The Zero Carbon Hierarchy – stepped progress towards a workable definition.

UNDERSTANDING THE BUDGET 2011



DEVELOPMENT LAYOUTS

Additional Considerations



What is the Energy Strategy?

Site Conditions:
- Access
- Location (regional weather)
- Ground conditions
- Flood risk
- Existing tree
- L
- , wind
- twork

Site Layout:
- Dwelling type mix/ density
- Built form considerations - roof pitch, building height etc
- PV and solar panels
- Local Renewable targets

Site Layout:
- Dwelling types
- Design for solar technologies:
    - Orientation for solar technology
    - Roof pitch
    - Over-shading

Other:
- Localism

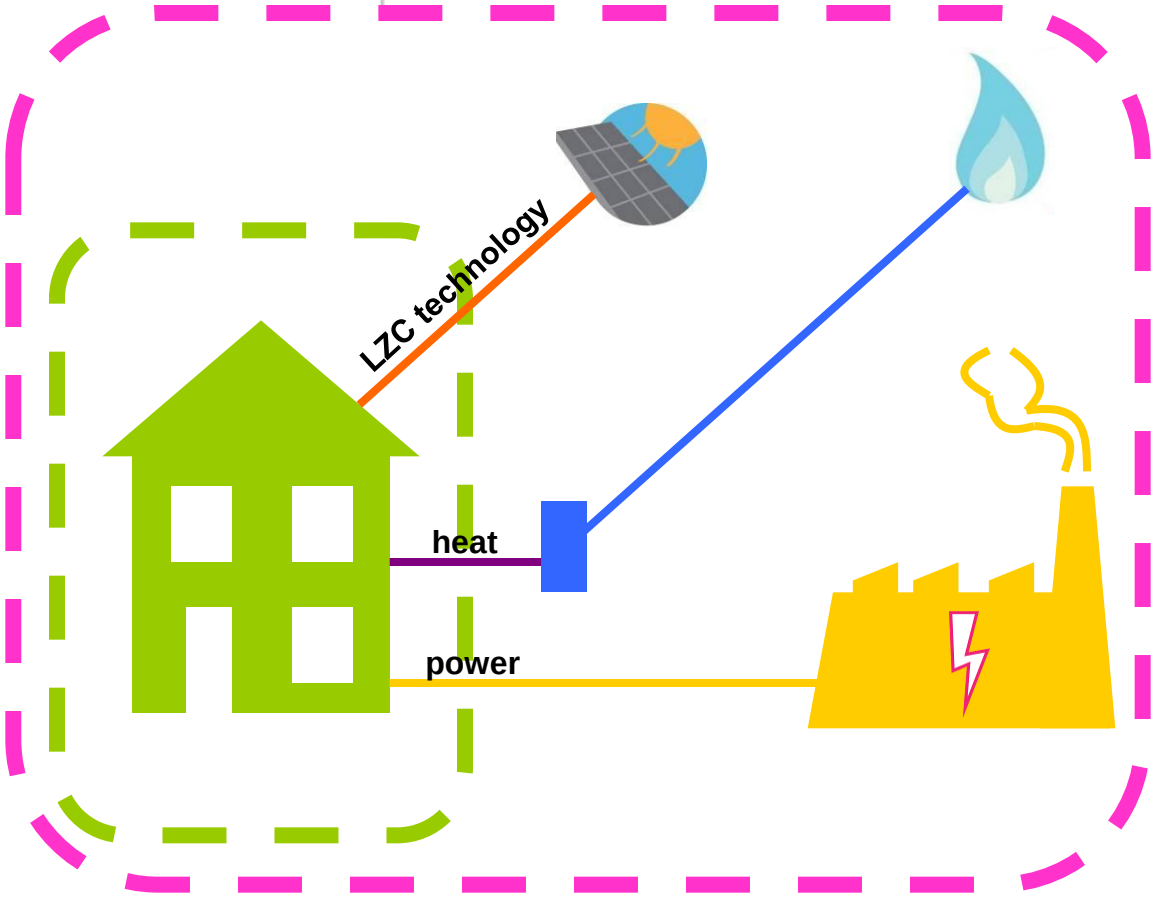
STEP 1 2016 FABRIC ENERGY EFFICIENCY STANDARD (FEES)

Fabric Energy Efficiency of 39 kWh/m²/year for apartments & mid terrace

46 kWh/m²/year for end terrace, semi and detached

- **Performance not prescriptive** No U-value lists/limits on elements. Uses kWh/m²/yr. For simplicity - space heating and cooling only.
- **Two levels depending on dwelling type**
  However same construction delivers 39 or 46, except in the case of the detached

STEP 1 2016 FABRIC ENERGY EFFICIENCY STANDARD (FEES) - Scope of 'Energy Efficiency'



Energy Efficiency Standard

- Building fabric U-values
- Thermal bridging
- Air permeability
- Thermal mass
- Solar, metabolic, lighting & appliance gains

Carbon Compliance Standard

- Heating / cooling appliances (boilers, etc)
- Mechanical ventilation
- Hot water
- Active controls
- Fixed lighting
- All LZC technologies

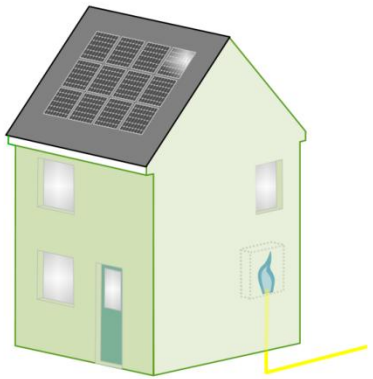
STEP 2 2016 CARBON COMPLIANCE

Target Carbon Compliance of 10 kg CO_2/m^2/year for detached homes

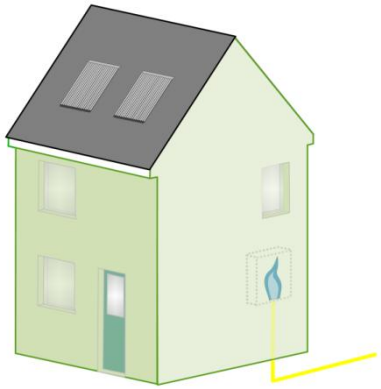
11 kg CO_2/m^2/year for attached homes

14 kg CO_2/m^2/year for apartments

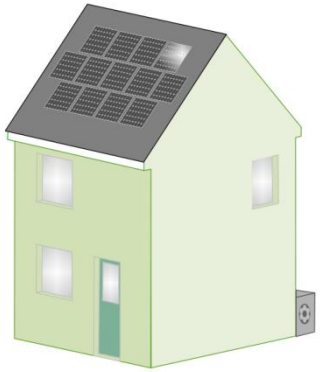
Approach provides solutions for a range of practical situations:



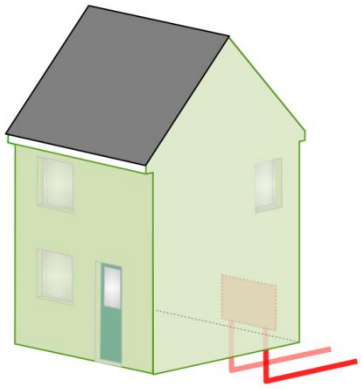
On gas grid
'PV'



On gas grid
'Fabric'



Off gas grid
Heat Pump



Community Heat
Network

STEP 3 2016 ALLOWABLE SOLUTIONS

Developer makes an Allowable Solutions payment for a particular development

A w… …ble, ve… …ble process

Developer receives a Certificate showing that the required carbon savings (to meet zero carbon standard) have been achieved

ALLOWABLE SOLUTIONS

Calculated over 30yrs

Investment in offsite LZC (financial return)

Continue carbon compliance onsite

Export LZC heat to existing stock

Offsite LZC electricity with direct physical connection

Efficient appliances and controls

Section 106 credit

Improve existing stock fabric


Allowable
solutions


Performance

One is Killed as Philly Baseball Stands Collapse

(By Associated Press)

PHILADELPHIA, May 15 — One man was reported killed and a number injured in a collapse of part of the lower tier of the right field grandstand of the Philadelphia National league baseball park Saturday. The accident occurred in the first half of the seventh inning in the game between St... delphia. The gam... the score 12 to 3 ... delphia.

The dead man ... died from heart ... of the excitemen... dozen persons wo... pitals while othe... the scene. The ... near the first bas... and involved two... 30 feet wide. The... fall through the ... ground but the ... down. It is bel... became weakene... stampling their fe...

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SAN MATEO, CALIFORNIA, TUESDAY, DECEMBE

Bridge Falls Into Gorge-


Mmmm?

FABRIC ENERGY EFFICIENCY STANDARD EVALUATION – CASE STUDY

Technology Strategy Board
Driving Innovation

First Wessex

Titon

NHBC Foundation
Housing research & development in partnership with BRE Trust

Homes & Communities Agency

SAINT-GOBAIN

BSRIA

Taylor Wimpey

LABC

UCL

REMOVE PROTECTIVE TAPE IMMEDIATELY AFTER INSTALLATION

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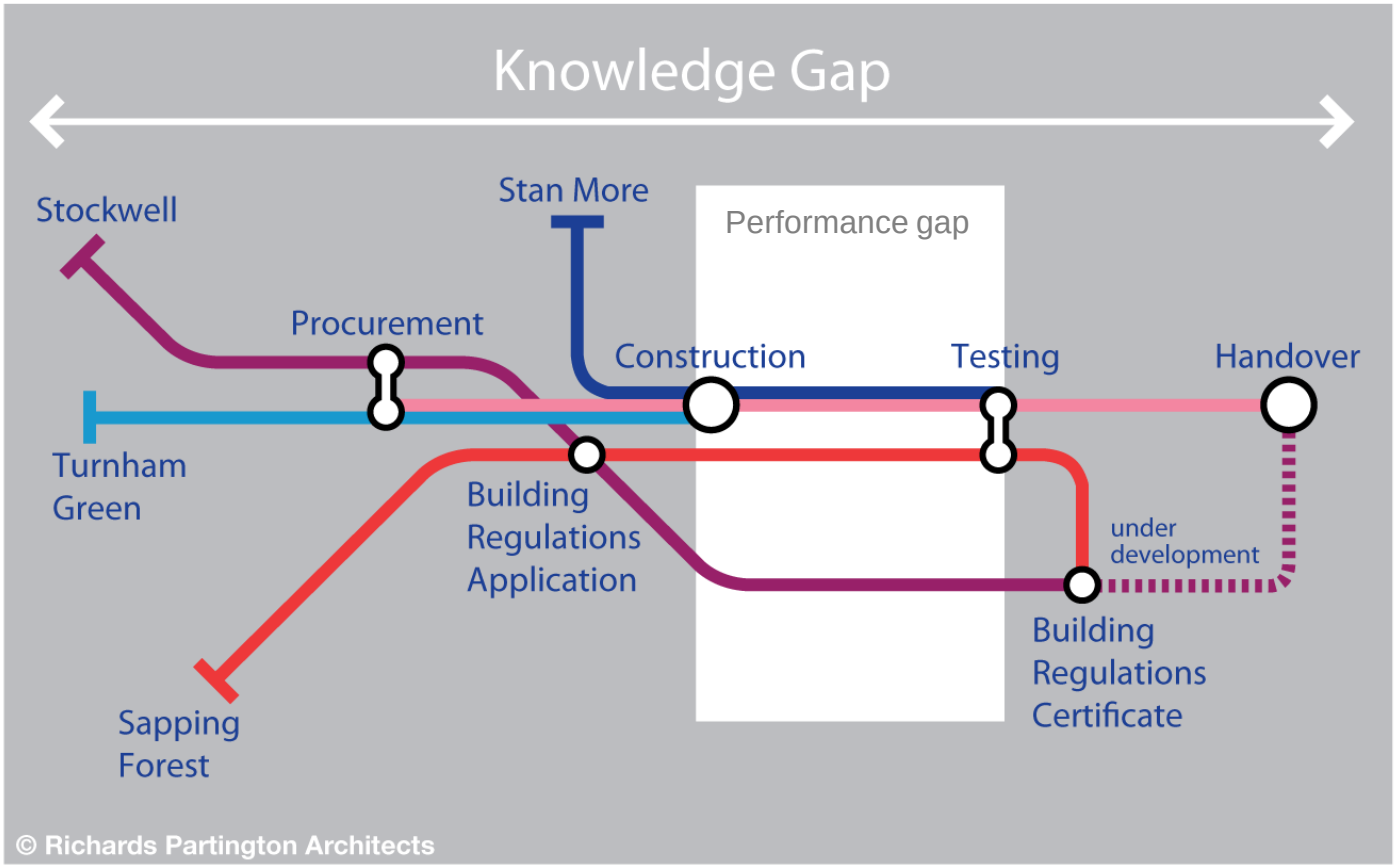
Mind the gap !!



Key to lines

- Designers
- SAP Assessor
- Manufacturer's Information
- Sub Contractor Design
- House Builder

Background & Evidence

Part L 2013 consultation

- Compliance and performance industry working group
  - Performance sub-group
- Consultation
  - Regulatory framework to incentivise QA process (PAS or similar)
  - Recognising that no Govt decisions made yet
- Building Regs team have shared key messages from consultation responses
  - Broad support for aims**, but some concerns about formality of an end to end PAS QA process/ confidence factor**
  - Lack of evidence / analysis on where performance gap occurs

Closing the performance gap

- Carbon Compliance report, Recommendation 4a:

  From 2020 the test results distribution should demonstrate that at least 90% of all dwellings would meet or perform better than the designed energy / carbon performance.

- The journey
  - 2013 -> 2016 -> 2020
- Alternative approach
  - Via Hub-led industry group
  - Collaborative
  - Wide industry support

The proposal

Main aim:

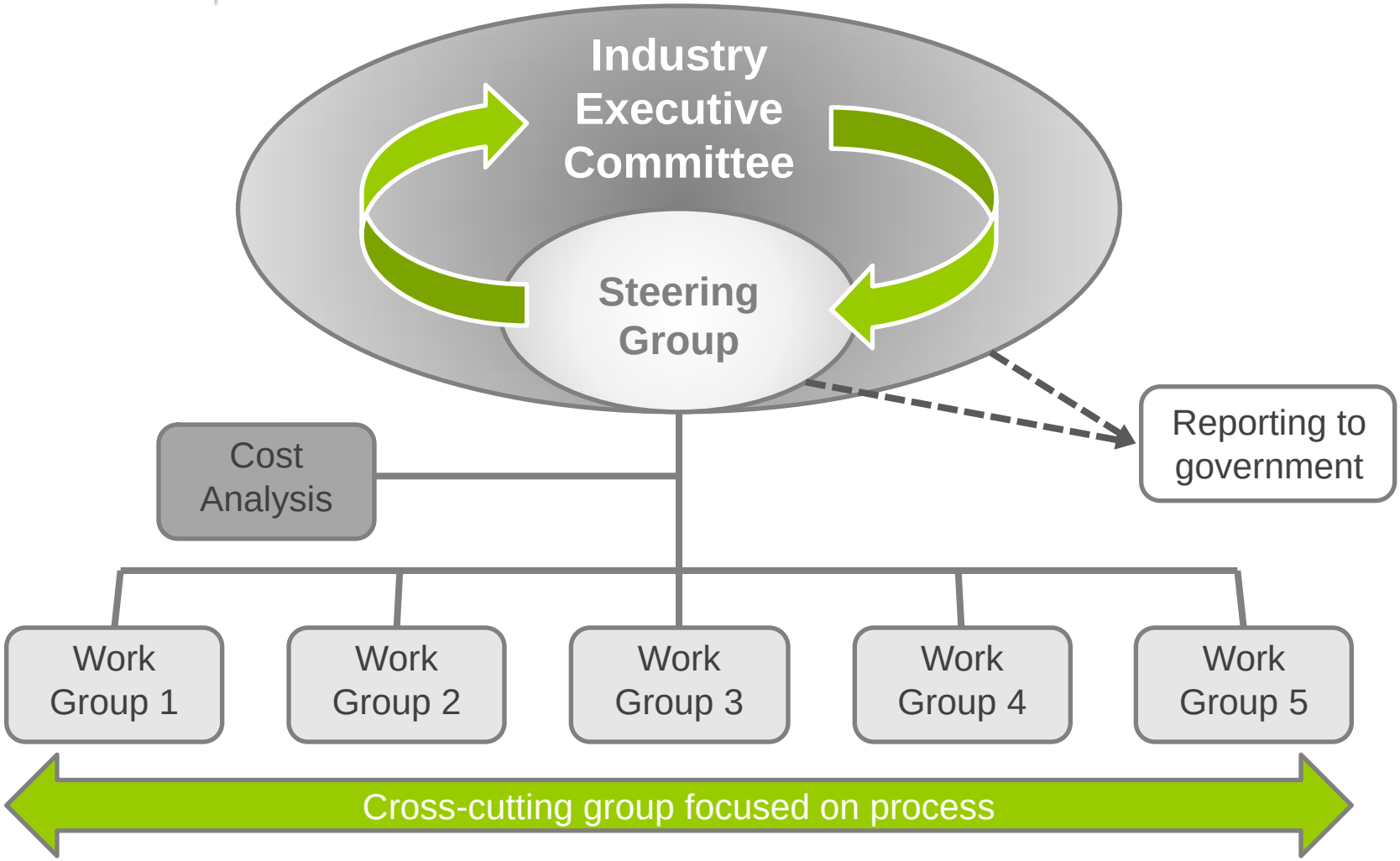
- To improve the as-built performance of new homes and meet the 2020 ambition
- In particular to provide:
  - **Enabling actions** for industry to act to close the gap between the designed and as-built performance of dwellings, starting in 2013.
  - **Tangible outputs** such as guidance documentation and dissemination of good practice will form an important part of the group's work.

➢ Hub-led group seen as *the* place which will, collaboratively, bring together all strands of current work .

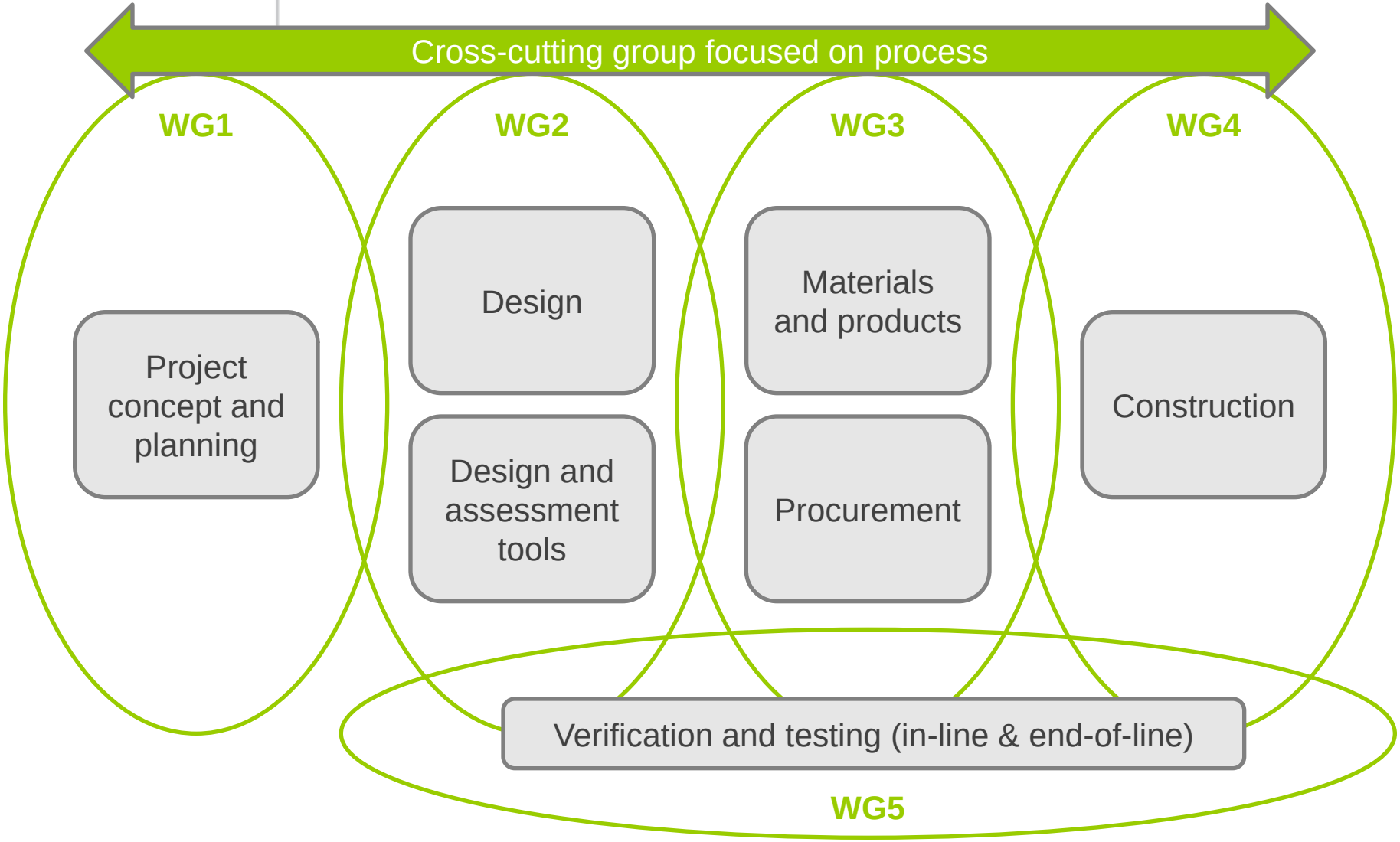
Objectives

- **Draw together and analyse existing work** in this area
- **Identify the gaps** in the evidence base & set criteria for further data collection & analysis to ensure all aspects are addressed.
- **Agree the programme of work** to meet the target for 90% of all new homes to meet or exceed their designed energy/carbon performance from 2020.
- **Develop** the information, education/ training, guidance, and good practice requirements for industry to adopt as potential **'quick wins'** from 2013
- **Develop collaboratively with all relevant parties to ensure support from industry and government**
  - Where necessary, **carry out the work** to help close the performance gap – such as further research, testing procedures, quality assurance schemes, etc.

Structure


Industry Executive Committee
Steering Group
Reporting to government
Cost Analysis
Work Group 1
Work Group 2
Work Group 3
Work Group 4
Work Group 5
Cross-cutting group focused on process

Work Group interaction



Scope & Programme

The work will be delivered across two phases using SMART criteria:

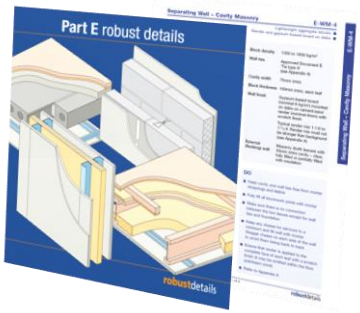
- **Phase 1** – Short term non-regulatory mechanisms alongside the 2013 amendment to Part L of the Building Regulations

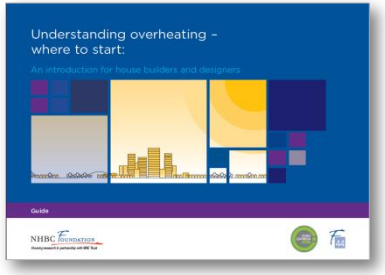
- **Phase 2** – Medium term work to provide greater confidence of ensuring the 2016 'as built' CO_2 emissions targets are met for new homes; with further recommendations for regulatory and non-regulatory changes.

- [**Phase 3** – Longer term work subject to future agreement]

Potential outputs

- **Guidance** targeted at particular professions and/or stages of the design and construction process e.g. models for SMEs, construction joint pattern books
- **Improved process** between inter-company departments and industry sectors
- Develop and recommend **'deemed to satisfy'** models of compliance
- Recommendations for relevant **training and education** of key personnel including designers; assessors; approvers etc.
- Development of training and/or seminar material
- Recommendations for new or amended **accreditation schemes**
- Recommendations for changes to the **compliance tool** (SAP)
- Development or adoption of a methodology for reporting the **in-situ performance** of materials and systems
- Recommendations for in-line and end-of-line **test methods**



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THANK YOU