ZERO CARBON HUB & SAINT GOBAIN

Providing Information to the Building Industry

Rob Pannell, Managing Director, Zero Carbon Hub
This session will:

- Highlight what is meant by ‘Zero Carbon Homes’
- Offer guidance on achieving targets from 2016
- Provide insights on risks to our industry
- Provide solutions to your construction questions
- Indicate the cost of achieving zero carbon
- Provide design guidance
The Zero Carbon Hub
PURPOSE AND STRATEGIC OBJECTIVES

*Facilitate the mainstream delivery of low and zero carbon homes working across boarders*

- Provide leadership and create confidence
- Reduce risk
- Disseminate information
Where are you?
Why Zero Carbon Homes?
THE EFFECTS OF CLIMATE CHANGE

Increase in the number of extremely warm days

Winter: 6-12 days/year
Summer: 12-30 days/year

Medium-High emissions

observations
1998-2007 was the warmest decade on record.

2009 – 5th warmest globally and 14th warmest in the UK.

2012 Hottest day ever in Scotland and wettest June in the UK.

2013 Wettest winter ever recorded.

2014 was the hottest year ever recorded.

We are here (ish)
KYOTO – WHO’S ON TARGET
Culprits: most CO2 from buildings stems from heating. Houses are particularly energy-inefficient.
VIABILITY

Balance of costs (£) vs. CO₂ emissions.
UK Government
And European Policy
& the
Zero Carbon Agenda
MEETING ZERO CARBON TARGETS

The Zero Carbon Hierarchy.

- **Allowable solutions**
  - Zero Carbon = Solutions addressing the carbon emission reductions that are difficult to achieve on site
- **Energy efficiency**
  - On-site low/zero carbon energy (and connected heat)
  - Carbon Compliance = On-site heat and power generation
  - Building fabric performance

- **5% Complete**
- **75% Complete**
- **95% Complete**

NEW RESIDENTIAL SOLUTIONS FROM SAINT-GOBAIN
ZERO CARBON HOME v CODE 5 HOME

Fabric Energy Efficiency

On-site LZC Heat and Power

Allowable Solutions

2016 Zero Carbon Home

On-site LZC Heat and Power

Fabric Energy Efficiency

Code 5 Home
CODE LEVEL 5 HOMES

LOW ENERGY

KNOW

HOW
THE ENERGY EFFICIENCY STANDARD

Building Fabric:
- U-values
- Thermal mass

Thermal Bridging

Air-permeability

Orientation, solar gains, Glazing proportion
PASSIVE HOUSE WALL SECTIONS

The PassivHouse manual

Concrete

Brick and Block
2016 CARBON COMPLIANCE

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

Energy Efficiency Standard

- Heating/cooling appliances
- Mechanical ventilation
- Hot water
- Active controls
- Fixed lighting
- All LZC technologies

Carbon Compliance Standard
ALLOWABLE SOLUTIONS

Calculated over 30yrs

Investment in offsite LZC (financial return)

Continue FABRIC FIRST & carbon compliance onsite

Offsite LZC electricity with direct physical connection

Efficient appliances and controls

Export LZC heat to existing stock

Improve existing stock fabric

Section 106 credit

2016 Allowable solutions
DEVELOPMENT LAYOUTS

**Site Conditions:**
- Access
- Location (regional weather)
- Ground conditions
- Flood risk
- Existing trees, water bodies etc
- Local energy resource for biomass, wind etc
- Existing district heating network

**Planning:**
- 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
COST OF ZERO CARBON HOMES

Current proposal

Revised proposal 2008/9

Original definition


Reduction on 2006 Part L 25% 33% 70% 100%

Code 3 Code 4 ‘Code 4½’ Code 5

True Zero Carbon

~150-200%

Code 6

£40k per home

£20k per home

£?

£20k per home

£40k per home

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?

COST OF ZERO CARBON HOMES

Original definition

£40k per home

Revised proposal 2008/9

£20k per home

Current proposal

£?
Annual Household Energy Spend

- **4-bed Detached house**: £2,379
- **3-bed Semi-detached house**: £1,621
- **3-bed Mid-terrace house**: £1,388
- **1-bed Ground floor flat**: £915

**Victorian**
with modern day improvements

**New Build**
built to 2006 regulations

**Future**
2016 aspirations

Indicative costs and savings calculated using Zero Carbon Hub house types modelled in NHER Plan Assessor 5.3/5.4 (SAP2009) with projected energy costs taken from DECC published figures.
So how do we achieve Low Energy Homes?
VENTILATION AND INDOOR AIR QUALITY
Construction images

Mmmm?
Construction images
The Performance Gap
DOES IT DO WHAT IT SAYS ON THE TIN?
Design Assumed:
- Wall ties
- Compressed edge seal
- Insulation
How is the u-value calculated?

Can’t assume same thickness across entire roof

Reduced space above joists makes installation of full insulation thickness impossible despite this being assumed in SAP calculation.

500mm roof insulation specification on 18° roof pitch.
THANK YOU

I’d love a new home
... Soon please !!