Climate change and housing

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Sea levels rise and fall

- During the last ice age 20,000 years ago sea levels were about 120 meters lower than now and temperatures were up to seven degrees Celsius colder.

- Three million years back, during the Pliocene era, the world was two to three degrees Celsius warmer than today and sea levels were 25 to 30 metres higher.

- Sea expands as it warms
What do we know? IPCC

- The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to unprecedented levels inn at least the last 800,000 years.

- Carbon dioxide concentrations have increased by 40% since pre-industrial times.

- The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.
Main greenhouse gases

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Fluorinated gases (F-gases)
What do we know? IPCC

- Each of the last three decades has been warmer than the last and warmer than any period for 160 years in the northern hemisphere.

- The period from 1983 to 2012 was the warmest 30-year period in the last 1,400 years.
What do we know? IPCC

- From 1970 to 2000, global emissions of greenhouse gases grew at 1.3 percent a year. But from 2000 to 2010, that rate jumped to 2.2 percent a year.

- Between 1901 to 2010, global mean sea level rose by 0.19 metres.

- “There is high confidence that the sea level rise since the middle of the 19th century has been larger than the mean sea level rise of the previous two millennia.”
A large proportion of fossil fuels must stay in the ground to avoid dangerous warming of 5 degrees or more.

Global warming is being felt across all continents and all oceans.

95 percent certainty that climate change is anthropogenic.
How hot will it get?

Change in average global surface temperature, relative to 1986-2005

- 4°C: Scenario assumes emissions continue to rise (business as usual)
- 3°C
- 2°C
- 1°C
- 0°C
- -1°C

Forecasts

1950 2000 2050 2100

Range

Source: Intergovernmental Panel on Climate Change
The future

- Sea level rise of between 0.28 metres to 0.98 metres by 2100.
- Global air temperatures could rise by up to 4.8 percent by 2100.
- Warmer, wetter and windier winters and drier, hotter summers.
- Storm surges and increased ocean acidity.
UK government response

The Energy and Climate Change Committee described the IPCC process as “robust” and that their conclusions should be accepted by policymakers.
National Planning Policy Framework

• “Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.”

• “To support the move to a low carbon future, local planning authorities should: plan for new development in locations and ways which reduce greenhouse gas emissions; actively support energy efficiency improvements to existing buildings; and when setting any local requirement for a building’s sustainability, do so in a way consistent with the Government’s zero carbon buildings policy and adopt nationally described standards.”
“Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.”
Climate Change Act 2008

- Commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels.
- Requires the Government to set legally binding ‘carbon budgets’.
- The first four carbon budgets have been put into legislation and run up to 2027.
- Committee on Climate Change set up to advise the Government on emissions targets & report to Parliament on progress made
- Includes the Adaptation Sub-Committee (ASC)
Adapting to climate change

- Changes to building regulations
- Flood defences
- Giving land up, creating new land
- Homes on stilts
- Floating homes
- Dual use flood plains
Adapting to climate change

- More robust roofing and fencing
- Heat insulation
- Outdoor areas
- Water features
- Reflective walls and roofs
- Air conditioning
Water storage
Hastoe overview

- 50 years old, 6,500 homes
- Specialisms - rural and environmental sustainability
- More than 200 villages and 70 local authorities
Rural fuel poverty

- Approx 18% households in rural areas, c.f. 16% in urban areas.
- Higher proportion of older people
- Approx 50% UK fuel-poor households have homes with solid walls
- More households off the gas grid (below as at 2010)

Defra’s Statistical Digest of Rural England 2014
Fuel costs increasing

- Oil production has now peaked in most fields
- International Energy Agency: “A field-by-field analysis of the historical production trends of 800 oilfields indicate that decline rates are likely to rise significantly in the long term, from an average of 6.7% today to 8.6% in 2030”
Know our tenants

- Two thirds of residents live in a rural location.
- 90% of rural residents live in a house, 50% of our urban properties are flats.
- Largest age group is aged 35-59 representing over 50% of customers.
- 1 in 4 residents is over the age of 55.
- 51% of our tenants are experiencing difficulties with paying their fuel bills.

- Broadly 72% are social tenants, 20% shared owners and 8% Leaseholders (mostly living in the South East).

- £200: Over a third of tenants earn in the region of £200 per week.
- Over 1 in 4 households has an occupant who is disabled or long term ill.
- 6%: 6% of households are from a Black & Minority Ethnic (BME) member.
- 27%: 27% of our tenants do not have access to the internet.
- 50%: 50% of our tenants claim partial and full Housing Benefit. 30% of rental income is from Housing Benefit.
Know our homes

- Average SAP rating of 72.9
- 1,000 homes with SAP less than 65
- 200 homes with SAP of less than 50
- 9,300 tonnes pa overall carbon footprint
- 3.7 tonnes pa per home carbon footprint
Organisational commitment

Value for money
Minimum SAP
Water efficiency
Green Homes Standard
Recycling & waste
Fuel poverty
Opportunity of new build must not be missed but...

- New homes v retrofitting - capital investment
- Priorities for retrofitting
- Integration with maintenance program, e.g.
  - Cavity and loft insulation
  - Replace boilers with super energy efficient ones
  - Fit low tech devices
- Maximise use of grants and incentives
Housing is a long term investment

- Low energy + good design
- Minimum CSH level 4
- Passivhaus
- Passivhaus lite
- Straw bale homes
Wimbish Passiv Haus, 3 years on. University of East Anglia study

- 90% energy savings
- Fuel bills:
  - 3 bedroom house £120 pa
  - 2 bedroom flat £65 pa
- Comfort levels very high:
  - air changes 7x ph (cf 2.5 ph)
  - filtered air beneficial for allergies etc
- Also... very low rent arrears

www.wimbishpassivhaus.com
Passiv haus
Ditchingham, Norfolk
Passiv haus
Burnham Overy Staithe, Norfolk
Passiv haus – not whacky or eco bling!
Straw bale homes

- Likely to be significantly cheaper to keep warm
- 60% reduction in carbon dioxide emissions
- Insulation standards nearly 3x higher than building regs
- Comparable build costs
- Double the fire resistance required by law
Straw bale homes - High Ongar, Essex
New build costs
37 rural schemes compared
Information and encouragement

- Pull-out heating system guide in magazine
- Community bulk energy purchasing
- Promote tariff switching and comparison services
- Energy saving advice
- ‘Winter warmers’
Winter warmers

- Green Doctors visiting older rural residents:
  - Bespoke advice on keeping warm/best tariffs/proper ventilation etc
  - Fit simple energy efficiency and draught proofing measures
  - Check carbon monoxide and smoke detectors.
  - Hastoe follow up calls

- Practical help – thermal curtains
Measure, learn, inform

- Retrofit programme is:
  - saving residents average £200 pa on energy bills.
  - generating 365 MW hours of renewable power
  - earning £155,255 income from renewable power generation
  - reducing carbon footprint by 191,504 kg emissions

- Information for residents, including face to face

- Reinforce

- Train relevant staff

- Train maintenance contractors
And finally - flooding

- One in six homes at risk of flooding – 5.2 million people
- Less than 40% of those at significant risk are aware of their risk
- What is the main source of flooding?
- Are we doing enough to protect our homes?
- Have we thought about how our vulnerable residents would cope?
- Have we provided any basic information about risk and preparedness?
Common sense, low/no cost features

- No low level holes in walls
- No electricity cables under floor
- Raised sockets
- Waterproof grout
- Flood proof doors/design allow for flood gates
- Manage rainwater run off
Conclusion

- Commitment from the Board and senior team
- Housing associations are uniquely placed and motivated to take the lead as:
  - Landlords
  - Service providers
  - House builders
  - Procurers
- Housing is a long term investment and the homes we build today will have to cope with increasing impacts of climate change.
Some films

• Ground Source Heat Pumps
• Gaymer Memorial retrofit
• Straw bale construction
• Energy saving in the home

http://www.hastoe.com/page/674/Films.aspx