

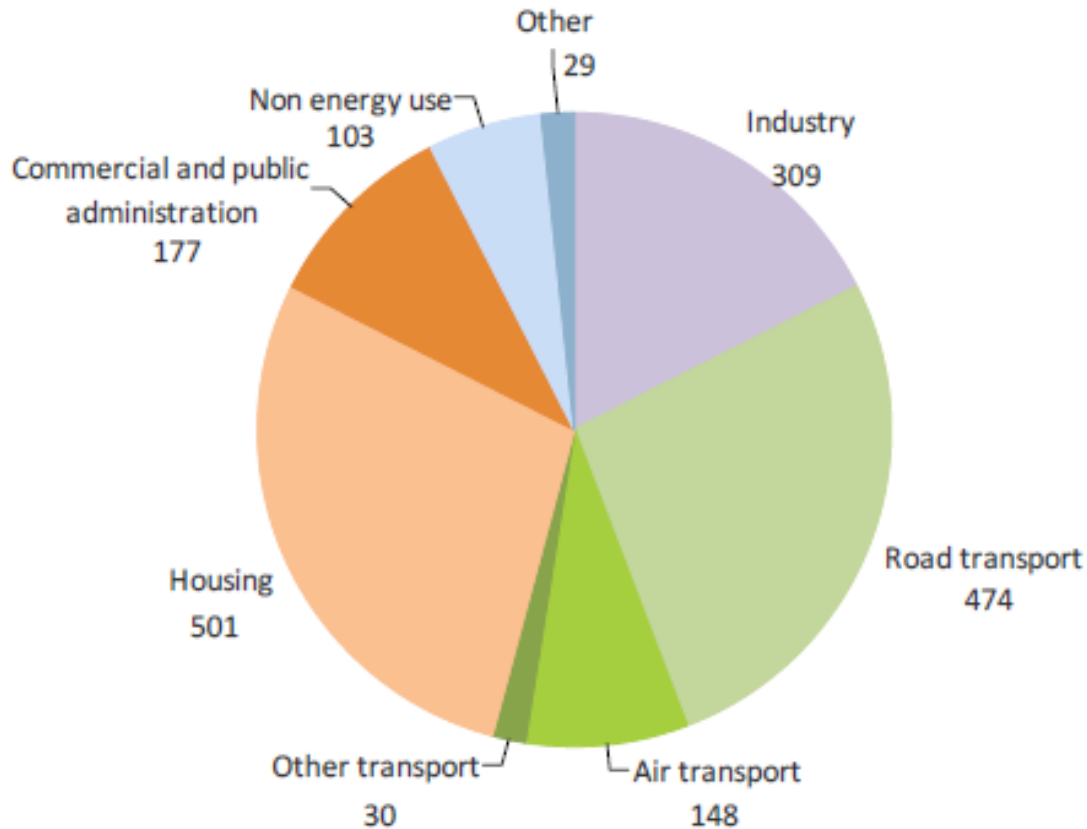


CIBSE Homes for the future debate – should all new homes be fully mechanically ventilated?

A briefing, concept and pre planning perspective

Lee Hargreaves
CEng BEng MCIBSE MEI

Housing sector energy consumption



Graph 1a: Final energy consumption by sector 2009 (UK, TWh)

The energy used in homes accounts for more than a quarter of energy use and carbon dioxide emissions in Great Britain.

More energy is used in housing than road sector. And is greater than air and industry combined.

This sector represents a major opportunity to cut energy and CO2 emissions.

Source :- DECC Housing Energy Factfile 2011

Key policy driving change



The EU Renewable Energy Directive

- UK committed to obtain 15% of all energy from renewable sources by 2020.

The 2008 Climate Change Act:

- a 34% cut in 1990 greenhouse gas emissions by 2020, and
- at least an 80% cut in emissions by 2050.

UK first country to commit legally binding targets

2050 targets will not be met without changing emissions from homes

Source :- DECC Housing Energy Factfile 2011

What is the briefing stage?



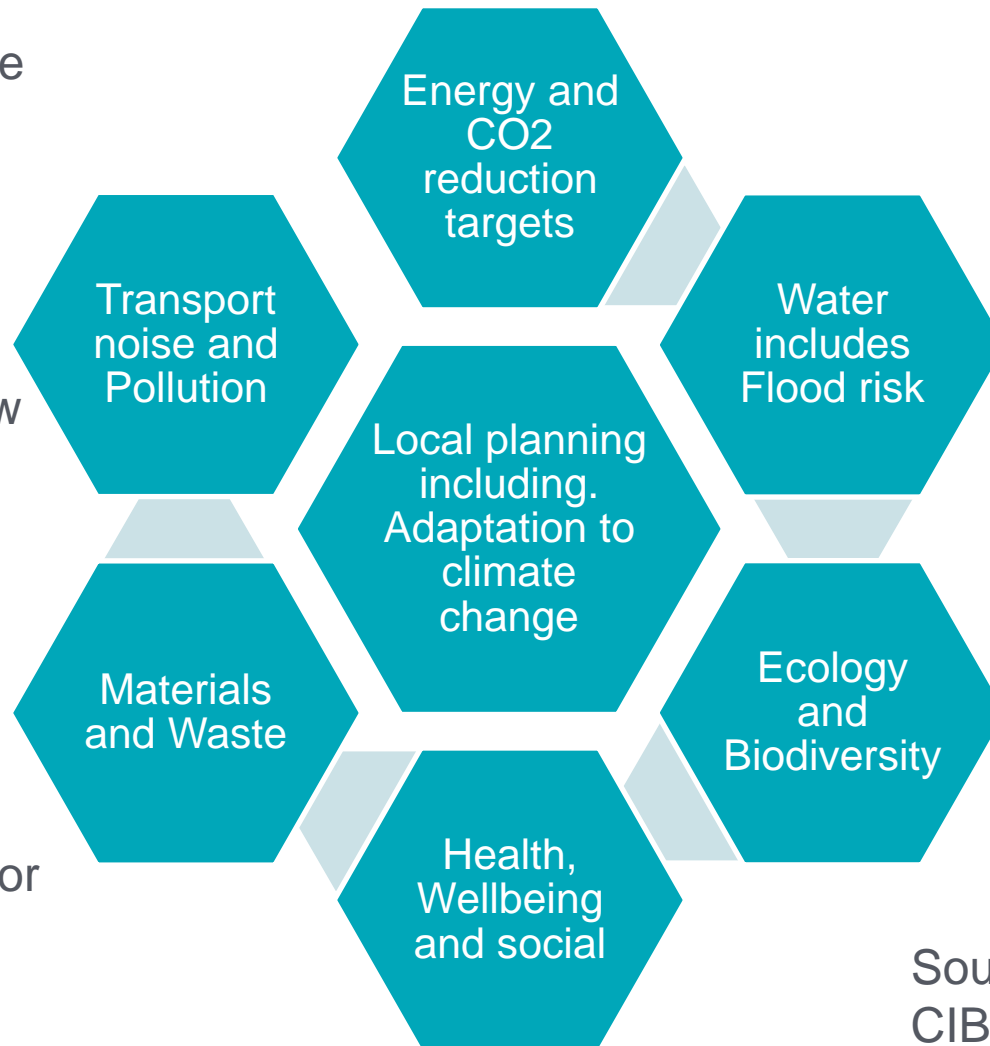
Strategic definition of the project briefing stage	
	<i>Develop Project Objectives including Quality and Outcomes,</i>
	Sustainability review, <i>Outline budget, Review parameters or constraints</i>
	<i>Undertake Feasibility Studies and review of Site Information</i>
	<i>Issue initial brief</i>

Source :- RIBA Plan of work 2013

What would a sustainability review consist of?



Consideration of the following specialisms would be expected to be completed within a strategic sustainability review



All these factors influence options for the selection of ventilation system and equipment

Source:
CIBSE Guide L

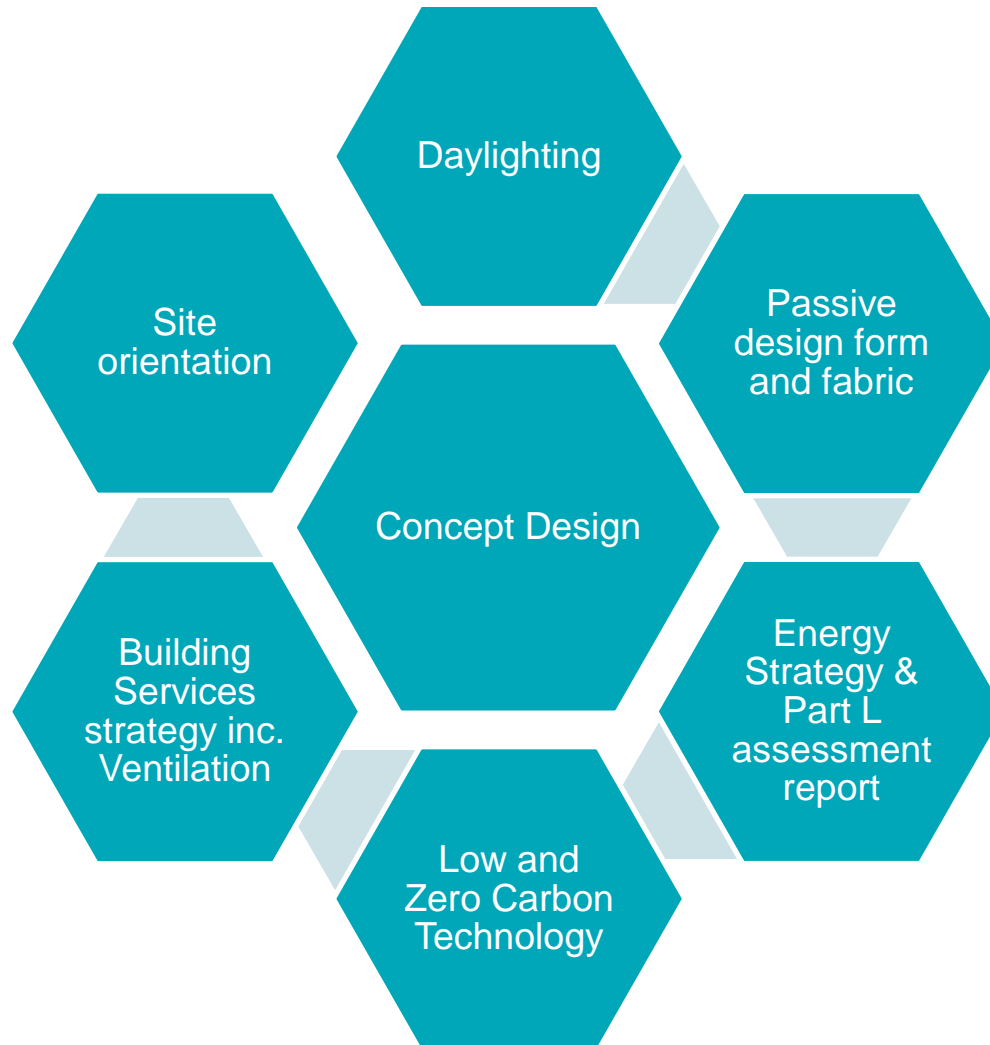
What is the concept stage?



Strategic definition of the project concept stage	
	<i>Prepare outline proposals for structural design and building services systems</i>
	<i>Outline specifications and preliminary cost information</i>
	<i>Issue final project brief</i>

Source :- RIBA Plan of work 2013

What would we expect to be completed for pre planning concept design?



The following aspects of design need to be **completed** for concept design deliverable

Can we say this is happening in the residential sector?

Source:
CIBSE Guide L

Why ventilation is important?



We need ventilation for;

Provision of outside air (oxygen) for breathing

Dilution and removal of airborne pollutants (including odours and volatile organic compounds VOCs)

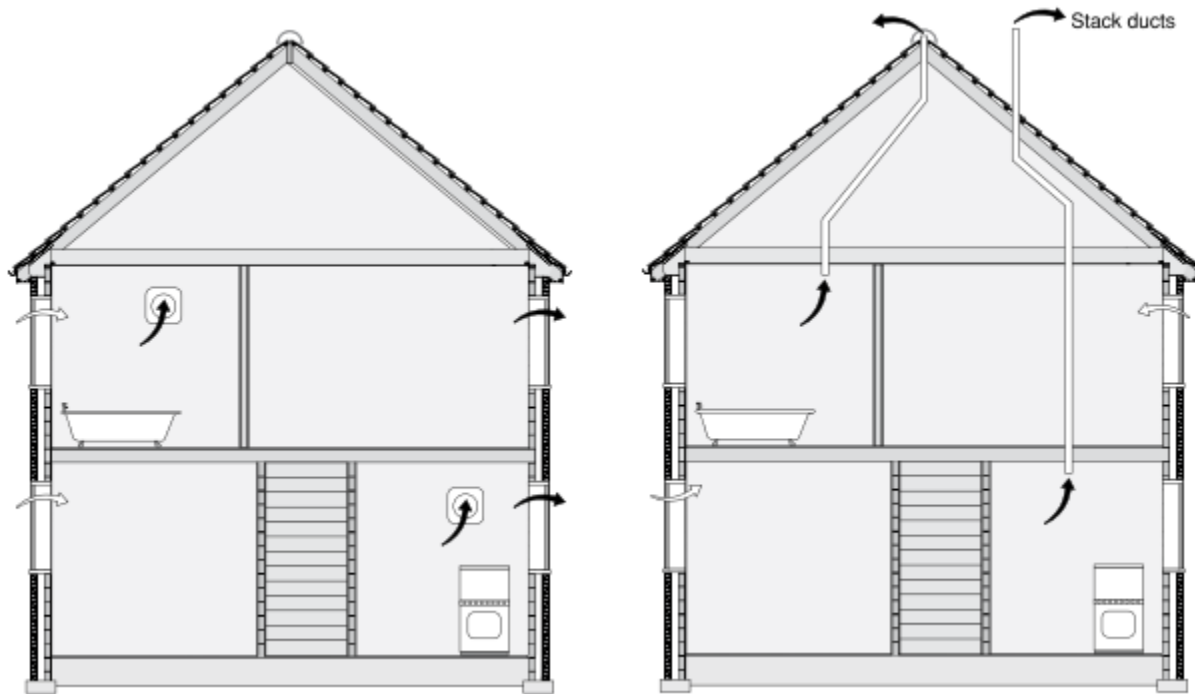
Control of excess humidity (arising from water vapour within indoor air)

Provision of air for fuel burning appliances

“ventilation may also provide a means to control thermal comfort” (states overheating is covered by Part L)

Source :- BRegs Part F DCLG 2010

What are the ventilation options?

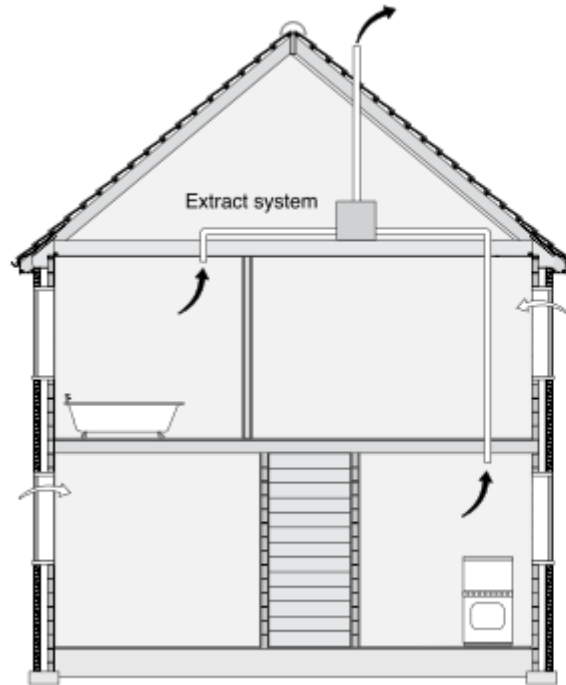


Background ventilators
and intermittent extract

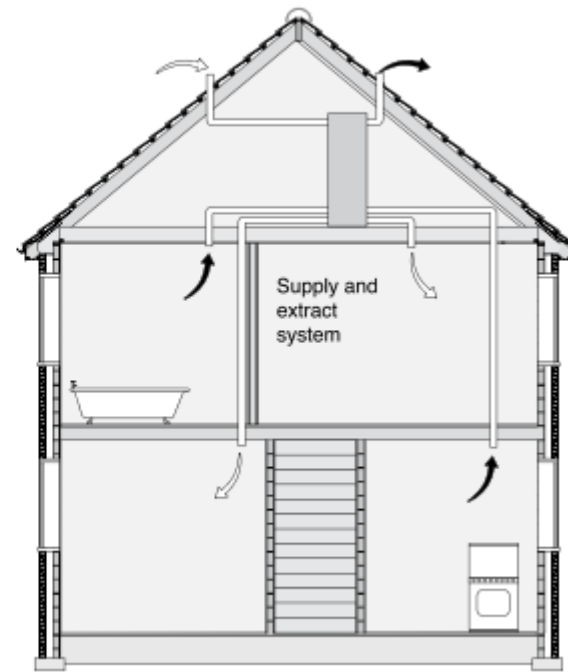
Passive Stack Vent

Source :- Bregs Part F 2010

What are the ventilation options?



Continuous Extract



Continuous S&E with Heat Recovery

Source :- Bregs Part F 2010

Recent ventilation research



	Study	Authors	Remit
1	Ventilation and Indoor air quality in Part F 2006 Homes	AECOM & Building Sciences (2010)	Looked effectiveness of systems installed in new homes and compliance with Part F
2	Investigation of Ventilation effectiveness	Faber Maunsell & UCL (2009)	Investigated Part F ventilation systems (simulated effectiveness)

Recent ventilation research - Findings



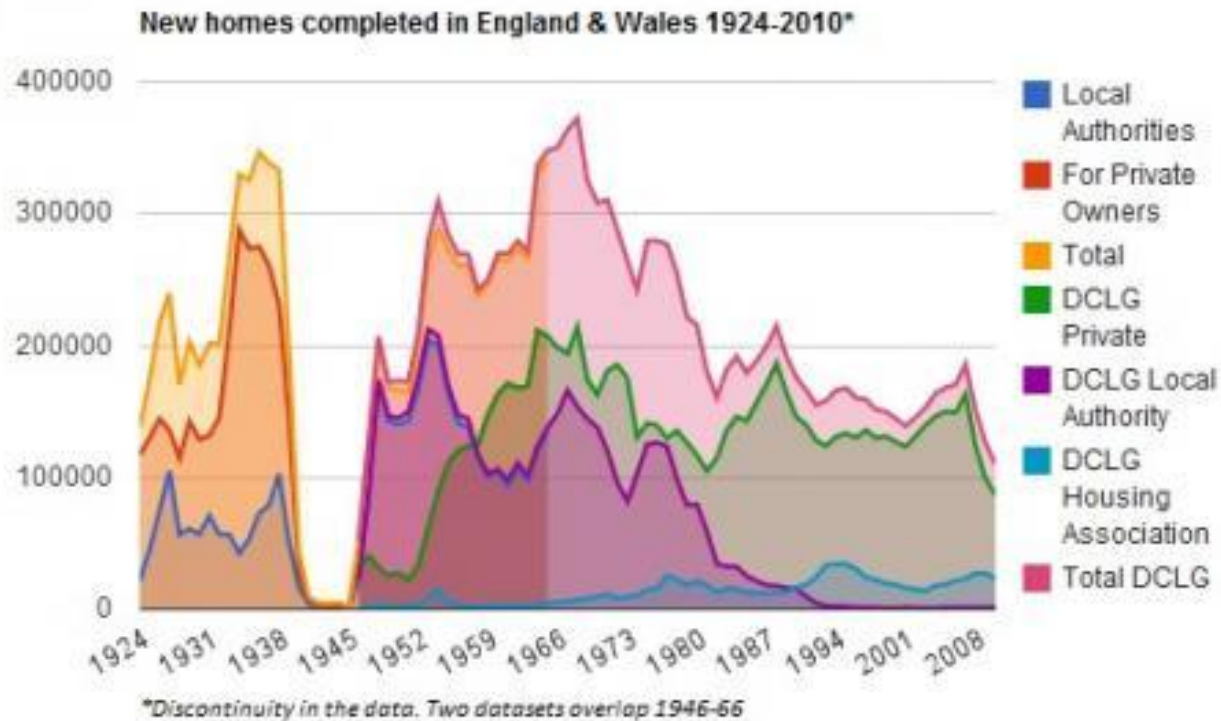
	Study	Authors	Findings
1	<p>Ventilation and Indoor air quality in Part F 2006 Homes</p> <p>Looked effectiveness of systems installed in new homes and compliance with Part F</p>	<p>AECOM & Building Sciences (2010)</p>	<p>Focused on airtight naturally ventilated dwellings i.e those using background ventilation with intermittent extract</p> <ul style="list-style-type: none">• ½ achieved air permeability of 5 m³/m² at 50Pa• 72% of the sample did not have adequate trickle ventilation• 52% of doors no 10mm gap• Only half achieved flow rates• 25% with RH levels higher than expected

Recent ventilation research - Findings



	Study	Authors	Findings
2	<p>Investigation of Ventilation effectiveness</p> <p>Specifically looked at Part F performance</p>	<p>Faber Maunsell & UCL (2009)</p>	<p>Pollutants that are emitted on a continuous basis VOCs are removed more effectively (in the long term) by continuous ventilation.</p> <p>Recommended material labelling link</p> <p>Point source local emissions of pollutants can be better removed by local ventilation rather than continuous background ventilation.</p> <p>Recommended computer based modelling to consider energy impact</p>

New homes completed (1924 to 2010)



Scotland - Approx 14800 pa

Source :- fullfact.org

Summary



- BRegs are changing very often and are becoming more sophisticated. Continued research and monitoring is essential.
- All homes need to be designed to operate with natural ventilation
Mechanical ventilation systems need to be designed to suit the property (industry should consider passive stack first)
- The right level of detail pre planning is a minimum standard
- And better domestic Design, Construction, Installation, commissioning and handover guidance is essential