How to make your home warm & comfortable –
with Allan Corfield & David Hilton

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How to make your home warm & comfortable –

1. **The current problem**
2. **The Fabric First Approach**
3. **Heating / Balance / Control**
4. **Your next steps**
5. **Q&A**

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The Current Problem

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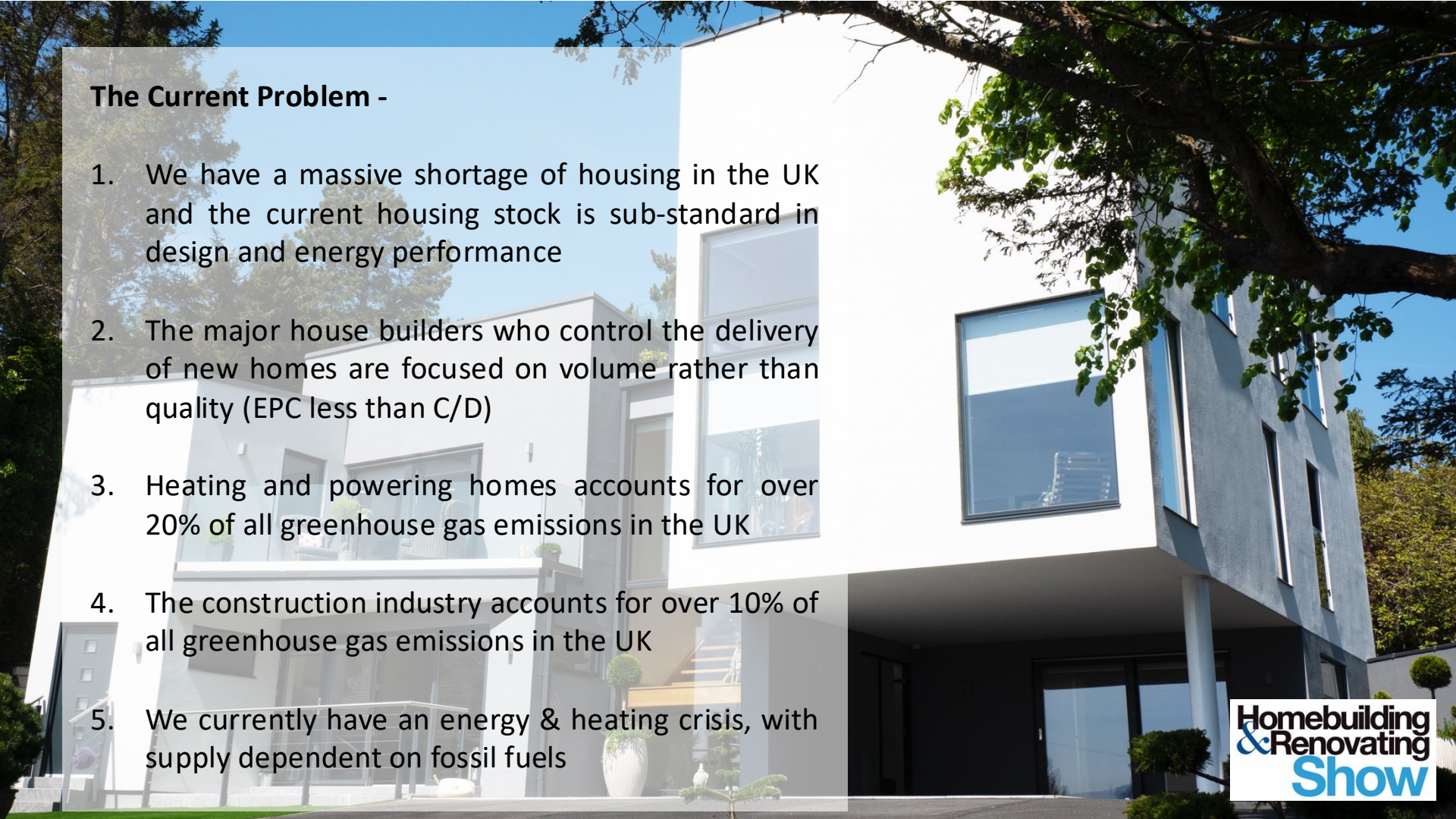

The Current Problem -

1. We have a massive shortage of housing in the UK and the current housing stock is sub-standard in design and energy performance

2. The major house builders who control the delivery of new homes are focused on volume rather than quality (EPC less than C/D)

3. Heating and powering homes accounts for over 20% of all greenhouse gas emissions in the UK

4. The construction industry accounts for over 10% of all greenhouse gas emissions in the UK

5. We currently have an energy & heating crisis, with supply dependent on fossil fuels

Considerations before you start?

1. Budget?
2. What is your motive, save the planet or save energy bills?
3. How deep a retrofit are you planning, are you willing to rip it up and start again?
4. Before you pin all of your hopes on an air source heat pump, do you have mains gas?
5. If you are adding a high performing extension, are you improving the fabric of your existing building?
6. Are the improvements your making, causing other problems – damp or mold?

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”Is a back to basics approach where you concentrate on the fabric of the building before throwing eco bling, in order to make it work.”

The Fabric First Approach

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Fabric First Design Principles -

1. Highly insulated building envelope with limited cold bridges
2. High specification windows & doors
3. Air tight membranes and tapes used to seal all external walls and penetrations
4. MVHR system providing fresh heated air throughout the home, potentially with a heating element
5. Maximise the natural solar gain through building orientation
6. Utilise a small renewable led heating system
7. Remember if you only fix one area then you will cause other problems – mold!
8. Look at the Passive House deep retrofit example EnerPhit

THE KEY ELEMENTS

1. Solar Gain
2. Construction Type
3. Air Tightness
4. Limit Cold Bridging
5. Ventilation Strategy
6. Heating Systems

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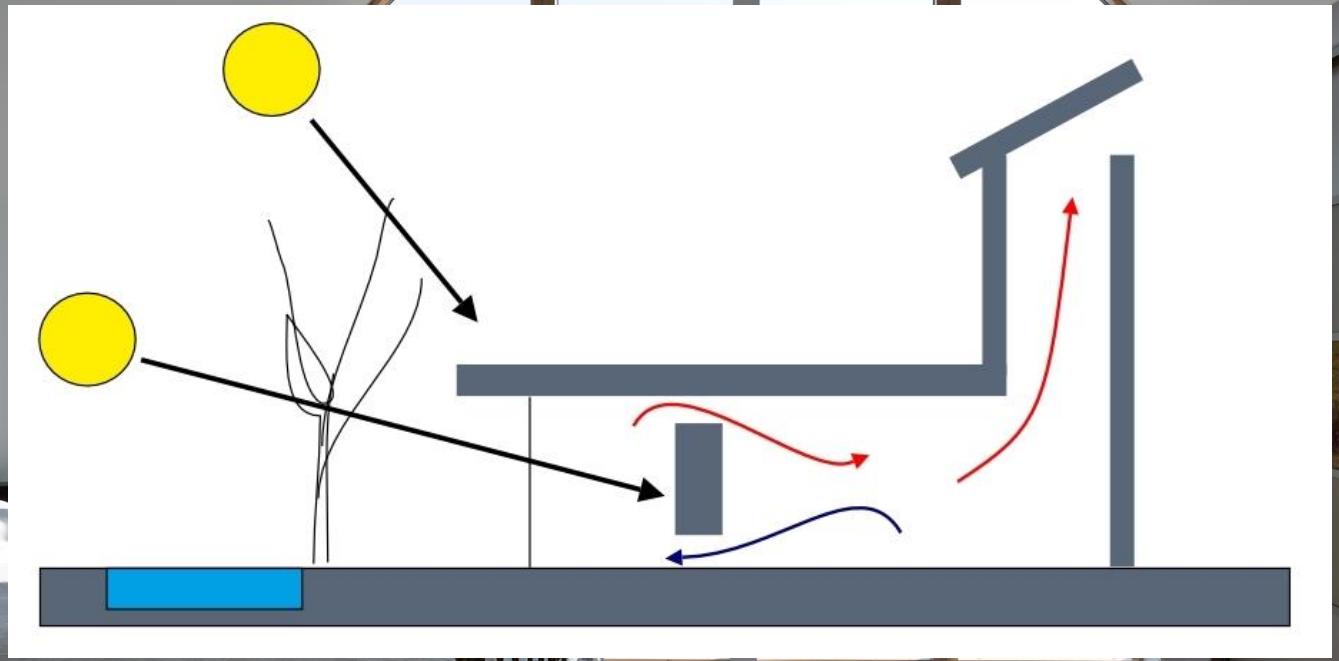
1. Solar Gain -

1. Consider orientation of the building to maximise gains
2. Large windows on Southerly elevations and small windows on the North
3. Accommodate shading or bries soleil to limit summer overheating



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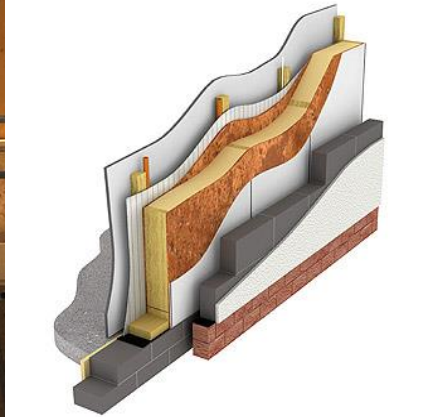
2. Construction Types -

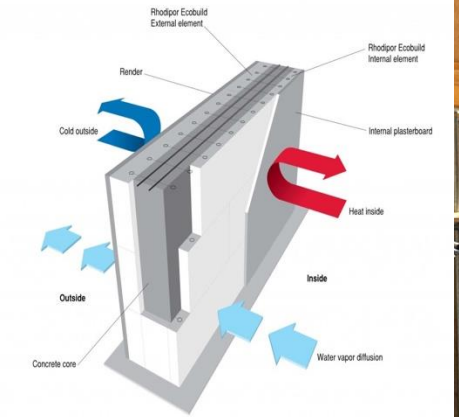
1. Choose a Construction type that is naturally airtight
2. Highly insulated
3. Ideally to a Factory tolerance

Timber Frame



SIPS

ICF



All can achieve a U-value of 0.10 to 0.15 W/m2k

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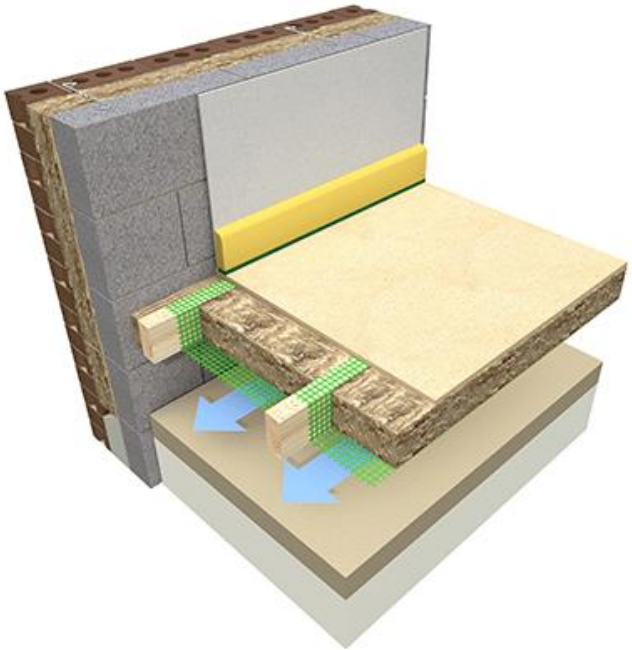
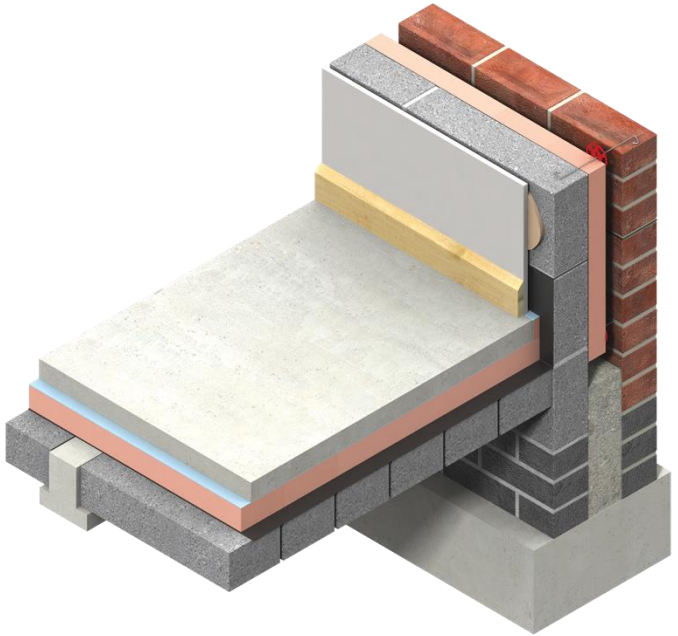
2. Construction Types - Floors



Between joists



Above existing

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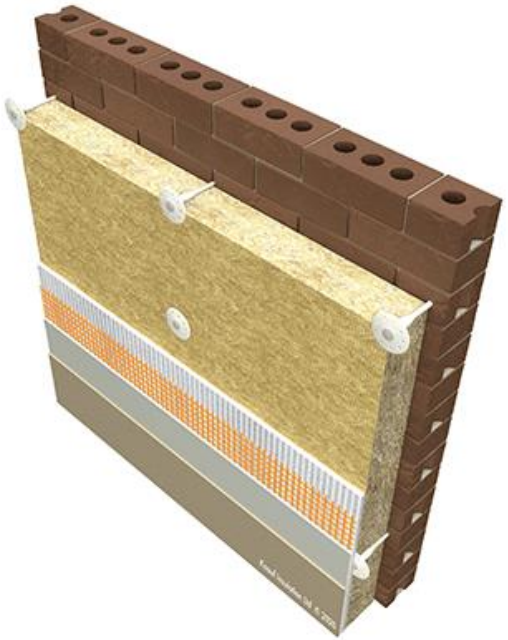
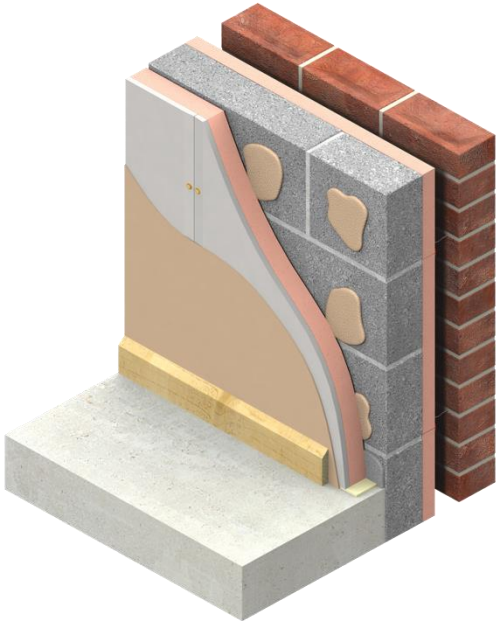
2. Construction Types - Walls



External



Internal

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2. Construction Types – Traditional Walls

Internally insulate -

1. Diasen Lime & cork insulating plaster
2. Lime based finishing plaster
3. Breathable paint

Low energy solution -

1. Lime & cork insulating plaster
2. Adhesive mortar
3. Gutex natural wood fibre insulation board
4. Lime based finishing plaster
5. Mesh
6. Breathable paint

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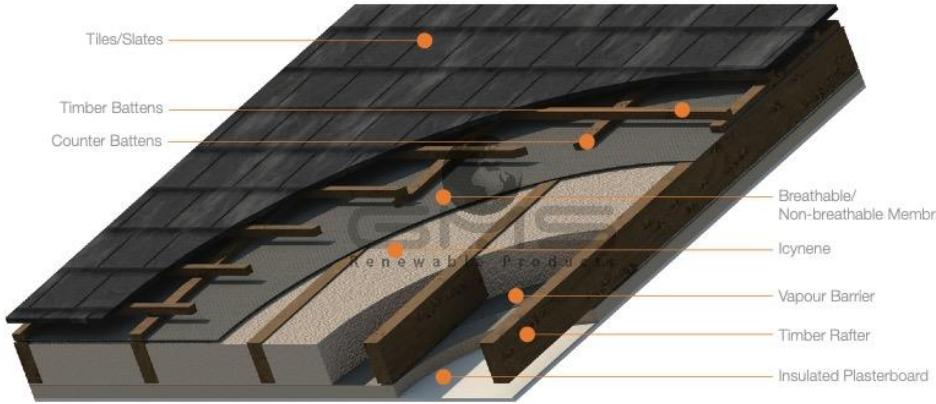
2. Construction Types - Roof



Cold

Warm

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3. Air tightness -

1. Tape all external joints & around windows
2. Use airtight membranes and vapor control layers
3. Tape or seal all service penetrations

Proctor Wraptite breather membrane

Internal airtight tape

Blower door test

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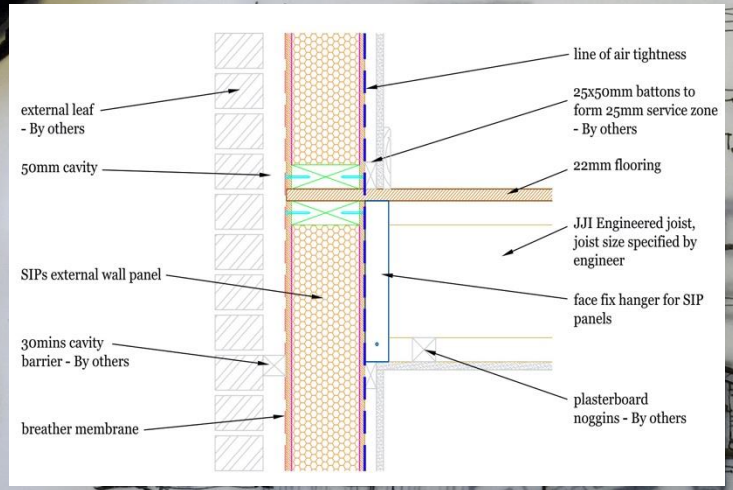
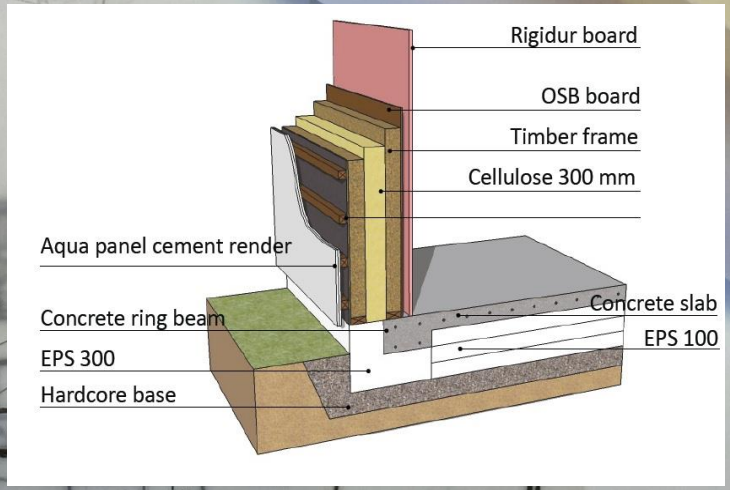
4. Limit Cold Bridging -

1. Architect to detail all parts of the building's connections & linear cold bridging
2. If using timber frame try and increase centres from 600mm to 1,200mm cc
3. Poor detailing can cost up to 28% in SAP calculation





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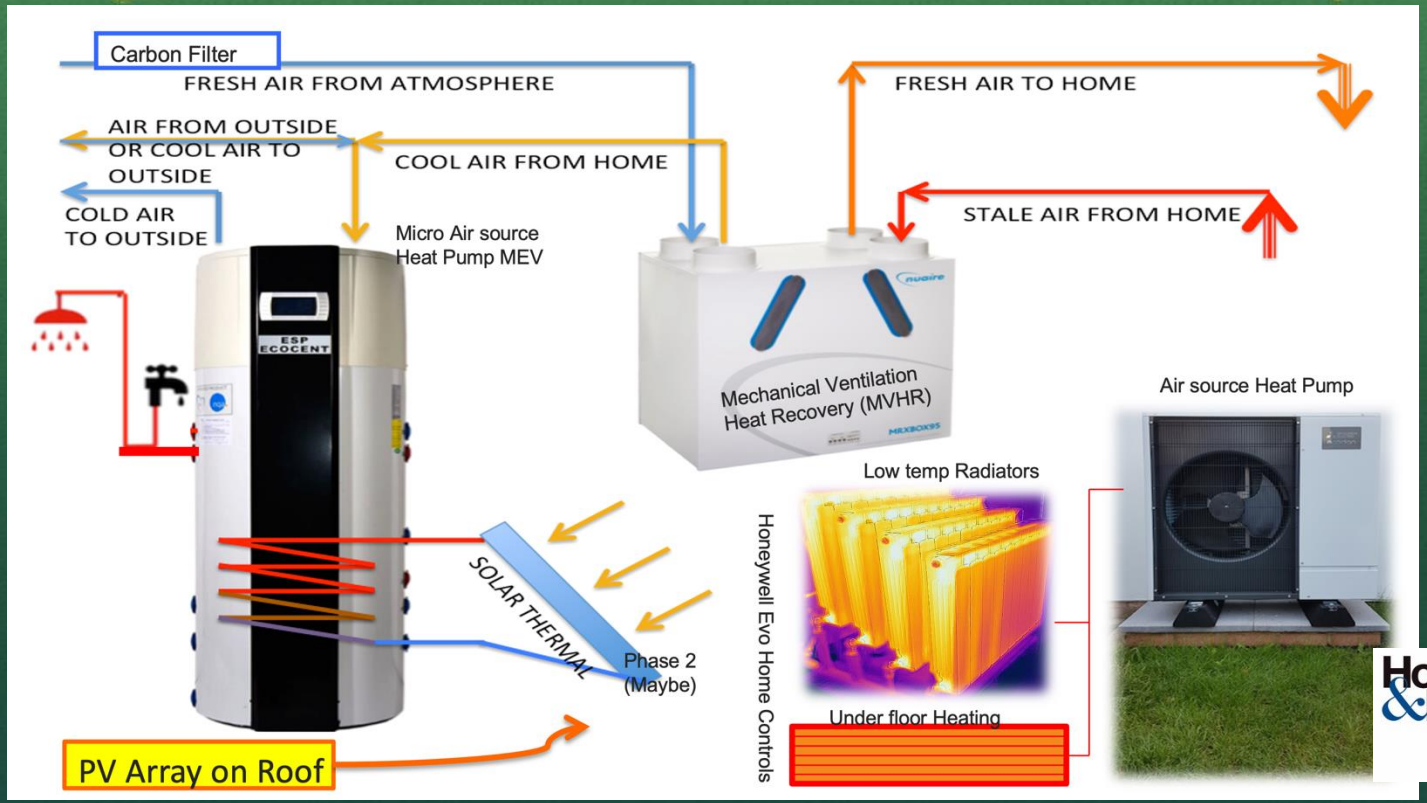
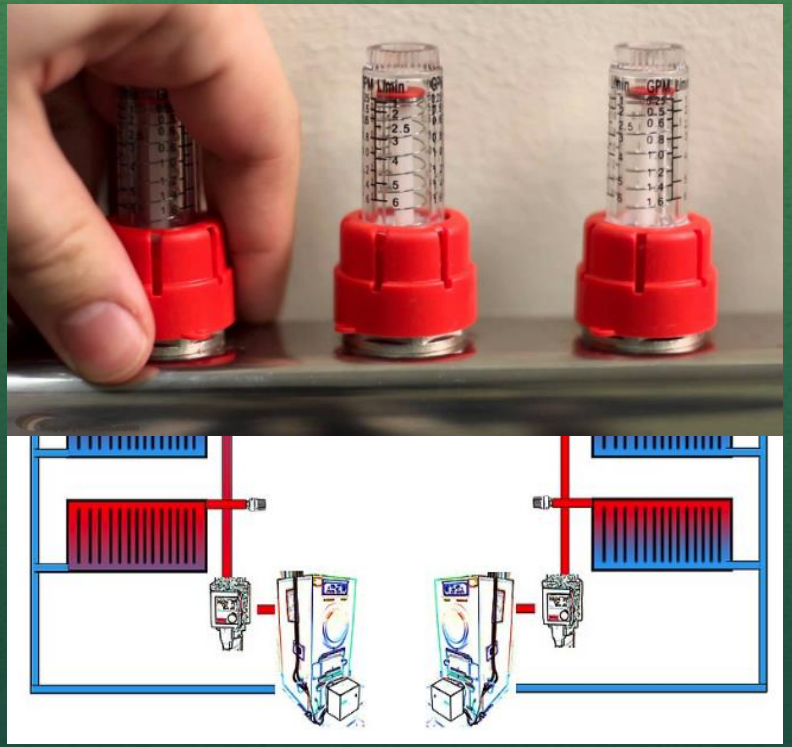
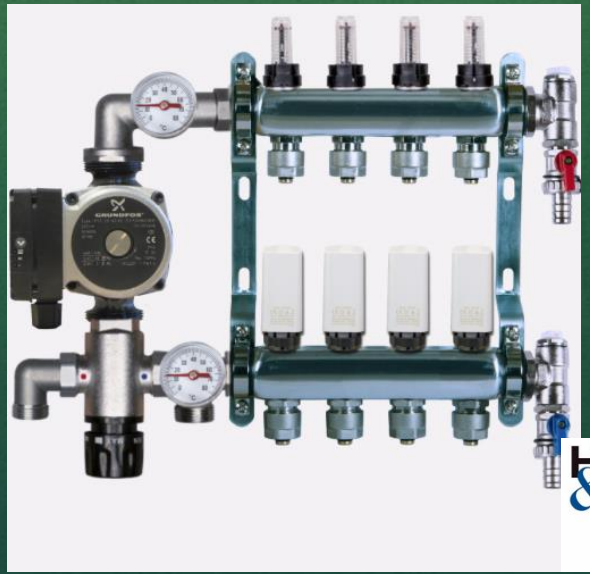
My Way – MVHR & Heating



Get the balance right





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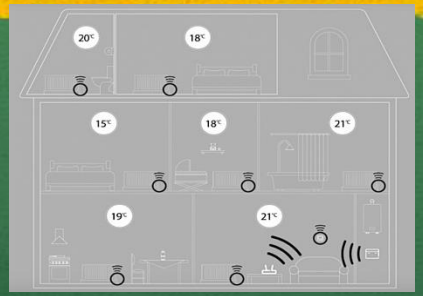
Control



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Your next steps to a warmer home -

1. Make the easy wins –
    1. Check radiators (balance and bleed)
    2. Add smart controls
    3. Upgrade existing boiler (only if really old)
    4. Improve insulation in the loft
2. Then move onto the more disruptive/costly options
    1. Replace the windows and doors
    2. Install external or internal wall insulation
    3. Install underfloor insulation in ground floor
    4. Make the building more airtight (don't forget the ventilation)
3. Only then should you consider changing the heat source
4. Look at the Passive House deep retrofit example EnerPhit

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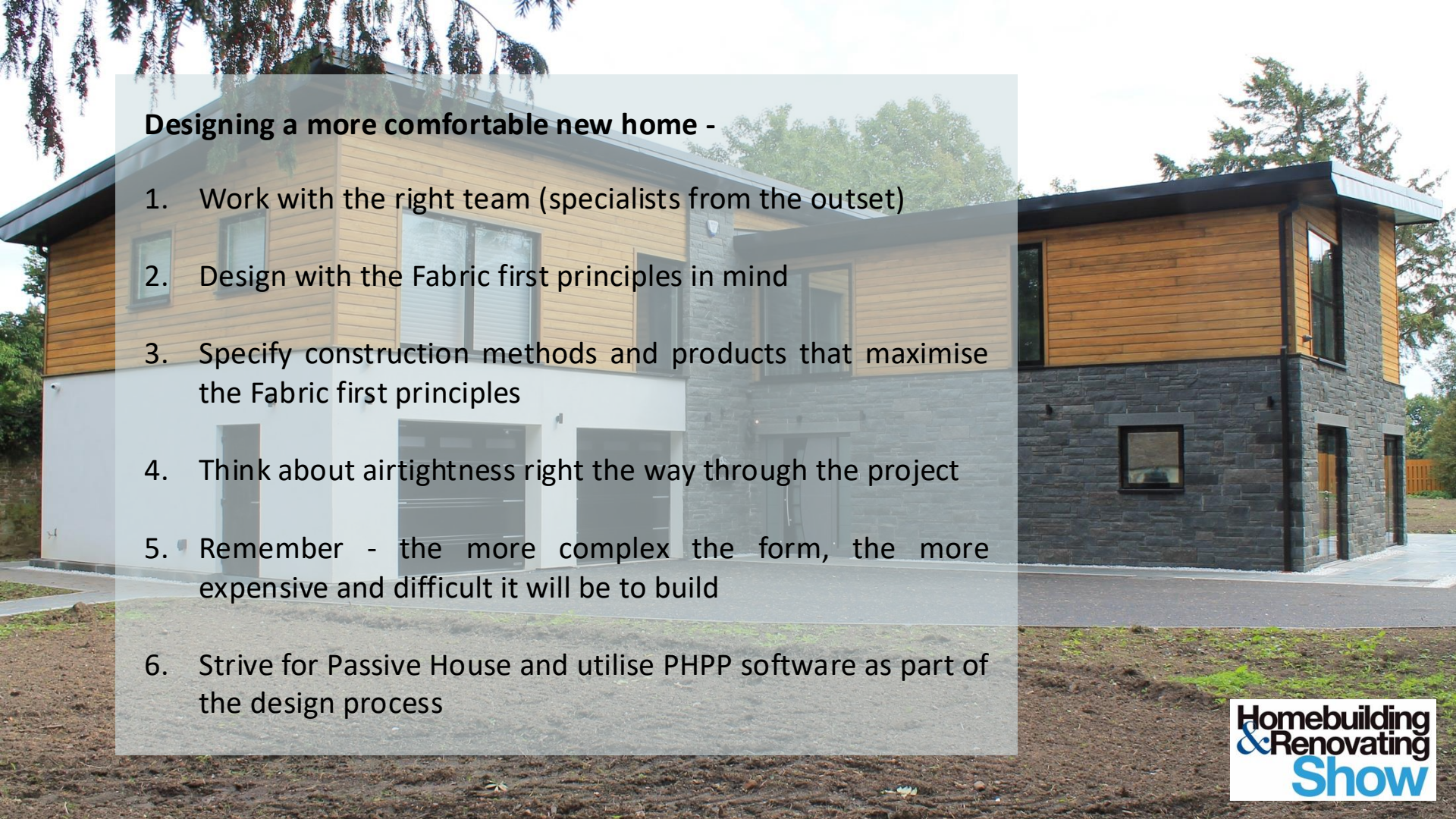

Designing a more comfortable new home -

1. Work with the right team (specialists from the outset)
2. Design with the Fabric first principles in mind
3. Specify construction methods and products that maximise the Fabric first principles
4. Think about airtightness right the way through the project
5. Remember - the more complex the form, the more expensive and difficult it will be to build
6. Strive for Passive House and utilise PHPP software as part of the design process

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