



**LOW ENERGY HOMES: BASIC DESIGN PRINCIPLES -  
WITH JENNY CHANDELA**



Allan Corfield  
**ARCHITECTS**

# An Introduction to Self Building

An eBook from **Allan Corfield Architects**

- Based in Swindon & Dunfermline
- Covering the whole of the UK
  - Completed 550+ projects
- Specialists in low energy residential projects
- RIBA Chartered Architects
- Energy Performance & Passive House Design
  - Cost Consultancy
- CDM Principle Designer
- Structural Engineering
  - VR & 3D design



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## Designing your low energy home –

1. The Case for a “Green” Home
2. The Fabric First Approach
3. The Design Process
4. Summary




# The Case for a “Green” Home



## 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)
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



“Put simply a green or low energy home - from design, technologies and construction method - uses less energy, from any source, than a traditional or average new house.”



These are examples of low energy homes-



These are examples of low energy homes-





These are examples of low energy homes-



These are examples of low energy homes-



These are examples of low energy homes-



# The Future Homes Standard

1. The new Future Homes Standard is aimed to ensure that all new homes built from 2025 will produce 75-80% less carbon emissions than homes delivered under 2013 regulations.
2. New homes built from 2022 produce 31% less carbon emissions compared to 2013 regulations. Amended Building Regulations came into effect June 2022.

*From 2025 no new homes should be connected to the gas grid, they should instead be heated through low carbon sources, have ultra-high levels of energy efficiency alongside appropriate ventilations.*  
(Committee on climate change)

## The Building Regulations 2010

### Conservation of fuel and power

APPROVED DOCUMENT

# L

#### Volume 1: Dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: On-site generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26A, 26C, 27, 27A, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition – for use in England

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PUBLICATION - ADVICE AND GUIDANCE

## Building standards technical handbook 2020: domestic

Published: 2 Dec 2020  
Developed by: [Scottish Government and Communities Directorate](#)  
Part of: [Building standards and more](#)  
ISBN: 978-1-904433-2-2

The building standards technical handbooks provide guidance on achieving the standards set in the Building (Scotland) Regulations 2004. This handbook applies to a building warrant submitted on or after 1 March 2021 and to building work which does not require a warrant commenced from that date.

Supporting documents

	<b>Building standards technical handbook 2020: domestic</b> 485 page PDF 19.5 MB	<a href="#">Download</a>
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## The Future Homes Standard -

1. It is better for the environment, by reduced carbon emissions during construction
2. It is better for the environment, during operation due to the reduced energy demand
3. Typically 40-80% betterment in building standards than current housing stock
4. Reduced running costs over the life of the house
5. Potential for zero or positive energy bills
6. A more comfortable, healthy built environment

“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





## Fabric First, the key elements -

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





# The Design Process





## Who do I need to work with?

### Basic –

1. Architect or Architectural Designer
2. Structural Engineer

### Might need –

3. Planning Consultant
4. QS
5. Heating Engineer
6. Project Manager
7. Landscape, lighting or interior designers
8. Principle Designer



## Design process overview -

### Stages

1. Initial Design
2. Planning Application
3. Building Regulations or Warrant
4. Production Drawings
5. On site
6. CDM



## What is critical throughout these stages?

1. Your involvement, **it's your home not your design teams**
2. Checking that you can afford it!
3. You must love the design before you proceed through the stages
4. Engage with your neighbours and the planners as soon as you can
5. Communication with your consultants



## Initial design & planning stages -

1. Initial design ideas should be a response to the site and your brief (function before form)
2. Orientate habitable rooms due South to maximise solar gain, with utility/plant/service zones to the North
3. If going for Passive then large windows to South none on the North, also compact simple form
4. Larger more complex forms will cost more and have more junctions which will impact thermal bridging factor
5. Design with a construction method in mind
6. Limit overheating at design stage, ideally outwith building envelope
7. Once design is frozen complete initial PHPP and SAP calculations

# Technical design (regs & production) stages-

1. You should be working with an efficient design, suitable for construction

2. Appoint a suitable kit company for the fabric of the building

3. Finalise specification of all major products and materials

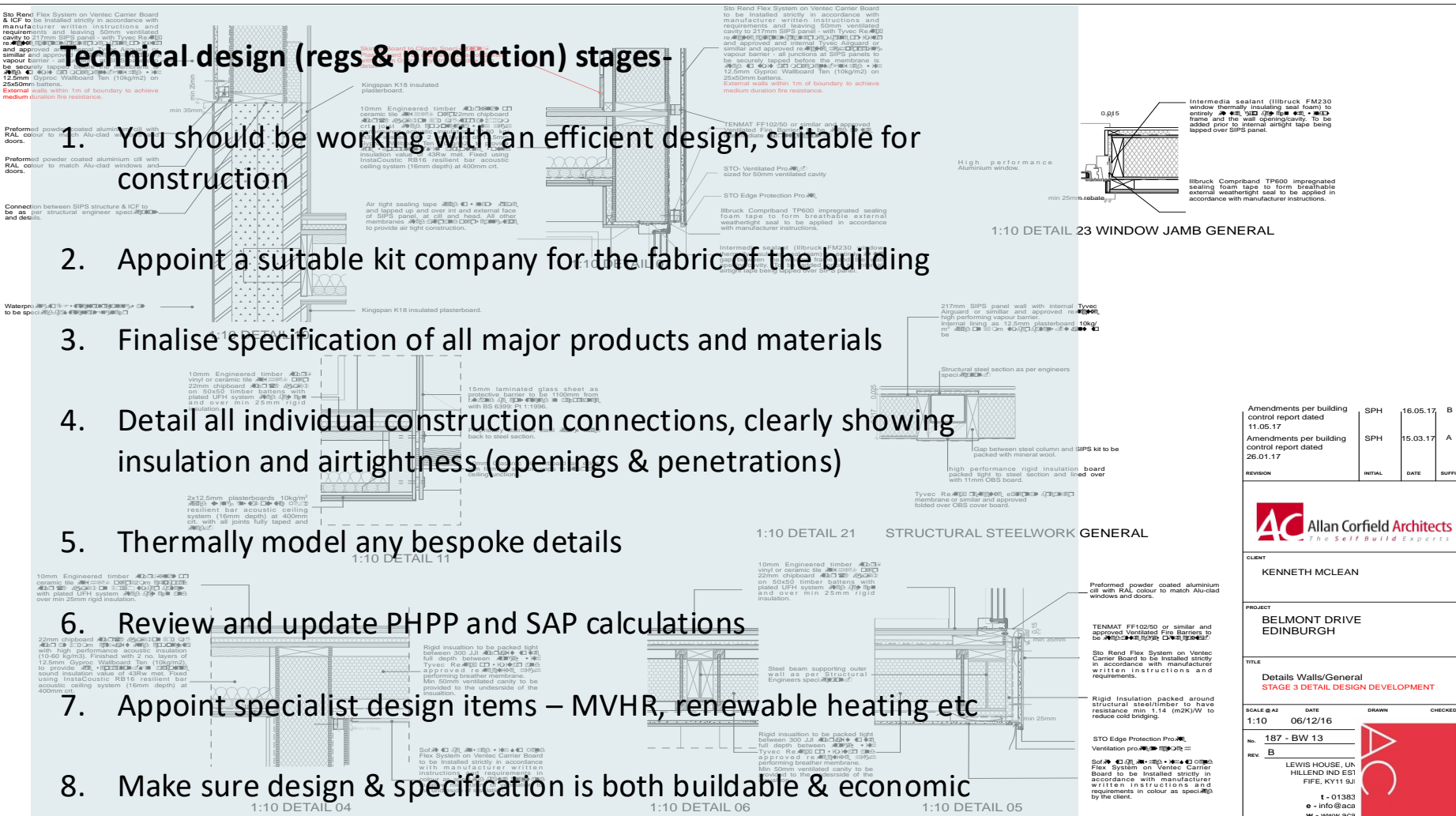
4. Detail all individual construction connections, clearly showing insulation and airtightness (openings and penetrations)

5. Thermally model any bespoke details

6. Review and update PHPP and SAP calculations

7. Appoint specialist design items – MVHR, renewable heating etc

8. Make sure design & specification is both buildable & economic



Amendments per building control report dated 11.05.17	SPH	16.05.17	B
Amendments per building control report dated 26.01.17	SPH	15.03.17	A
REVISION	INITIAL	DATE	SUFFIX
 <b>Allan Corfield Architects</b> <i>The Self-Build Experts</i>			
CLIENT			
KENNETH MCLEAN			
PROJECT			
BELMONT DRIVE EDINBURGH			
TITLE			
Details Walls/Design STAGE 3 DETAIL DESIGN DEVELOPMENT			
SCALE A2	DATE	DRAWN	CHECKED
1:10	06/12/16		
No.	187 - BW 13		
REV	B		
LEWIS HOUSE, LN HILLEDEN IND EST FIFE, KY11 9JL			
t - 01383 e - info@aca w - www.aca			

## On site -

1. Before you start make sure you discharge any planning or regs conditions. Also put in place any warranty or insurance policies.
2. What procedures do you have agreed for managing quality on site.
3. Every trade that comes on site needs to know about airtightness.
4. If you are using inexperienced trades then consider Toolbox talks, at key stages –
  1. Kit sign off
  2. Window fitting
  3. Airtightness layer (VCL)
  4. Pre airtest
5. **Tape everything!**
6. Any onsite changes to be run past the design team.

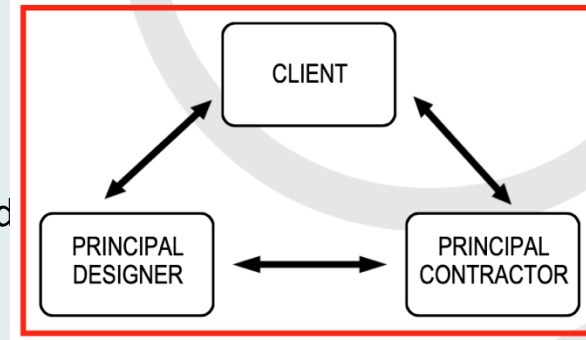


## CDM 2015-

The **Client** has overall responsibility for the successful management of the project and is supported by the **Principal Designer** and **Principal Contractor** in different phases of the project.

The Principle Designer will:-

1. Provide pre-construction information to appointed designers and Principal Contractor
2. Assist the client in provision of pre-construction information
3. Gather information for the Health and Safety File
4. Liaise with the Principal Contractor
5. Update to CDM Matrix where design work is carried out after the construction phase has commenced



# IN SUMMARY

1. The biggest impact on your low energy home is during the initial design stages
2. Research all options, principles and construction methods for low energy homes
3. Decide how energy efficient you want your home to be; Zero / Passive or Fabric First
4. Detail out the poor traditional construction details, ie limit areas of cold bridging
5. Strive for Passive House standard Airtightness results
- 6. Remember none of this matters if your designers/ builders don't follow these principles!**





Allan Corfield Architects presents:

## 'How to Self Build Successfully' Seminar



"An excellent place to start a project – great clear information and educational, great place to network for services. Well worth the cost, even for me travelling 250 miles each way! Would recommend a combined visit with a day in NSBRC exhibits for even more. Well done ACA!"

Visit ACA at stand TV63  
[www.acarchitects.biz/nsbrcstand](http://www.acarchitects.biz/nsbrcstand)

## Are you considering Self Build?

This seminar – hosted by Allan Corfield Architects and delivered by top industry leaders – prepares you for your Self Build journey.

The day includes expert advice on key topics ranging from finding land and funding your project to future proofing your design and cost control. There are opportunities for individual consultations and networking throughout the day.

### Key Topics:

- Finding and assessing land
- Funding and protecting your project
- Your project team and the design process
- Project Management and cost control
- Future home standards and construction systems
- Renewable heating design
- MVHR design
- Virtual Reality demonstration



For dates offered, more information, speakers bios and to book your place,

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**03333 444217.**

**Location:** Build It Theatre, NSBRC, Swindon

**Cost:** FREE