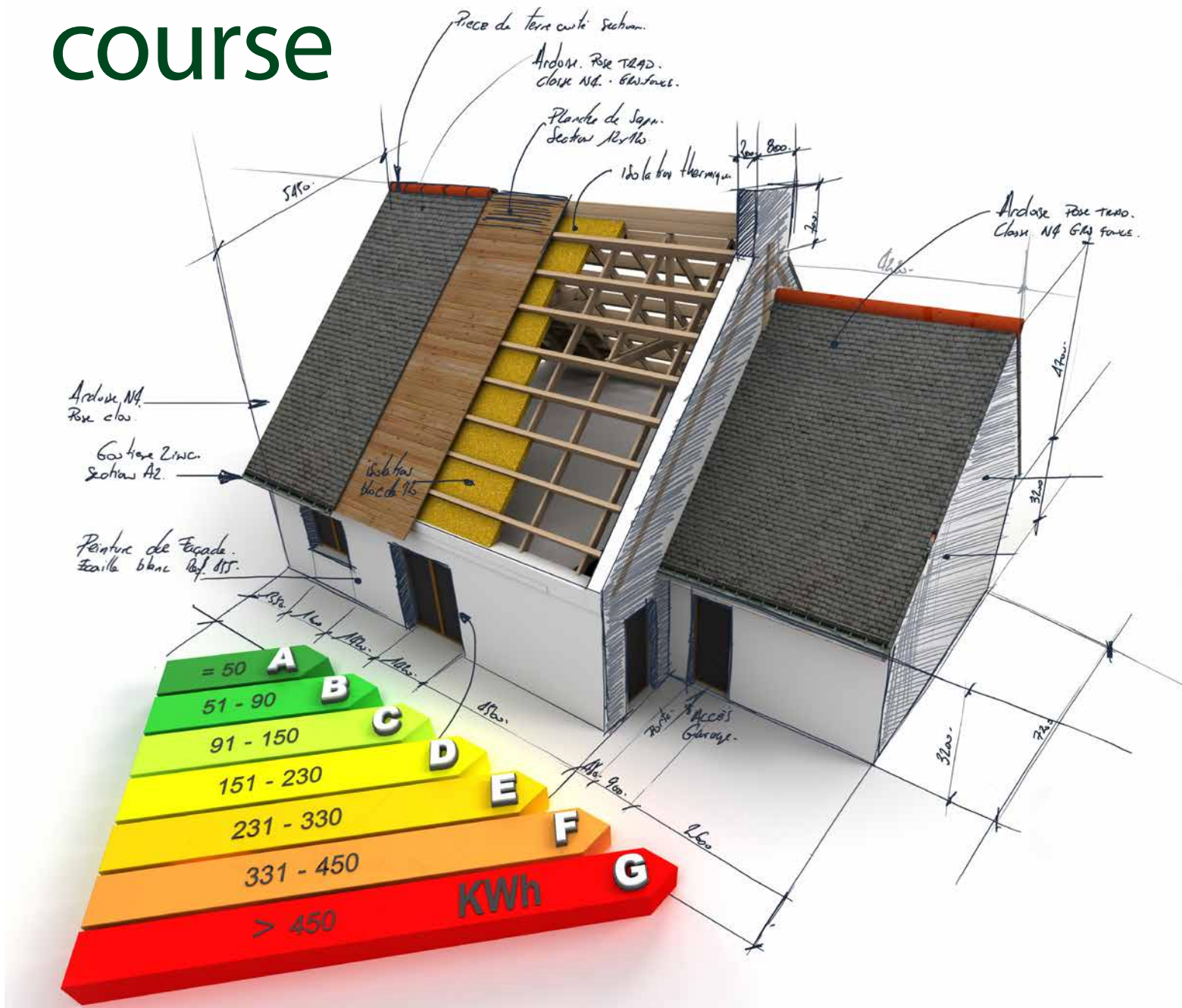


# AECB CarbonLite™ Retrofit Foundation course



# CLRf – Your Gateway to Expertise in Domestic Retrofit

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**AECB CarbonLite™ Retrofit Foundation course (CLRf)** is the leading advanced level e-learning course for domestic building retrofit. It has been contributed to by a number of experts in sustainable retrofit and low energy building construction professionals.

The course has been cited in the **UK Government 'Heat and Buildings Strategy' (October, 2021)** as one of the routes for the built environment to upskill towards decarbonising buildings and heating, as a crucial part of efforts to meet net zero carbon targets in the UK.

CLRf consists of eight in-depth modules, all taught online as part of a 130-hour minimum, self-paced, online learning programme. It features in-depth learning materials, resources & quiz style assessments including multiple choice, scenario based and calculation. The fully online, self-directed learning allows you to easily track your progress and dip in and out of the lessons as and when you have the time. The system means you can go faster or slower depending on your work and other commitments, with up to a year to complete the course.

No other online course prepares built environment professionals as thoroughly for the technical challenges of retrofitting existing buildings to an excellent standard.

## **The programme equips professionals with the skills and knowledge to:**

- Develop effective retrofit strategies
- Deliver projects that operate as designed
- Understand the movement of heat and moisture in buildings
- Reduce the financial risks that clients and professionals carry when projects fail
- Understand how different construction types and local variations impact upon retrofit

- Learn about and discuss ways to avoid or manage unintended consequences
- Evaluate the financial viability of projects and how to advise clients appropriately.

## **The aim is to enable retrofitters to achieve improved buildings that enjoy:**

- A future-proofed increase in winter and summer internal comfort levels
- Excellent indoor air quality
- Low running costs with a minimal energy performance gap
- Retrofit strategies that are 'economically optimised' for owners and occupants
- CO<sub>2</sub> savings at low to negative cost per tonne of CO<sub>2</sub> saved
- Avoidance or reduction of risks from unintended consequences related to moisture.





# DOMESTIC RETROFIT – WHY STUDY?

We are in a climate emergency caused by greenhouse gases being released into the earth's atmosphere at an unprecedented rate & volume. One area where we emit vast amounts of GHG's is simply through the space heating and the hot water demand within our homes. In the UK, the operational CO<sub>2</sub> emissions from domestic buildings alone accounts for 69%, and is responsible for 18% of our entire annual national CO<sub>2</sub> emissions. Retrofit is at the heart of making valuable contribution to decarbonising our homes.

To achieve the 2050 targets for reducing CO<sub>2</sub> emissions, it is often said that 27 million UK homes need to be retrofitted at a rate of one per minute. This assumes that a deep retrofit is installed, and works effectively for at least 25 years. The reality is that poorly planned retrofit is the norm, and measures are not only piecemeal, but also often counter-productive.

This course was developed because government reports highlighted the scale of the retrofit challenge. The Hansford Report (2015) on the Solid Wall Insulation sector identified poor workmanship, little design input and inappropriate detailing amongst many other shortcomings of projects looked at. The Each Home Counts Review (2016) called for urgent action to improve quality and raise standards. Both reports highlighted the need for knowledgeable experts capable of leading successful projects. There is an opportunity for AECB CarbonLite™ retrofit-literate design professionals and consultants to meet this need, as well as delivering homes that facilitate healthier and more sustainable lifestyles for clients.

Findings of the Sixth Assessment Report from the Intergovernmental Panel on Climate Change, or IPCC, (IPCC, 2022) call for increased efforts to decarbonise. Professor Jim Skea, Co-chair of Working Group III for the IPCC has said that "Unless there are immediate and deep emissions reductions across all sectors, 1.5°C is beyond reach" if seeking to minimise global temperature rise.

Therefore, "Business as usual" is no longer a viable option. The climate emergency demands that we aspire to targets of net zero carbon and even carbon negative buildings.

*The CLRF course addresses the above identified skills gap and the rapid need to meet net zero targets within the construction industry.*

## Who Should Study?

As an advanced level training course, equivalent to postgraduate learning, CLRF is aimed primarily at construction professionals and those whose role involves commissioning and decision making around retrofit. The course brings together a wealth of expert knowledge on low energy building retrofit and methodology.

To get the most out of taking the full course you will already have good professional knowledge within the construction sector. You will have a serious interest in how to do advanced energy efficient retrofit and be wanting to deepen your understanding of building physics and the risks associated with measures, to enable you to make informed decisions.

Homeowners with a desire to drive their own retrofit projects will also find this course useful. While only the more technically minded will be interested in all the detail, there is much useful knowledge even for those who are less technical.

The course is especially aimed at:

- Retrofit Commissioners
- Retrofit Designers
- Architects
- Architectural Technologists
- Housing Associations
- Local Authorities
- Passivhaus Designers
- Retrofit Coordinators
- Building Services Engineers
- Construction Managers and Consultants
- Energy Assessors
- Energy Managers
- Self-Retrofitters
- Sustainability Managers
- Surveyors and Valuation Professionals.



# COURSE CONTENT

The AECB CarbonLite™ Retrofit Foundation course (CLRf) features eight modules, each taking an in-depth look at the following:

## Module 1: Introduction to AECB CarbonLite™ Retrofit

This module introduces learners to the key themes and principles underpinning the programme.

1. Introduction to AECB CarbonLite™ Retrofit
2. Overview of the course modules
3. Benefits of a Successful Retrofit
4. Comfort and Health
5. Ventilation and air quality
6. National and International Context

## Module 2: Buildings in the UK Climate

This module explains the variations in the UK's climate and the impact this has on retrofit projects.

1. Buildings in the UK Climate – Climate and Weather
2. Buildings in the UK Climate – Climate Change
3. UK Climates and Microclimate

## Module 3: The UK Housing Stock

This module examines the UK housing stock, the most common features of their construction and how variations should change specifications and approaches.

1. Introduction to UK housing stock
2. Traditional Construction
3. Non-traditional Construction
4. Retrofitted examples of traditional and non-traditional buildings
5. Walls – regional and local variation
6. Floors – regional and local variation
7. Devising Retrofit Strategy with Existing Defects in Mind
8. Module 3 scenario based homework



## Module 4: Energy in Buildings

This module examines how energy is saved through retrofit and how the performance gap can be eliminated through appropriate design and specification.

1. Retrofit Performance Gaps
2. Power and Energy in buildings
3. Heat Load and Annual Degree Hours
4. Useful Energy, Delivered Energy and Primary Energy
5. Energy Performance – applying the physics
6. The Five Factors of Thermal Performance – New Build
7. The Five Factors of Thermal Performance – in retrofit
8. Introduction to 3 CLRF Modelled House Types
9. The CLRF Model – UK house types
10. Form Factors, Heat Loss and Thermal Bridges
11. Embodied Energy in Retrofit
12. Module 4 scenario based homework

## Module 5: Moisture in Buildings

This module examines the causes and impacts of moisture within buildings and how to avoid unintended consequences that this often leads to in sub-optimal installation.

1. Moisture in Buildings – Biological Decay
2. Moisture in Buildings – The Moisture Performance Gap
3. Moisture Physics – Relative and Absolute Humidity
4. Moisture physics – Diffusion and Bulk Air Movement
5. Evaporation and condensation in building materials
6. Liquid water and building materials
7. Moisture in Materials – Wood Moisture Equivalent
8. Moisture Movement – Magnitude and Direction
9. Moisture in Buildings – Problems and Solutions
10. Heat sources and microclimates
11. Moisture Reservoirs, Bulk Air Flow and Diffusion Flow
12. Moisture movement – Liquid Water Flows
13. Rising Damp and Hygroscopic Moisture
14. Suspended floors
15. Hygrothermal modelling, surveying, monitoring and analysis
16. Introduction to the CLRF Case Studies
17. Moisture in Buildings – How to look at your retrofit
18. Module 5 scenario based homework

## Module 6: Monitored Case Studies and Data

This module provides case study data based upon monitored retrofit projects covering a wide range of building types and materials, employing different insulation and ventilation strategies.

1. Introduction to the case studies
2. Case studies

## Module 7: Building Services for Retrofit

This module examines the best strategy for retrofitting building services, including the specification of heating, electrical, ventilation and renewables.

1. Heating – gas, LPG and oil
2. Heating – Electricity and Biomass
3. Heating – controls
4. Hot water
5. Airtightness and Ventilation – extract fans and passive stack
6. Airtightness and Ventilation – MEV and MVHR
7. Electricity – lighting and appliances
8. Renewables – solar thermal and PV
9. Module 7 scenario based homework

## Module 8: Retrofit Investment Appraisals and CLR Cost Modelling

This module equips learners with a detailed understanding of how to forecast and model project costs and payback.

1. The Costs of Retrofit
2. Different Financial Viewpoints and the Decision-Making Process
3. The Financial Impact of Climate Change
4. Overview of the UK housing stock
5. Financial Concepts and Methods of Appraisal (a)
6. Financial Concepts and Methods of Appraisal (b)
7. The AECB CarbonLite™ Retrofit Model – assumptions
8. The AECB CarbonLite™ Retrofit Model – further information
9. Investment appraisal in practice
10. Conclusions



*The knowledge gained from this course and how it will assist me in my work is well worth the time and very reasonable cost at the outset*

**Richard, Passivhaus Designer**

## KEY INFORMATION

### What commitment do I have to give to the learning?

In order to fully comprehend the content and benefit from the programme, the AECB advises that each learner spends at least 130 hours over the course of up to 12 months completing the course. This equates to around three hours per week on average.

- 130 hours of self-guided reading and interactive quizzes.
- Four homework tasks based on projects which the tutors know in great depth
- Course price £410+VAT.
- There is the opportunity to renew access to the course for a further year at a time if required (currently £60+VAT).

### When can I start?

You can start at any time in the year and progress at your own pace.

## FREQUENTLY ASKED QUESTIONS

### What if I can't commit to completing within 12 months?

Whilst we encourage candidates to complete the course within the 12-month time frame, you can easily extend access to the materials for one year by paying a 12-month renewal fee.

### Is there guidance available if I get stuck on a module?

You can use the 'Contact Lesson Teacher' links that are available within each lesson and quiz, or email our training team.

### Will I be able to access the CLR course lessons after completing the course?

Yes, after completing the course, you will have the option to retain access on an annual basis (for a modest fee). This means that as the course is updated or improved over time, you will have access to the latest, most up to date version.

### What is the deadline for joining the course?

The course has been made more flexible so you can now join at any time.

### What elements do I need to do at a fixed time? Or are they all flexible?

You can start the course when you wish and progress at your own speed.

### Do you think I can realistically do this course while working full time?

Yes. The course can be spread over a 12-month period so that a wide range of busy people can manage it around their schedule, and there is always the option to extend.



*I wish this course had been available at the start of my career*

**Daren, Architectural Technologist**



# CONTACT

As an e-learning provider, we take all of our bookings online. To book, visit <https://aecb.net/product/carbonlite-retrofit-training/>

You need to be an AECB member before booking on to the course. You can become a member at [www.aecb.net](http://www.aecb.net) for as little as £39 (student/low income/retired rate) (members of the Passivhaus Trust receive a 20% discount on joining fee).

If you have further specific questions relating to the course, please email [training@aecb.net](mailto:training@aecb.net)

AECB CarbonLite™ Retrofit is developed and operated by the Association for Environment Conscious Building (AECB)



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