



A Green Investment Plan for Cumbria - Building Retrofit issues paper

Domestic energy consumption (gas, other fuels, and electricity) is responsible for 26% of Cumbria's carbon dioxide emissions. In addition, the industrial commercial sector is responsible for 43% of emissions and some of that will be from energy use in buildings (A *Carbon Baseline for Cumbria* by Small World Consulting, February 2020). Getting to net zero requires that all buildings are made more energy efficient – by improving insulation and airtightness while maintaining adequate ventilation – and heated using electricity (the most efficient form of this being heat pumps), biomass or hydrogen (which needs to be produced without the release of fossil-carbon).

Existing buildings (more than 90% of which will still be here in 2050) need to be 'retrofitted' (retrospectively fitted) with loft and wall insulation, high performance doors and windows and ventilation systems then gas or oil boilers replaced by renewable heating and hot water systems. This will improve the comfort and health of the occupants, reduce their bills, and cut carbon emissions.

The Challenge

Around 70% of properties in Cumbria have an EPC of D or below. Work needs to be done on all such properties to bring them up to at least C. There are in the order of 250,000 residential properties in Cumbria, so over 15-year period 220 properties a week need retrofitting, even before considering all the other buildings that need work doing to them – the energy performance of non-domestic buildings also needs to be improved. *The Potential for Green Jobs in Cumbria* report considered this could create an average of 2000 jobs over that period.

Some previous insulation measures have been poorly installed:

- Loft insulation, particularly that done under grant schemes, has not been installed properly (installing loft insulation is an unpopular, poorly paid activity, regarded as unskilled, too often carried out with insufficient quality control).
- Cavity wall insulation has caused damp problems in some homes, particularly where the quality of construction is poor, and the cavities have obstructions in them. Once the filling in a cavity wall is wet it increases the energy needed to keep a home warm compared with an unfilled cavity. It is not known how many filled cavity walls in Cumbria have become wet but it is likely to be a common problem.

Government funding for energy efficiency measures has too often been short term and 'stop-start'. Companies that have invested to be able to supply insulation and related services have in the past found that work has dried up as public support programmes have

been unexpectedly scaled back, or not really materialised as expected, resulting in little appetite in the construction industry and relevant trades to getting involved in energy efficiency work.

Barriers to retrofit

These include:

- Availability of trusted information on what should be done to a particular property
- Availability of tradespeople/installers who can do the work required to a good standard
- Availability of finance to do the work
- Complexity and hassle of dealing with all of the above
- Upheaval involved in having work done.

The second of these may be the most critical barrier. The development of companies offering relevant services has been hampered by the stop-start nature of UK funding for retrofit over the last decade or so.

There are no Trustmark-accredited installers of cavity wall insulation based in Cumbria. There are companies involved in solar PV in Eden and South Lakes and plumbing/ heating/ electrical companies that now do heat pumps and other forms of renewable energy. The only one of these that could be thought to be in West Cumbria is Roland Hill in Wigton.

But heat pump and solar PV installers are the tip of the iceberg when it comes to what is needed for retrofit. 90% of the work is about improving the fabric of the building and requires good general builders.

Different skills and technologies are required for different types of buildings

From EPC data 22% of properties in Cumbria were built before 1900. This ranges from 11% in Barrow to 34% in Eden (but note that in Barrow 33% of properties were built between 1900 and 1929). This will be an underestimate as all buildings built since 2008 will have an EPC whereas buildings constructed before 2008 will only have an EPC if they have been sold, let, or had renewable energy systems installed.

Buildings constructed before 1900 are designed to lose moisture as water vapour through their walls – they need to ‘breathe’. Using modern, cement-based mortars, renders and plasters on these buildings can be like putting mushrooms in the fridge in a plastic bag – they go mouldy. Improving the insulation and airtightness of older buildings needs to be done right or problems with damp and mould will increase. Breathable materials, such as lime mortars need to be used, but these are more difficult to apply, and most tradespeople are not skilled in their use. Grant-funded insulation programmes have not always recognised the challenges of improving energy efficiency in older buildings nor that the measures they fund are not always appropriate. There can also be barriers resulting from conservation area and listed building designations.

Buildings built since the 1920s generally have cavity walls that can be insulated (but note that damp problems that can be caused by doing this if the cavities are not clear of obstructions).

There are therefore two ‘markets’ for retrofit:

- Older buildings that require breathable materials to be used – about a quarter to perhaps one third of properties in Cumbria.
- Modern buildings that can be made more energy efficient by installation of cavity wall and loft insulation, double glazing and draught-proofing.

Tenure types

The different types of housing tenure affect how finance for retrofit is arranged. The distribution of these types of tenure in Cumbria is shown in Section 2 of the Annex. Nationally, the worst housing is often in the private rented sector, where the landlord has to pay for energy efficiency improvements whose benefits go to the tenant in the form of lower bills. Financial support for measures often depends on the financial situation of the tenant, but work is best carried out between tenancies when properties are empty. Social housing landlords generally have more institutional capacity to improve energy efficiency. By far the biggest tenure type is owner occupation – around 70% of properties in Cumbria (in 2011). Nearly 40% of these are owned outright. Most of these will be owned by older people, many retired. Those with incomes low enough to qualify for government grant schemes (for the Green Homes grant this is a household income of £30,000) are likely to be elderly and unwilling to undergo the upheaval involved in having retrofit measures installed.

Ideas for how retrofit for these different tenure types could be arranged, set out in a [recent report by the Green Finance Institute](#), are also shown there.

Standards

A new standards framework for retrofit, [PAS 2035](#), was introduced in 2019, and became mandatory in June 2021. This creates the role of Retrofit Co-ordination to oversee projects, which will mean the training of a new workforce for this role.

Carbon Credits

There is presently no code to allow monetisation of carbon savings from improvements in EPCs, though such a code could probably be quite easily produced using EPCs as a baseline / verification measure. A very rough calculation would suggest that at current voluntary carbon prices (£15 assumed, but this is expected to rise quite substantially), improvements to take a home above EPC level C could be worth some £500-750 per home, which may be a material saving for some residents / landlords.¹ At such values, if all of the homes requiring improvements in Cumbria were addressed, the aggregate value of credits could be of the order of £100+ million, a level that may be of interest to retrofit finance providers as a way of reducing the cost of capital for borrowers. At a national level, based on the Government’s target of six to nine million homes being taken above EPC level C by 2032, the value of credits could be as much as £7 billion, indicating that there may be value in looking to establish an EPC-based voluntary credit.

¹ Assumes a 1.5-2 tonne p.a. saving per home over 25 years. The medium UK home emits 5.5tpa, but the stock in Cumbria is typically less efficient than the UK average

Current Retrofit activity:

Cumbria Action for Sustainability (CAFS) projects:

- ***Cold to Cosy Homes***
 - Advice (currently by phone) on measures needed, behaviour changes, etc.
 - Free LED light bulbs and professional draught-proofing
 - Signposting to support/grants available in local areas for those eligible.Run in conjunction with Local Energy Advice Partnership (LEAP) and councils in Cumbria. Funded by the Energy Industry Voluntary Redress Scheme.
- ***Retrofit for Cumbria***

A new project looking to recruit 35 able-to-pay households wanting to do whole house retrofits for a pilot programme. Working with Carbon Co-op (based in Manchester, with good track record of doing whole house retrofits). Funded by Energy Industry Voluntary Redress Scheme. Co-ordinator at CAFS is Tina Holt.
- CAFS also offer **paid-for services**: telephone advice, home audits and thermal imaging.

Carlisle City Council

- **Home Life Carlisle**

An advice service covering energy retrofit as well as other issues. Gives access to a grants for insulation etc for those qualifying.

Eden District Council

- [Strategic priorities](#) include a **Zero Carbon Housing Retrofit Programme**)
- Have successfully bid for £1.5 million from the **Green Homes Grant Local Authority Delivery Scheme** to retrofit 135 homes. Grants available for owner occupiers of houses with an EPC of E, F or G with an annual household income of under £30,000. Working with E.ON on delivery.

Opportunities

1. **Build the capacity of tradespeople in Cumbria** to do high quality work, using appropriate materials, on older buildings. Key to this could be Ecological Building Systems, a company based in Carlisle (owned by an Irish parent company) that supplies more breathable (vapour open) materials that can be used to enhance insulation and airtightness. Importantly they provide training on how to use these materials. Three companies in Cumbria have been trained and invested in the equipment needed to apply their insulating cork/lime render. The challenge may be that existing builders /tradespeople have enough work as it is and do not see the need to learn new skills and ways of working
2. **Start up a company based in West Cumbria** (as that is where jobs are needed) to provide the range of measures required for a 'fabric first' approach to retrofit, including insulation and draught-proofing for more modern buildings. Key stakeholders in this could be Allerdale and Copeland district councils. A possible model could be YES Energy Solutions based in Halifax, a Community Interest Company that started in 2000 as a division of Kirklees Council (<https://www.yesenergysolutions.co.uk/about/company-history>). If such a company

were set up as a community benefit society it could raise the required start up capital from a community share offer.

Or work with existing heat pump companies (there are installers in Barrow, Ulverston, Penrith and Wigton) so they offer a whole house energy efficiency + heat pump service.

Given the past issues with the retrofit industry any project should ensure that **training, jobs and a stream of work** (through public funding of measures, or attractive loan funding for the 'able to pay') are all provided. Doing any one of these alone will not be sufficient.

Anne Chapman and Ian Callaghan, September 2021

ANNEX - SUPPORTING INFORMATION:

1. Current energy efficiency of buildings (from Appendix 2 of 'The Potential for Green Jobs in Cumbria, CAFS March 2021)

Information on the energy efficiency of buildings in Cumbria has been obtained from the national database of energy performance certificates (EPCs).² EPCs were introduced in 2008 and rate properties as A to G on the basis of their construction, levels of insulation, heating systems, efficiency of lighting, etc. In theory, band D properties use about 4 times as much energy per m² as band A properties and band G properties at least 6 times as much.³ EPCs have to be provided when buildings are sold (including new builds), rented out or to obtain feed in tariff or renewable heat incentive payments for renewable energy systems. The 55% of domestic properties in Cumbria⁴ with an EPC are therefore likely to be more energy efficient, on average, than the properties for which an EPC has not been obtained, as they will include all new homes and all homes with renewable energy systems.

The EPC rating of domestic and non-domestic properties in each district is shown in Figures 4 and 5. Only 0.2% of homes are rated A, 8.6% B and 23.4% C. Almost 70% are D or below.

Of the non-domestic properties with an EPC (it is not known what proportion of the total stock of such properties this is), 1.1% are rated A, but the number at the other end of the scale, in band G is also high at 9.1 %, (only 2.1 % of homes in band G). 66% of non-domestic properties with EPCs are band D or below.

Many public buildings⁵ must have a display energy certificate (DEC). This also gives an A-G rating for the building, but it is based on actual energy use (heating fuel and electricity consumption) not just on inspection of the building. The breakdown of DECs in each district of Cumbria is shown in Figure 6. Just over 10% are A or B rated, with 55% D to G.

It is considered that homes need to be at least C rated if we are going to achieve net zero carbon. It is likely, therefore, that over 70% of homes and a similar proportion of non-domestic buildings will need to be retrofitted to improve their energy performance, given that, on average, properties with EPCs will be more energy efficient than those without.

The current government aspiration is 'for as many homes as possible to be EPC band C by 2035'.⁶ For Cumbria to achieve net zero by 2037 this target needs to be exceeded. The UK Energy Research Centre has recently said:

Almost all of the UK's 29 million homes will require upgrading by 2050, that is about 1 million homes per year, and is equivalent to more than 19,000 homes per week.

² <https://epc.opendatacommunities.org>

³ http://energyrating.org.uk/energy_performance_certificate1.html

⁴ The total number of domestic properties in Cumbria was obtained from www.gov.uk/government/statistics/council-tax-stock-of-properties-2018, to which 2-years worth of new build properties were added, assuming the number per year is the average no of new dwellings per year, 2015-2018 (From p.111 of Cumbria Intelligence Observatory and Nicol Economics, 2019). The 84 dwellings per year for the Lake District NP split equally between Allerdale, Copland, Eden and South Lakeland.

⁵ Those with a total useful floor area greater than 250m², occupied by a public authority and frequently visited by the public (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/452481/DEC_Guidance_rev_July_2015_.pdf)

⁶ p.141 of Committee on Climate Change, 2019.

Current retrofit rates are inadequate for achieving even a significant portion of the required level of decarbonisation to meet the 2050 targets.⁷

Achieving net zero in Cumbria over a fifteen year period requires upgrading at least 220 properties a week to band C or better.

Figure 4.1 Domestic EPCs by District

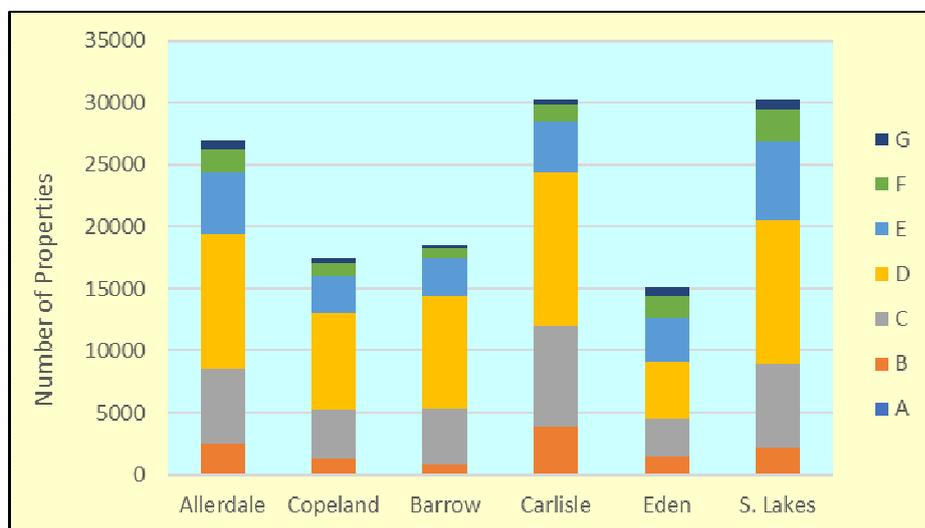
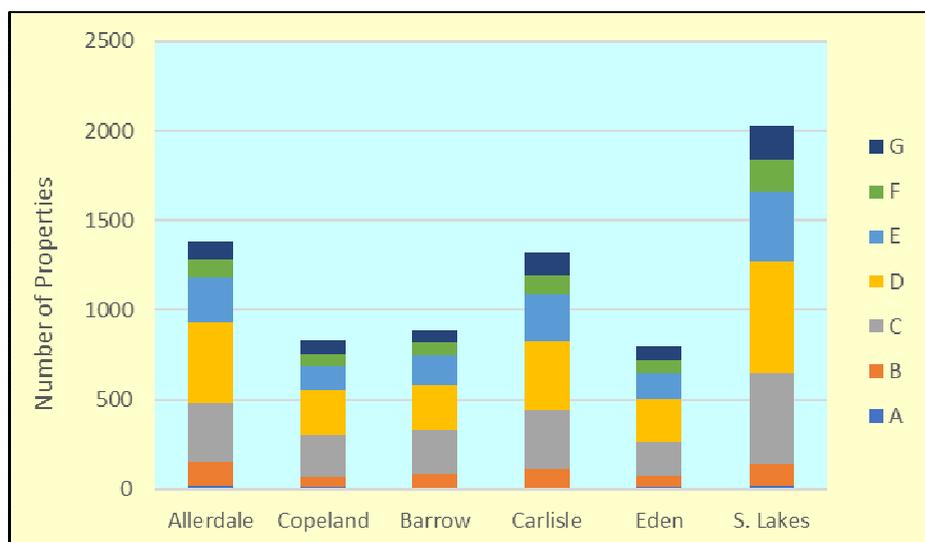
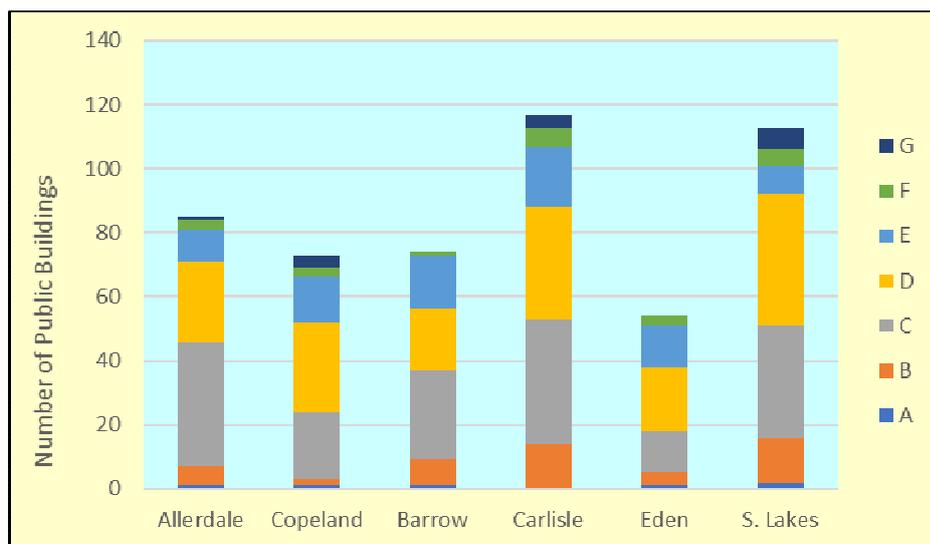


Figure 4.2 Non-domestic EPCs by district



⁷ <https://ukerc.ac.uk/publications/net-zero-heating/>

Figure 4.3 Display Energy Certificates by District



2. Tenure of homes in Cumbria

From <https://www.cumbriaobservatory.org.uk/housing/> Note data is from 2011 census.



Possible ideas for ways of financing retrofit in buildings with different tenure types were put forward in a report of the Green Finance Institute’s Coalition for Energy Efficient Buildings in a report in 2020, reproduced below.

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Lending products	Property Assessed Clean Energy 'style' financing	Financial institutions provide long-term capital for retrofit projects, while local authorities or associated independent third parties collect repayments via an additional property charge that is passed through to the lender.	✓	✓	✓
	Green Equity Release	Enables homeowners over the age of 55 to unlock the equity in their property for investment, with favourable terms to incentivise investment into energy efficient improvements.	✓	✓	
	'Help to Green' Equity Loan	Homeowners can borrow against the equity in their property, in order to invest into energy efficiency improvements. Government support, similar to the Help To Buy scheme, could facilitate favourable borrowing terms.	✓	✓	
	Domestic Energy Efficiency Salary Sacrifice Scheme	A salary sacrifice scheme that allows employees to draw a loan through their employer for investment into home energy improvements, which is repaid via gross salary contributions.	✓		
	Leaseholder Financing	Provides an attractive financing offer to private leaseholders, via social landlords or related intermediaries, to foster positive engagement and consent for multi-property retrofit projects.			✓
	Add-to-my-Mortgage Platform	A digital platform to streamline the process for homeowners to apply for a Further Advance (e.g. additional borrowing on their mortgage) at the 'point of sale' of energy efficiency measures.	✓	✓	

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Saving and investment products	Community Municipal Bonds	Utilises a crowdfunding approach to create an efficient, scalable and cost-effective source of funding for local authorities to finance projects that address the climate emergency.			✓
	Long-Term Retail Investment	Retail investors to provide capital for home improvements, receiving predictable returns from energy-efficient private rental properties	✓	✓	✓
	Energy Saving ISA	Energy bill savings from a retrofit project can be directed towards an ISA or savings product, to help tenants build up their savings for a mortgage deposit or other investments.	✓	✓	

- OO:owner-occupied homes; PRS:private-rented sector; SRS:social-rented sector;
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			OO	PRS	SRS
Energy service products	Insurance-backed Comfort Plans	An insurance-backed guarantee mechanism for 'Comfort Plans' to increase confidence amongst early adopters (e.g. social landlords) and improve the financing available for deep retrofit projects.	✓		✓
	Comfort as a Service	Financial mechanisms to unlock the cash savings in energy efficient and optimised homes, to support the investment case for housebuilders and homeowners to achieve high efficiency standards.	✓	✓	✓
	MEES Compliant Funding	An energy performance guarantee that allows private-rental landlords to procure long-term compliance with MEES requirements.	✓		

Type	Name	Demonstrator description	Tenure		
			OO	PRS	SRS
Guarantee mechanism	Government Guaranteed Financing	A government guarantee to support large-scale retrofit projects in the social housing sector, aimed to scale the supply chain and drive economies of scale that benefit all housing tenures.		✓	✓

* OO: owner-occupied homes; PRS: private-rented sector; SRS: social-rented sector;

3. Age of housing stock from EPCs

Cumbria combined - EPC by age of dwelling

	Total	Pre 1900	1900-1929	1930-1949	1950-1966	1967-1975	1976-1982	1983-1990	1991-1995	1996-2002	2003-2006	2007 -
A	241	3	1	1	6	2	0	5	1	9	7	17
B	11877	51	19	133	120	141	156	278	117	149	248	368
C	32361	1782	1447	2545	5409	2762	2782	3108	1837	2862	2812	1494
D	56483	10424	7278	7207	11302	6393	3209	3357	2355	2982	734	294
E	24927	10234	3797	2535	3218	2199	853	765	359	307	167	75
F	9385	5526	1182	646	837	526	174	154	72	44	8	4
G	3238	2231	396	216	217	98	22	16	5	3	0	2
	138,512	30,251	14,120	13,283	21,109	12,121	7,196	7,683	4,746	6,356	3,976	2,254
		22%	10%	10%	15%	9%	5%	6%	3%	5%	3%	2%

Age of dwelling by district (based on EPCs)

	Pre 1900	1900- 1929	1930- 1949	1950- 1966	1967- 1975	1976- 1982	1983- 1990	1991- 1995	1996- 2002	2003- 2006	2007 -
Allerdale	23%	9%	8%	17%	10%	7%	5%	3%	4%	2%	1%
Barrow-in-Furness	11%	33%	13%	13%	7%	4%	4%	3%	3%	1%	1%
Carlisle	17%	7%	14%	18%	7%	4%	5%	3%	5%	4%	2%
Copeland	20%	8%	9%	23%	9%	6%	6%	3%	3%	3%	1%
Eden	34%	3%	5%	8%	7%	5%	6%	5%	6%	3%	3%
South Lakeland	27%	6%	7%	12%	11%	5%	7%	4%	6%	3%	2%

4. Properties not connected to the gas grid and fuel poverty

(from <https://www.nongasmap.org.uk/>)

District	number of properties	% of non gas properties	% in fuel poverty	claimant count
Allerdale District	46358	30.1	10.5	1032
Barrow-in-Furness District	33957	11.9	14.4	1119
Carlisle District (B)	51232	24.5	10.1	831
Copeland District (B)	34065	24.1	9.8	823
Eden District	26572	66.4	11.4	173
South Lakeland District	57676	43.5	10.1	331