Author	Source	Key Comments
Royal Institute of Chartered Surveyors	Time to Retrofit: Decarbonising UK buildings and economic recovery (Webpage: Time to Retrofit: Decarbonising UK buildings and economic recovery (rics.org))	"*Constructing new buildings is very carbon-intensive, in addition to the emissions produced during a building's life cycle. The focus should be to retrofit the existing stock of buildings to make them more energy-efficient. Retrofitting has the greatest scope for decarbonising the UK building stock and will achieve relatively quick results*." "*Considering the most and least conservative scenarios … for the total number of buildings that can* [be] *refrofitted to improve energy efficiency … the analysis showed that the estimated energy savings achievable from retrofitting the existing building stock could potentially lie somewhere between 51,000,000 kWh up to 182,000,000 kWh saved per annum, combining both residential and non-residential buildings.*"
Financial Times	Rebuild or renovate: the embodied carbon conundrum (Webpage: Rebuild or renovate: the embodied carbon conundrum | Financial Times (ft.com))	"*The embodied carbon in the materials required to build a new home … entails a huge environmental impact. But … when it comes to emissions, customers remain fixated on those generated by their homes, largely ignoring those created during construction*." "*Prioritising operational carbon over embodied carbon in this way misses a crucial point: the emissions generated by construction materials such as a new concrete foundation are already released into the atmosphere, whereas savings made by using a heat pump rather than a gas boiler, or by improved insulation, might take decades to accrue to the same level*." "*Surveys in the US and Europe indicate that constructing a new home produces about 400kg of CO_2 emissions for every square metre. In the UK, the average detached home would therefore create about 60 tonnes of CO_2. That equates to about 15 years' worth of emissions from the average home, using the CCC data, which was calculated in 2014*."
Royal Institute of Chartered Surveyors	Retrofitting to decarbonise UK existing housing stock: RICS net zero policy position paper	"*To fully decarbonise built assets and achieve net zero, both the operational carbon and embodied carbon over the whole life of the asset must be addressed… The built environment sector… has primarily focused on reducing operational emissions, with the embodied aspect of carbon emissions not being fully considered*."

	(PDF: https://www.rics.org/content/dam/ricsglobal/documents/to-be-sorted/retrofitting-to-decarbonise-the-uk-existing-housing-stock-v2.pdf) Urgent action needed to decarbonise UK buildings (PDF: https://www.rics.org/content/dam/ricsglobal/documents/reports/Decarbonising%20UK%20real%20estate%20-%20factsheet.pdf)	"*Energy efficiency is likely to be of 'increasing importance in owner-occupier and investor-owner decisions including those relating to lending and mortgages', and in such this will be reflected 'more clearly in reported property values'*". "*Improving existing stock is essential for reducing carbon emissions from real estate. Buildings that are too costly for retrofitting without financial support will continue to emit large quantities of carbon. Failing to retrofit also means that households and businesses continue to pay high energy bills*." "*The absence of embodied carbon regulations means a significant part of these emissions are uncontrolled and unmeasured. With sparse data on embodied carbon levels in buildings, there is very little incentive to reduce them*."
AECOM	The carbon and business case for choosing refurbishment over new build (Webpage: The carbon and business case for choosing refurbishment over new build (aecom.com))	"*New buildings have been portrayed as a symbol of progress and a thriving economy, but in an increasingly resource-constrained world, should we be so quick to demolish and rebuild?*" *"Together, building and construction are responsible for 39 per cent of all carbon emissions in the world, with operational emissions (from energy used to heat, cool and light buildings) accounting for 28 per cent. The remaining 11 per cent comes from embodied carbon emissions, or upfront carbon that is associated with materials and construction processes throughout the whole building lifecycle."* See figure 3 in the web article.
Clarion Housing	Circular Economy Strategy (PDF: Circular Economy Strategy (goodhomes.org.uk))	"*Based on initial assessment of the 202,000m^2 gross internal floor area (GIFA) Merton Regeneration Project the scale of benefits that may be realised through comprehensive implementation of the Circular Economy Strategy are significant. For the demolition and construction phase benefits could include:* • *£5,000,000 cost savings in waste disposal and materials purchase;* • *16,500 fewer HGV movements;*

		• *7,760 tonnes CO2 e saving, equivalent to the annual operation of approximately 2,000 homes; and* • *122,000 tonnes of virgin material use avoided.*"
Giesekam, J., Barrett, J., Taylor, P. and Owen, A.	The greenhouse gas emissions and mitigation options for materials used in UK construction PDF: The greenhouse gas emissions and mitigation options for materials used in UK construction (strath.ac.uk)	See para 3.5
Historic England	There's no place like old homes: Re-use and recycle to reduce carbon Re-use and Recycle to Reduce Carbon (historicengland.org.uk)	I would say it would be useful to read Chapters 2, 3, and 4. Here is a summary of the case study with the Victoria Terrace: "The Victorian Terrace: this case study involved the retrofit of a Victorian-era red brick end-of-terrace dwelling in the East Midlands, which was retained as a single-family dwelling. The life cycle carbon emissions of these case studies were assessed according to three scenarios: Base-case (Before), Refurbishment (After), New-build" "Refurbishment and retrofit resulted in dramatic reductions in carbon emissions… Carbon emissions are reduced by 60% in the Victorian Terrace case study as a result of energy efficiency interventions. Carbon emissions are reduced by 53tCO2e by 2050 – it would take 10 years for a forest of 12,594 conifer trees to offset this carbon, this represents an area of approximately 5 ha or 7 football pitches." "The construction related embodied carbon emissions from the refurbishment works [of the Victorian Terrace] were estimated to be 2% of the building's total emissions over 60 years. On the other hand, the construction of a new home of the same size produces up to 13 times more embodied carbon than refurbishment. For the New Build, 16.35 tCO2e or 28% of building's total emissions were embodied emissions. Demolition emissions alone account for 4% of carbon emissions from the New Build over the 60 year reference study

		period. It would take ten years for a forest of 3,885 newly planted trees to offset the 16.35 tCO2e of embodied carbon emissions.”
Cardiff University	Homes of today for tomorrow: Decarbonising Welsh Housing between 2020 and 2050 Decarbonising Welsh homes: stage 1 summary (gov.wales)	See Chapter 4.
Empty Homes Agency	New Tricks with Old Bricks: how reusing old buildings can cut carbon emissions NewDocument1 (world-habitat.org)	Read page 12-20.