Building narrative_successful retrofit in practice, explored as a case study

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ABSTRACT

The climate emergency, international decarbonisation targets and the cost of living all necessitate retrofit of the UK housing stock. Current UK good practice retrofit for decarbonisation is system-led, but to meet UN Sustainable Development Goals, retrofit must address decarbonisation, affordable warmth and quality holistically, adding considerable scope and complexity.
Research identifies that decarbonisation is being taken seriously by the social housing sector (Green et al., 2020) but engaging the private sector presents a huge challenge. Retrofit that focuses explicitly on decarbonisation could diminish the distinctiveness of homes and neighbourhoods, missing opportunities to enhance their architectural qualities.
In this paper a case study is used to explore the retrofit process, through the perspective of the homeowner, designer and constructor. The case study subject is retrofit of a terraced pre-1919 dwelling, with characteristics and challenges representative of around 30% of homes in Wales. Analysis of the three perspectives focuses on understanding the related actions of the homeowner, designer and constructor during retrofit. The impact of retrofit is predicted using metrics that include thermal performance and energy efficiency, fuel consumption, carbon in use and embodied carbon.
The paper concludes by analysing the effectiveness of the current RIBA Plan of Work for domestic retrofit and explaining the interconnected contributions required from key stakeholders to ensure sustainable retrofit that delivers a wide range of benefits beyond meeting decarbonisation targets.

KEYWORDS housing, retrofit, decarbonisation, designer, constructor

1. INTRODUCTION

UK Government has committed to meeting international decarbonisation targets by 2050, which requires decarbonisation of the housing sector. At least 80% of the homes that will be in use in 2050 already exist (Office for National Statistics, 2023), and have a considerable carbon footprint. The entire UK housing stock must be retrofitted over the next 25 years if the UK is to meet these legally binding targets.

Recent increases in the cost of energy have had financial implications for every household in the UK, making it clear that decarbonisation must be delivered alongside dramatic improvements in energy efficiency, if it is to be implemented without a significant, adverse and widespread impact on fuel poverty.

The implications of COVID19 and consequent changes in live-work patterns have made people look more closely at their homes, and how well they work (and don't work). As every home in the UK is 'improved' over the next three decades, it is imperative that we consider the quality of the home in parallel to decarbonisation and the cost of living.

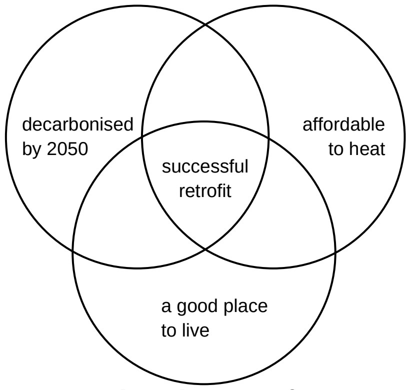

Figure 1: three key retrofit aims

Every home is different. Some differences are minute and transient, while others are more fundamental or immovable. Difference is sometimes celebrated, providing character and identity where sameness and repetition can lead to monotony, and speaks of a focus on cost over quality. In other contexts, consistency may equate with affordability where difference leads to accusations of unfairness, and sometimes to homes that are unfit for inhabitation. While their starting points may be diverse, all homes are shaped in use by the same shifting influences and demands, as they weather the passing of time and are adapted to accommodate the needs of their users. Today, all must be transformed to meet these three common aims (figure 1) which can be read as an interpretation of the ancient principles of firmness, commodity and delight (Vitruvius, 1914). Successful retrofit at the scale required by international targets requires that we collectively develop a singular narrative for retrofit that accommodates, embraces and sometimes promotes difference but also ensures equity, and reflects the global imperative of climate change.

2. METHOD

This paper draws from four research projects undertaken between 2017 and 2022 under the collective title *Homes of Today for Tomorrow*, with the singular aim of understanding how successful retrofit can work in practice. Stage 1 of the work (Green et al., 2018) compiled a pan-Europe review of retrofit case studies to understand current and emerging retrofit best practice. Stage 2 (Green et al., 2019) developed a taxonomy of house type that describe the Welsh housing stock and used case studies to understand retrofit limits. Stage 3 (Green and Lannon, 2020) focussed on the social housing stock, and again used case studies to establish appropriate targets for retrofit, but repeated mistakes made in stage 1 by focussing on retrofit outcome rather than process. Stage 4 (unpublished) used just four 'hard to treat' case studies to engage with a variety of people (clients, designers and constructors) to interrogate the RIBA Plan of Work 2020 (RIBA, 2021). Research has established the need for a different type of case study – a narrative which focuses less on *what* the retrofit consists of, and more on *why*.

For this paper, a theoretical retrofit narrative is constructed from a number of real case studies which have previously been explored in detail. The story is told from three different perspectives, to understand how key stakeholders approach retrofit and have different agendas that inform and redirect the retrofit. Each perspective describes a different part of the retrofit timeline in chronological order, with reference to the work stages outlined in the RIBA Plan of Work, as the single most consistent point of reference for designers and constructors in the UK:

RIBA Stage 0 – the dwelling: what is the context to the case study, and the story so far? What are the issues with the existing house? how might understanding context inform the retrofit aims?

RIBA Stages 1, 2 – the homeowner. What are their needs and aspirations? What advice is available? How does the client build a team and get retrofit underway?

RIBA Stages 3, 4 – the designer. what policy and standards influence the retrofit as planned, and is it helpful? How does the designer measure and report on the impact of the proposed retrofit?

RIBA Stages 5, 6 – the constructor. How is the constructor engaged? What is their agenda? How is progress monitored and compliance checked? What do they gain from the project?

By adopting this structure, the paper explores the effectiveness of RIBA's Plan of Work for domestic retrofit, and analyses how it could be improved. Conclusions are drawn in the form of guidance that could assist in the development of a common retrofit narrative for homeowner, designer and constructor – leading to better, more informed retrofit.

Exclusions: domestic retrofit is notoriously complicated and multifaceted. It was only possible to report on select aspects of retrofit in this paper, and detail is omitted unless relevant to the focus of the paper. Cost of retrofit and forms of appointment are excluded, as they require their own discussion.

3. DISCUSSION

Stage 0: the dwelling

The case study is located on Harriet Street in Cathays, a district of Cardiff. It is situated in the middle of a terrace, part of a network of Victorian streets built when the city expanded rapidly between 1880 and 1900. Before 1880, the ten-hectare territory was a patchwork of fields bounded by simple roads and a modest railway line. By 1900, the area consisted of ten streets and more than three hundred homes, all built to similar designs with consistent materials and methods (see figure 1). In many ways, the case study is typical of the pre-War terraced homes that make up around 20% of the UK housing stock, and almost a third of the Welsh housing stock.

RIBA Plan of Work Stage 0 (strategic definition) requires contextual analysis and a building survey, in order to understand the scope of the project and identify key aims. The dwellings on Harriet Street were all built of solid masonry, mostly facing stone with loose rubble infill and brickwork detailing around window and door openings, and a slate roof. The area is very flat and because of Cardiff's low-lying position there are no basements. Gardens are small. It is a long street of more than a hundred buildings, and the size and detailing of the houses differs on either side of the street and down its length, suggesting that the street was built in short runs to slightly different designs, by a number of builders. The end of the street closest to the city centre appears to have been constructed first, and to slightly more generous space standards, but the whole street was clearly built to provide modest family housing for local workers.

Over five generations (1900-2023), the residents of this neighbourhood have witnessed many changes. Dirt roads are now tarmac; drainage and services run through the ground beneath, including both mains gas and electricity. Toilets have been moved inside, most heat is delivered by gas-fired wet central heating and electric lighting illuminates every home at night (and sometimes during the day).

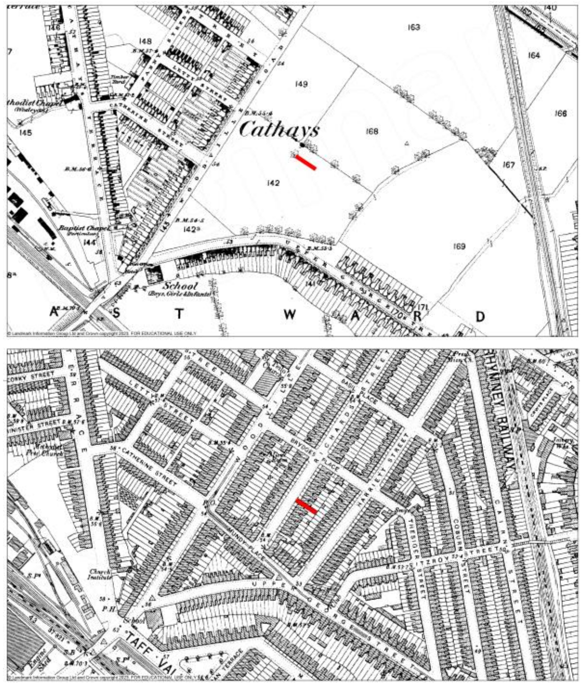

Figure 2 (left) compares OS maps from 1880 (top) and 1900 (bottom), revealing the rate of development and repetition in house type (case study shown in red). "Most of the housing in Cathays is indistinguishable from similar suburbs in Cardiff (Morgan, 2013).

More recently, internal layouts have also been reconfigured. Very few are now occupied by 'nuclear' families. A small number of inhabitants are elderly people who have lived on the street for much of their lives, but most of the dwellings on the street, and those around it, have been transformed into houses in multiple occupation (HMOs). Typically they accommodate student renters, a significant population with the university just a few streets away. Many houses have been treated quite crudely in order to better serve the student rental market. The case study is an HMO with five bedrooms and very modest shared spaces.

The external fabric of the house has not been improved since it was built over a century ago. The original slate roof has been replaced with concrete tiles. A short outrigger projecting from the rear of the house was extended into the garden between 1980 and 1990. This increased the house size slightly but consumed half of the garden, putting much of the outdoor space into shade. The remaining garden is now entirely covered in concrete paving, allowing rainwater to pool around the house. The extension is cavity wall construction, probably with a small amount of insulation in compliance with Building Regulations at the time. A single layer cementitious render has been applied to the entire rear of the property, obscuring most of the original character and trapping moisture in the dwelling.

Internally, some period features remain (see figure 3) but many have been lost through internal reconfiguration of the dwelling, and replaced with inferior additions – for example skirtings, doors and ironmongery. There are several small steps in the ground floor, where the floor slab follows a slight change in level across the plot. It is unclear whether the ground floor was always concrete, or was originally suspended timber. A damp-proof course has been installed but there is localised damp penetration in the external walls. All of the original fireplace openings have been blocked up and chimney stacks no longer articulate the ridgeline. Instead, a gas-fired combi boiler provides both hot water and heating via a wet central heating system. Recent increases in the cost of energy have extended the annual heating bill beyond £3000 per annum. No renewables have been installed.

The biggest impact of this relatively recent change in demographic is its transience. Short leases and the typically poor condition of houses mean that there is no sense of ownership among residents, and little or no desire to improve, or even maintain. Rapid handover from one tenant to the next leaves scant time for repairs, maintenance or improvement, and most landlords actively discourage tenants from making changes that would make the building more homely. This is because straightforward, generic properties are easier to maintain, expectations of quality are low among the student renting population and landlords are primarily concerned short term with a reliable rental income and long-term with the stability of the investment value of the property. The lack of care from both landlord and tenant combined with an annual churn of new inhabitants diminishes the sense of community that was once felt within the street, creating a downward spiral of quality in the built environment and a lost sense of place and neighbourhood.

Figure 3 (from left to right):
The character of the dwelling frontage on the street is mostly intact although replacement windows are poor quality and the front garden offers little benefit.
Hard surfaces dominate the rear garden which is small, overlooked and overshadowed.
The poor quality rear extension is typical of properties on the street, and of this dwelling type.
Some period features remain, but much of the original character has been diminished through poor quality repairs and adaptation, carried out with little sensitivity for building character.

Stages 1 and 2: the homeowner

The homeowner recently bought the house from a private landlord to get out of rental accommodation and onto the housing ladder. They hope to retrofit the house such that it is more suited to their needs as a family of four - back to the nuclear family - and increase its value. They have a common challenge; there is a lot they would like to change about the house, but their budget is limited and they cannot afford to spend a long period of time living in rental accommodation while also paying a mortgage.

The Energy Performance Certificate (EPC) accompanying the house places it the ‘D’ band, but underestimates actual energy costs by a considerable margin. EPC guidance suggests that they consider small improvements such as draught-proofing and low energy lighting, but does not help them understand what aspects of the house are in need of attention, or how they might go about any changes. The home survey that was a mandatory part of the homebuying process is also unhelpful, only identifying that solid walls may lead to damp, condensation and mould growth if left untreated.

The homeowner must now begin the process of deciphering how their new home performs (technically, functionally, socially and spatially), and consequently how it might work better if certain changes are made (RIBA Stage 1, preparation and briefing). Fred Scott, *on Altering Architecture* (2008), makes the case that there is a tendency to seek architectural responses that propose improvement by optimising functional performance, but very often optimal functional performance is a difficult thing to pin down, and doesn’t necessarily encompass more human and sensual, and perhaps more important, qualities of a place. Indeed, during this initial analysis, the client must consider to what degree the property will be adapted to meet their current and future needs, and to what degree their behaviour might adapt to reflect the specifics of their new home. “There is usually over time an interaction between the built form and its occupants that is like chemistry... The idea of alteration is to offer an alternative to preservation or demolition, a more general strategy to keep buildings extant beyond their time, that is to be inhabited, occupied.” (Scott, p.10, 11)

It is clear to the homeowner that they must make changes to their new home, which has a combined kitchen and living room, both very small, and no dining room. They would like to restore communal spaces downstairs, and open up the living and dining rooms to create more generous spaces. They would like to add another bedroom for future flexibility. They are also unhappy with the garden provision, which is too small and overshadowed for their children to play in it.

After undertaking extensive research, most of which they find confusing or inconclusive, the homeowner contacts a number of locally based construction companies. One of them visits the property to discuss the changes they would like to make. The constructor explains permitted development rights, which allow the homeowner to consolidate the existing rear extension with another small extension, and convert their loft-space into a bedroom, without planning approval. They explain that if planning approval is needed, the retrofit is likely to be prolonged by at least three months, extending the period of time for which the house is difficult to live in, and the family are financially vulnerable. This increases the likelihood that work will not happen, with no guarantee that planning approval will be granted. The constructor agrees to provide a quotation for drawing up plans for a retrofit within permitted development rights (using a locally based architectural technologist they have a working relationship with), obtaining Building Regulations approval and carrying out the work. The client asks about energy efficiency, and the constructor advises that predicted fuel costs will be provided as part of a SAP calculation, but not until they are needed as part of the Building Regulations approval package (Stage 4).

The quotation is significantly more than the homeowner can afford. They speak at length to family and friends, unearthing similar stories. The homeowner's mother makes a suggestion. She has been living alone in a large house, and would like to spend more time with family. She proposes that if the works include provision for a self-contained apartment, she would be willing to sell her home and part-fund the retrofit. This more complex scenario appears to warrant expert input, and further research leads the household to the RIBA's *Find an Architect* service, which provides details of locally based architectural practices that undertake domestic retrofit projects.

Stages 3 and 4: the designer

The designer works at the first architectural practice approached by the homeowner. The practice recently decided to make retrofit a core part of their business, anticipating increasing amounts of work due to the cost of living crisis and looming international decarbonisation deadlines. Their website showcases carefully taken photographs of retrofit undertaken in conservation areas and on listed buildings, mostly with contemporary language that is sympathetic to the host historic buildings.

The designer visits the homeowner at their home, just a few miles from the practice office. She is familiar with the building type – a pre-War terraced house that has seen little maintenance and even less modification for around forty years. She advises that the household's spatial and functional aims appear straightforward, but incorporating separate spaces for an older relative will require more analysis. Her particular concerns are that the existing house is enclosed on three of its four sides (removing the possibility of separate access), and if the house becomes too deep, internal spaces will be dark and disconnected from outside. She notes that planning approval and a party wall notice will almost certainly be required for work this extensive, and her fee will have to reflect this.

The improvement in energy efficiency required by the household is less clear. Recent increases in the cost of energy have made it critical that most retrofits improve energy efficiency, to make comfort affordable. Many domestic clients seek to understand the balance between the capital cost of retrofit and the impact on annual energy costs. For some homeowners, energy efficiency is a primary concern, particularly if they see the dwelling as a long-term *home for life*. For a small percentage of clients, the wider environmental impact of their home is a key concern and energy efficiency an absolute priority. These different agendas describe a broad spectrum of aspirations.

The designer speaks with the homeowner about statutory standards for thermal performance and energy efficiency prescribed by UK Building Regulations, which are likely to be an absolute minimum if both decarbonisation and affordable fuel bills are considered important. The Building Regulations adopt a piecemeal approach to improving energy efficiency based on *consequential improvement*; performance of the building only need be improved when 50% of an individual element (a wall, floor or roof) or 25% of the total building surface area is being changed in some way. In contrast, for many years good practice has consistently advocated *whole-house fabric first* retrofit, whereby the dwelling is perceived holistically as an integrated system, and the building envelope is improved to a consistent standard, designing out potential weak points and minimising energy use.

She also introduces two voluntary standards used widely in the UK. EnerPHit brings the rigorous Passivhaus standard to retrofit, with demanding targets and a total focus on minimising energy consumption, such that a conventional heating system is not needed. As the guidance notes, "A radical whole house retrofit is likely to achieve the best results both in terms of energy reduction and comfort. However, this is a significant undertaking which could take place over several years. Getting the sequence right and decisions in the early phases are critical to ensure that the full potential of the retrofit is realised and that the project doesn't inadvertently result in carbon lock-in" (EnerPHit, 2023) The Climate Emergency Retrofit Guide (LETI, 2021) offers a range of slightly less stringent retrofit standards, but extends its influence from energy and carbon in-use to embodied carbon. A recent supplementary LETI publication includes worked examples for a range of house types, with different standards for unconstrained and constrained retrofit (constraints usually arise from perceived character of a building or neighbourhood). Sensibly, "space heating demand, hot water demand and Energy Use Intensity targets have been developed for when predictive energy modelling can be carried out. Fabric and system targets have been developed in tandem and these can be used when detailed energy modelling is not possible or financially feasible, for example on a small project." (LETI, 2021, p.9)

Element	Welsh Bldg. Reg.s part L (2023)*	LETI constrained retrofit (2021)	LETI exemplar retrofit (2021)	Passivhaus EnerPHit (2022)
walls	0.18-0.30 W/m^2.°C	0.32 W/m^2.°C	0.15 W/m^2.°C	0.10-0.15 W/m^2.°C
floors	0.15-0.25 W/m^2.°C	0.20 W/m^2.°C	0.15 W/m^2.°C	0.10-0.15 W/m^2.°C
roof	0.13-0.16 W/m^2.°C	0.12 W/m^2.°C	0.12 W/m^2.°C	0.10-0.15 W/m^2.°C
glazing	excl. / 1.4 W/m^2.°C	1.30 W/m^2.°C	0.8 W/m^2.°C	0.85 W/m^2.°C
air tightness	unconstrained	3 ac/hour@50Pa	1 ac/hour@50Pa	1 ac/hour@50Pa
thermal bridging	unconstrained	0.10 W/m^2.°C	0.08 W/m^2.°C	<0.01 W/m^2.°C
heating system	unconstrained	ASHP+MVHR	ASHP+MVHR	any+heat recovery
renewables	none required	if permissible	PV: 40% of rooftop	none required
energy for heating	no holistic target	60 kWh/m^2/year	20 kWh/m^2/year	25 kWh/m^2/year

*U-values for Welsh Building Regulations relate to new elements (lower value) and existing elements (higher). UK Building Regulations are less stringent. Historic (Listed) buildings are excluded from compliance.

Table 1: comparison of retrofit standards

The meeting goes well, and the designer is appointed. Over a period of weeks, in consultation with the homeowner, she develops a proposal to transform the house in accordance with the future needs of the multigenerational household by reconfiguring the ground floor as a pair of homes that share living spaces, using small, well located courtyard gardens to provide light and views throughout (see figure 4). Given the relatively modest fees agreed, the designer relies on their own expertise, and no other consultants are involved at this time. These drawings are then submitted to the local planning authority for approval (RIBA stage 3), who promise to arrive at a decision in 8-12 weeks.

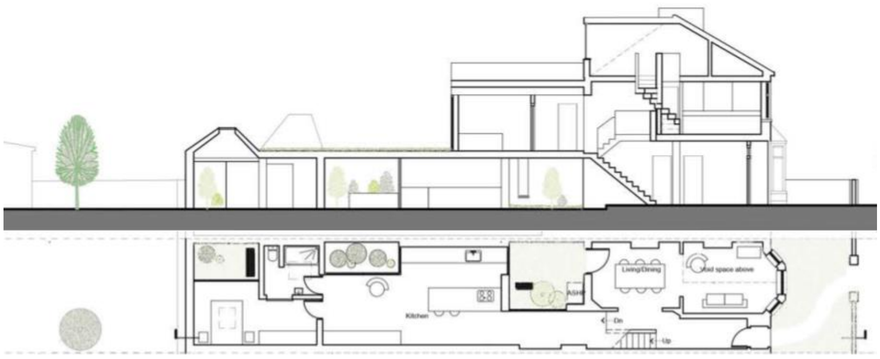

Figure 4: The designer proposes to meet the needs of the combined households through a ground floor of connected spaces interlocked with small, valuable gardens.

To avoid losing more time the designer is paid by the homeowner to work at risk, developing the proposal into a detailed tender package that constructors can bid against. This work takes a further two months and includes production of the first SAP calculation, providing the homeowner with an estimate of energy costs. On the basis of this simple modelling, further changes are made to the proposals, and the decision is made to add roof-mounted photovoltaic panels to the scope of works. This package of drawings and a specification is then issued to three local constructors (RIBA stage 4).

Stages 5 and 6: the constructor

The constructor owns a small contracting business. Most of their work is domestic retrofit and extensions in the Cardiff area, and they typically only have one or two projects ongoing at any time. The constructor was one of three parties bidding for the work when they put together a tender return with support from a known quantity surveyor. They visited the property and met the householder prior to quoting, and are familiar with the project location and building type, having undertaken retrofit on similar dwellings. They like to keep busy, but are reliant on satisfied clients and word of mouth for future business. They priced the work competitively, with a reasonable profit margin and a contingency for risk which they make transparent – in their experience, unanticipated issues are commonplace in older houses and tight urban contexts, although the ex-rental property will have been subject to regular statutory checks. The proposal described by the designer is complicated, and squeezes a lot into the ground floor, but makes sense. Some of the details developed by the designer are not how the constructor would want to build them, and others will cause issues with Building Control. The constructor anticipates that changes will be needed as the scheme progresses, and puts a provisional sum in his fee bid to cover this. This level of consideration seems to be well received by the homeowner, who accepts the constructor's fee quote.

A few weeks later, planning approval is granted and the project can move forward. The designer's involvement comes to an end at this point, although she does tell the constructor that she would like to see the finished scheme, and is happy to respond to any questions that arise. The constructor is in regular contact with local authority Building Regulations officers, and recommends to the homeowner that they use the *Building Notice* route to compliance. Unlike a full plans application, this approach is only for smaller projects, and does not result in a formal approval certificate. However it enables a quick start (just two days from registering the project) and requires less information up front, providing more room to manoeuvre on site.

The project gets underway quickly. As the existing building is opened up alongside a dialogue with Building Control, unanticipated complications necessitate that small changes are made to the proposal. While these changes are not big enough to compromise the planning approval, they do impact on some of the designer's original intentions. The constructor finds that the householder does their best to understand issues and agree changes as they arise, but that they are not very well placed to make informed decisions. They tend to be led by the advice of the constructor, and focussed on avoiding delays to the retrofit. As the project progresses, the constructor proposes further changes to improve the cost effectiveness of the project that will save both themselves and the client money. The homeowner accepts most of these changes, and appears to appreciate the savings that they offer.

The retrofit is completed on time, in part because of changes agreed between the constructor and the homeowner. The project runs a little over budget, but within the contingency allowed by the constructor. When the designer visits the home a few months later, she seems a little dismayed by some of the changes that were agreed, in particular the substitution of sustainable, low carbon materials for cheaper alternatives such as uPVC windows and composite cladding boards. For the most part, the homeowner is happy with the outcome of the retrofit, although there are quite a few loose ends, they were expecting the garden areas to be completed to a higher standard, and their energy use (in particular heating bills) does seem higher than was predicted by the SAP modelling.

4 RESULTS

proposed work	size of home	Space heating kWh/m^2	SAP10 predicted fuel cost	SAP rating	EPC	% decarb. vs. 1990	embodied Carbon $kgCO_2$	Current (2022) fuel cost
Existing property, last refurbished in 1990	4b5p	127	£1096	64	D	34%	Nil	£2,457
Building Regulations-compliant systems-led low carbon retrofit	4b5p	160	£1315	57	C	83%	8,525	£3,210
LETI compliant whole house retrofit (constrained)	4b5p	70	£800	74	C	89%	15,950	£2,105
LETI compliant retrofit + multi-gen conversion (constrained)	5b7p	40	£786	81	B	90%	19,545	£2,074
LETI compliant retrofit + multi-gen conversion (constrain) +PV	5b7p	40	£352	92	A	95%	40,025	£1,141

Table 2: energy efficiency, decarbonisation and fuel costs, predicted for a range of retrofit scenarios

Results show that if retrofit complies with Building Regulations but focuses on installing low carbon heating, annual fuel bills can increase considerably, increasing fuel poverty. Careful retrofit can simultaneously decarbonise, increase quality (space standards, usefulness) and improve performance (reducing fuel bills). Holistic retrofit to a higher standard (e.g. LETI or EnerPHit) without renewables can decarbonise while maintaining fuel bills at current levels. Holistic retrofit with renewables (typically PV) can cut fuel bills in half, keeping households out of fuel poverty as energy costs rise. PV comes with a considerable embodied carbon footprint. Some of this work can be done within (and linked to) Permitted Development rights, but some requires planning approval. The extent of work that falls within Permitted Development rights is critical in determining the scope of many retrofit projects. However, EPC A and international decarbonisation targets are only achieved through an imaginative, non-standard approach to retrofit that requires engaged consultants with considerable expertise.

5 CONCLUSIONS

Prior research has established that case studies are essential to both exploring and explaining retrofit. This paper demonstrates that it is difficult to describe retrofit case studies concisely, and there is a tendency to focus on targets and outcome rather than process. However, much of the valuable learning in retrofit relates to *why* decisions are made rather than *what* decisions are made.

There are few opportunities to encourage retrofit in the private sector, but point of sale provides one. Further research is needed urgently to understand how to undertake retrofit of the private sector fairly, reliably and affordably, if this opportunity is to be exploited by 2050.

The homeowner, designer and constructor have some common concerns but also divergent aims, and will interpret and influence retrofit in different ways. The homeowner, as end user, may be best placed to dictate functional and organisational requirements of retrofit, but may not articulate them well. The designer, if suitably qualified, will be able to understand and interpret the homeowner's needs, offer sound advice and develop an appropriate retrofit proposal. The RIBA professional code of conduct requires that they also have due regard for the wider climate agenda. Designers working on heritage buildings must have a heritage qualification. For the constructor, the drawings and specification appended to their appointment will dictate the scope of retrofit they must undertake, but they must coordinate delivery of these works alongside concerns about cost (and profitability), labour, materials, technical performance and statutory compliance.

The aims of each party must be transparent at the outset, if retrofit is to be deemed successful. Potentially important concerns such as reducing embodied carbon can be lost in translation. The role of the designer is critical in synthesising the hopes and dreams of the homeowner with the technical direction required by the constructor, along with any overarching retrofit aims. It is not clear that a Retrofit Coordinator (as defined by PAS2035 – see BSI, 2023) will have sufficient skills and expertise to replace a qualified Architect as designer of a complex domestic retrofit.

Newbuild projects can be mapped as a linear, sequential process. The development of many retrofit projects is not linear. What appear to be small or unanticipated changes can have substantial impact on a retrofit project, and may necessitate significant redesign, cause abortive work, and even affect viability. The current (2020) RIBA Plan of Work does not adequately describe the domestic retrofit process. A better template would be more specific to retrofit, and encourage overlap of key stages through more cyclical planning and better collaboration.

For the same reasons, the traditional approach to construction whereby a designer develops a proposal and then hands responsibility for its delivery to a constructor is unhelpful in domestic retrofit. The different stakeholder agendas can be connected if homeowner, designer and constructor co-develop, and commit to, a shared set of project aims at the project outset. Collaborative forms of contract provide templates for this approach.

The designer and the constructor should be involved from the briefing stage, to enable better decisions from the outset, avoid abortive work and improve efficiencies. A recent trend for practices to offer combined design-build services proposes a model which could be extended to more typical businesses that only work in one domain through initiatives that partner designers with constructors. A collaborative approach would see the designer act as lead consultant for the early stages, diminishing to a 'guidance' role. The constructor would begin by providing critical advice and support, taking over as lead consultant as works progress to site. If designers and constructors developed closer working relationships, this approach could be cost-effective and lead to better, more successful retrofit.

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