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Article

Residents' Values: Co-Designing Social Housing Retrofit

Saskia Furman [1,*], Karim Hadjri [2], Anna Martínez Duran [1] and Xavier Martín Tost [1]

[1] School of Architecture La Salle, Ramon Llull University, 08022 Barcelona, Spain; a.martinez@salle.url.edu (A.M.D.); xavier.martin@salle.url.edu (X.M.T.)
[2] Sheffield School of Architecture and Landscape, University of Sheffield, Sheffield S10 2TN, UK; k.hadjri@sheffield.ac.uk
* Correspondence: saskiarebecca.furman@salle.url.edu

Abstract

Residents' values in social housing retrofit extend beyond energy efficiency targets to encompass complex social and physical considerations, shaping their acceptance and experience of interventions. These values appear to influence retrofit success yet are often overlooked in policy and practice that prioritise technical performance. This paper investigates what residents value in social housing retrofit through a focus group method with the Sutton Estate in London, combining institutional stakeholder (housing association and architect) and resident perspectives. Content analysis of focus group questionnaires, discussions, and consensus-building activities revealed four key resident values: (1) *good stakeholder relationships*, emphasising trust-building through personal connections; (2) *access to information*, requiring clear, continuous communication through multiple channels; (3) *comfort, health, and safety*, integrating physical and mental wellbeing; and (4) *building and community longevity*, focusing on preserving building character and social sustainability. The findings suggest that social housing retrofit may benefit from a holistic approach integrating residents' values throughout the project lifecycle, addressing the social, physical, and long-term sustainability of homes and communities. The findings highlight the importance for housing associations, architects, and policymakers to consider residents' values when developing retrofit strategies, balancing technical requirements with residents' needs and priorities.

Keywords: social housing; retrofit; focus group; codesign; sustainability; resident values

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1. Introduction

Social housing retrofit is crucial in achieving ambitious EU and UK climate targets [1,2]. The 2021 EU Energy Performance of Buildings Directive (EPBD) recast prioritises the "energy performance of buildings housing vulnerable households" [3,4] (p. 10). Implementation is supported by the EU's Next Generation Funds and the UK's Warm Homes Plan (WHP) [5].

Social housing in the UK is formally defined under Section 68 of the Housing and Regeneration Act 2008 as low-cost rental and ownership accommodation made available to households whose housing needs cannot be adequately served by commercial markets [6]. The National Housing Federation emphasises that affordability, rather than provider type or specific tenure arrangement, remains the defining characteristic of social housing provision [7]. This study focuses specifically on social rental housing, where dwellings are owned by housing associations or local authorities and rented to tenants at below-market rates [8].

Social housing tenure status is relevant for investigating retrofit strategies because although social housing residents are the end-users, they lack ownership and decision-making power over housing improvements. This creates a unique context where retrofit success depends heavily on engaging residents who possess invaluable "situated knowledge" [9] about their homes' performance, comfort needs, and community dynamics but lack formal decision-making power. Karvonen [10] explains, however, that meaningful participation should treat residents as experts in their own housing experiences rather than passive recipients of technical interventions.

According to Thuvander et al. [11], the term "retrofit" emphasises elevating buildings to higher standards. Fawcett [12] further explains that retrofit encompasses the modification of existing buildings to improve energy performance, comfort, and functionality, ranging from minor upgrades to comprehensive interventions that can achieve substantial reductions in energy consumption of 60% or more. Deep Energy Retrofits (DERs) aim for 60–90% energy performance improvement, with some standards defining specific targets, such as the EnerPHit (Passivhaus retrofit) standard, which requires heating demands to be below 25 kWh/m^2/year [12]. These standards prioritise environmental sustainability over social sustainability.

Dempsey et al. [13] explain that social sustainability encompasses two key dimensions: social equity, ensuring equitable access to services and opportunities; and sustainability of community, supporting social interaction, community stability, and residents' ability to maintain viable communities over time. Recognising this broad understanding of social sustainability, recent studies [14–16] highlight resident inclusion in retrofit to ensure fairness and equity [17]. This is particularly true for marginalised groups. Sunikka-Blank et al. [18] found that retrofit preferences vary across socio-economic groups, emphasising residents' unique knowledge as "experts and authorities in their own experiences" [19] (p. 106), supported by multiple studies [14,16,20,21].

Collaboration between housing retrofit consumers and producers can create effective socio-technical systems [22] that combine stakeholder perspectives to generate "transformative knowledge" [9]. On the other hand, Morgan et al. [23] identified four key retrofit barriers: insufficient communication, monitoring system misuse, digital exclusion, and disruption. To generate this transformative knowledge and mitigate retrofit barriers, the literature emphasises early resident engagement [24,25], collaborative decision-making [23], feedback integration [16,20], safeguarding future systems use [14,19], and addressing social needs alongside environmental goals [23,24].

Residents' values encompass the priorities, preferences, and beliefs that social housing residents hold towards their homes and communities, including such aspects as sense of place [26], comfort [26–28], building character [26,29], practical functionality [27], and safety considerations [18]. Femenías et al. [29] and Wise et al. [26] show that residents' values are often overlooked in policy- and expert-led technical approaches, yet values strongly influence which retrofit measures residents consider acceptable to implement [26].

Developing an understanding of residents' values in retrofit should involve multiple approaches. Quantitative methods measure predefined benefits [27], while co-design methods capture value negotiations [28]. Murillo Camacho et al. [30] advocate balancing residents' values with sustainability goals through meaningful engagement in decision-making, noting potential conflicts with official value systems such as international conventions.

Co-design is underpinned by Arnstein's [31] "Ladder of Citizen Participation", which emphasises stakeholder partnerships over tokenism, involving users throughout processes, rather than limiting them to stages [32]. Discussing how to utilise co-design, Armeni [33] points out that care must be taken to avoid superficial approaches to justify pre-determined decisions. Luck [34] champions open dialogue to reveal tacit knowledge and user prefer-

ences, while Sanders & Stappers [35] operationalise this with three main approaches to co-design: (1) probes, eliciting user response; (2) generative toolkits for future scenarios; and (3) prototypes manifesting ideas. Sanders & Stappers [36] explain that researchers should act as facilitators, rather than translators, between designers and end-users to enable mutual learning.

Co-design is a collaborative approach that positions end-users as partners in the design process, involving residents throughout project development rather than limiting participation to the consultation stage [36]. Specific to social housing retrofit, co-design incorporates residents' lived experiences into design solutions, offering advantages in adaptability, balanced development through information sharing, and social acceptance through shared values [28]. Lane [37] describes public participation in planning as integrating local knowledge and preferences with technical expertise, combining transactive planning theory's direct designer–user collaboration with communicative theory's focus on dialogue.

Residents often value retrofits' non-energy benefits (NEBs) more than energy benefits [15], particularly in social housing [38], and co-design enables collaborative upgrade prioritisation while simultaneously encouraging smarter energy use. This approach can lead to contextually appropriate improvements that enhance users' quality of life.

Emphasis on technical performance targets in retrofit projects, however, has overlooked resident values in social housing. Understanding their values is essential for housing experts to improve retrofit acceptance, technology adoption, and sustained community benefits. While the recent literature has investigated resident engagement [14,23], and socio-technical integration [19,22] and acknowledged resident values [16,29], evidence for identifying residents' values for integration remains limited. Alhough co-design shows promise in social housing contexts [15], its application to retrofit projects remains understudied. Therefore, this research was designed with the following objectives:

1. Identify and analyse social housing residents' values in retrofit through a focus group with residents and institutional stakeholders.
2. Examine how co-design can be used to integrate resident values with technical performance requirements.
3. Develop key principles for housing experts to enhance retrofit outcomes through value-based resident engagement.

A co-design methodology captures stakeholder interactions and facilitates knowledge exchange [36]. In this case, it is possible to evaluate the decision-making process in relation to residents' values.

2. Materials and Methods

This research aims to identify residents' values in social housing retrofit, evaluate collaborative decision-making methods, and develop principles to inform decision-makers. The focus group method explored complex issues through group discussion, revealing both resident and institutional stakeholder perspectives. Values were identified through qualitative content analyses of focus group data [39] to extract findings from individual questionnaires, group discussions, and consensus-building activities. An inductive approach allowed categories of values to emerge directly from participant responses rather than imposing predetermined frameworks [40].

A case study was selected through convenience sampling [41] based on inclusion criteria essential for accessing and investigating resident values: social housing residents, energy efficient retrofit, active resident engagement, and European location. The Sutton Estate in London took a hybrid approach to decision-making, combining top-down technical requirements with bottom-up resident input, offering rich contexts to examine how

institutional and resident priorities interact in retrofit processes. Initial site visits and attendance at Resident Steering Group (RSG) meetings confirmed suitability and facilitated focus group recruitment through the Housing Association's (HA) regeneration team. As this research is part of RE-DWELL, a European research project investigating affordable and sustainable housing, access was facilitated via the RE-DWELL consortium partner Clarion Housing Group—owner and manager of the Sutton Estate.

2.1. Case Study Context

The Sutton Estate in Chelsea, London, was established in 1912–1914 as social rental housing, funded by philanthropist William Sutton. Today, it is owned and managed by the Clarion Housing Group. The estate has undergone major regeneration since 2014, with a revised design direction occurring in 2018 following the rejection of an earlier planning application. Three regeneration strategies were involved in this new approach:

1. DER in four blocks, empty for six years, aimed to reduce energy consumption from 208 kWh/m^2/year to 111 kWh/m^2/year, a 38% reduction [42], through measures including enhanced insulation, double-glazed windows, and a Ground Source Heat Pump (GSHP).
2. A thorough maintenance and upgrading strategy in 11 blocks, with residents in situ. Upgrades included triple-glazed windows, improved airtightness, and hybrid boilers.
3. Comprehensive landscaping, including communal gardens with seating, sustainable drainage, limited parking, and efforts to increase cycling.

Completed in late 2024, the project has won a Building with Nature award [43], and all dwellings remain as social rental housing. In this case, residents rent their accommodation with secure or assured tenancies that provide long-term housing security. As secure tenants, residents can normally live in the property for the rest of their lives, provided that they do not break the conditions of the tenancy [44]. Existing residents pay social rents for the four DER blocks, while new residents pay Local Affordable Rent rates, both of which are significantly below Chelsea's private market rates and subject to government-capped annual increases [45,46]. This combination of tenure security and regulated affordability provides residents with long-term housing stability, making their perspectives on retrofit improvements particularly valuable for sustainable housing outcomes.

The focus group for this study took place in May 2024, during the final stages of construction but before project completion. The Sutton Estate's selection for this focus group investigation was particularly strategic given its demonstration of resident agency transforming institutional decision-making processes. When the previous housing association proposed demolition and partial privatisation in 2014, residents launched the successful "Save Our Sutton" campaign [47], securing a rejection of the demolition proposal in 2018 [48]. Therefore, the estate's progression from this threatened demolition to award-winning retrofit through resident activism provides a unique context for examining how collaborative governance models function in practice rather than in theory. Moreover, this case offers insights into resident values within an already-established culture of meaningful participation, distinguishing it from estates where resident engagement begins from baseline consultation approaches.

At the time of the focus group, the four DER blocks remained empty, while residents continued to live in the eleven blocks undergoing maintenance and upgrading in situ; resident participants lived in the occupied blocks. However, the focus group discussions evaluated the overall decision-making process for the entire estate regeneration, including both the DER and maintenance programme. This approach enabled investigation of residents' values and retrofit priorities, focusing on the process of decision-making and residents' experiences during regeneration rather than post-completion performance assessment.

2.2. Sampling of Participants

Participant recruitment followed a convenience sampling [41] approach facilitated by Clarion Housing Group's Head of Regeneration (Table 1), who served as the primary gatekeeper for accessing the estate community. Initial contact was established through this gatekeeper, who provided introductions and permitted attendance at the RSG meetings. This enabled direct engagement with residents already involved in the retrofit decision-making process. Following initial contact, recruitment continued through snowball sampling, where participating residents referred other community members who had experience with the retrofit process. This methodological approach resulted in four resident participants: three volunteers from the RSG, plus one additional resident who joined spontaneously during the focus group setup. Two HA participants were recruited from this team due to direct involvement in the retrofit project. The architect participant was nominated by their firm following a site visit. All participants were female and met the inclusion criteria of being directly involved with the retrofit project either as residents or professionals.

Table 1. List of interview participants.

Acronym	Stakeholder	Age Range	Occupation
R_1	Resident	60+	Retired
R_2	Resident	41–59	Off ill due to chronic illness
R_3	Resident	41–59	Housewife
R_4	Resident	60+	Retired (management)
HA_1	Housing Association	41–59	Regeneration manager
HA_2	Housing Association	41–59	Head of regeneration
A	Architect	41–59	Architect

Ethical approval was obtained through the RE-DWELL project's Ethics and Data Management Committee, following European Commission guidance and GDPR requirements. All participants provided signed, informed consent after receiving participant information sheets detailing this study's purpose, confidentiality commitments, and their right to withdraw. Data collection and storage adhered to GDPR guidelines, with all recordings and transcripts stored securely and anonymised.

2.3. Focus Group Activities

The focus group took place on site and in a community room within the over-55 housing block. Two tables contained refreshments, and chairs and sofas provided seating. Paper hand-outs included presentation slides, questionnaires with open-ended questions, and a five-point Likert scale activity. The 90-min focus group was structured through the following activities: ice-breaker, project introduction, individual questionnaires, group discussion, and group activity. Activities were designed as a progressive sequence: individual questionnaires captured personal perspectives, group discussion of the same questionnaires generated debate and consensus-building through collective discussion, and Likert scale exercises enabled structured comparison of priorities across different stakeholder groups. Questions were developed from literature review findings to investigate the following:

1. What do residents value in retrofit, beyond energy performance?
2. How can resident participation in social housing retrofit increase sustainability beyond carbon performance targets?

Generative toolkits [35] were developed to discuss scenarios. During the icebreaker, participants identified the housing upgrade most important to them. A questionnaire was

completed twice: first individually with pen and paper and again as one group with a facilitator to generate debate and reach consensus. The questionnaire comprised of one scale-of-importance and four open-ended vignettes. The five questions covered interconnected areas of retrofit decision-making, capturing residents' values across technical preferences, design priorities, participatory processes, social outcomes, and retrospective evaluation of the retrofit process, providing comprehensive coverage of resident perspectives throughout the retrofit lifecycle. Participants were then divided into two facilitated groups to answer Likert scale questions. Following Sanders and Stappers' [36] framework, facilitators provided both structured guidance and creative freedom while ensuring balanced participation. Sessions were documented through audio recordings and notes.

As part of the RE-DWELL project's implementation, the European Commission offered ethical guidance to be followed as part of the ESR management structure. The network management structure includes an Ethics and Data Management Committee responsible for the fulfilment of ethics and data management compliance in line with the EC guidance and the ESR projects, which include this study. Ethical clearance, consent, and data protection and storage adhere to the guidelines of La Salle, University of Ramon Llull, and this study was conducted in accordance with Regulation (EU) 2016/679 (General Data Protection Regulation), confidentiality principles, and national laws.

3. Analysis and Results

Following digitisation and transcription of questionnaires and Likert scale answers (Table 2), Hsieh & Shannon's [49] conventional qualitative content analysis addressed the research question "What do residents value in social housing retrofit?" This inductive approach was selected because existing knowledge about residents' retrofit values is fragmented [40]. Stemler's [39] systematic technique was used to compress text data into meaningful content categories. Through a critical realist lens, the analysis acknowledged how power dynamics shape stakeholder narratives while valuing their experiences, progressing from semantic to latent meaning through iterative review.

Table 2. Results of the Likert scale exercise.

Statement	Answers *	
	High-Level Stakeholders	**Resident Stakeholders**
The needs of the building infrastructure dictate the design choices.	1	5
Each building is different therefore a bespoke approach is needed every time.	5	5
Non-energy benefits including daylight, spatial room design, comfort, health benefits and others, are more important that energy performance benefits.	3–4	3–4 Dependent on personal circumstances
Open and honest communication between all groups is key to retrofit success.	5	5
Joint decision-making should occur by speaking with residents to collect their needs and wishes, then using these as design input.	5	5
Trust building between the three groups is key to engagement, beginning with cultivating a supportive environment with residents as integral team members. Engaging residents early in the design process builds personal relationships, streamlines decision-making, and reduces conflict.	5 Timing—not "early"	5

Table 2. *Cont.*

Statement	Answers *	
	High-Level Stakeholders	**Resident Stakeholders**
Social value for existing residents should be a priority in decision-making. E.g., activities for residents, gardens, community building activities, increase employment, and more.	5	5
The wider neighbourhood should be integrated into the Sutton Estate project through local involvement. E.g., employing local tradespeople, hosting local events.	4–5 Dependent on neighbourhood	5
Retrofit technologies and procedures should be tested on social housing to promote innovation.	3	5

* Answers are scored on the following Likert Scale: 1—strongly disagree; 2—disagree; 3—neither disagree nor agree; 4—agree; 5—strongly disagree.

Content analysis followed Elo & Kyngäs' [40] three-phase process. (1) The preparation phase involved deep immersion in the data, using sentences or groups of sentences as the unit of analysis. During (2) the organising phase, NVIVO version 1.71 software facilitated open coding, generating 43 unique codes that were systematically consolidated into higher-order categories based on thematic relationships and conceptual similarities. (3) The abstraction phase grouped codes into four resident value categories, each with two to three underlying factors. Category names were chosen to directly characterise content, with the framework reflecting both residents' values and institutional divergences. Representative quotes demonstrate credibility through authentic citations [40].

The analysis identified four key values that social housing residents prioritise in retrofit projects: Value (1): *good stakeholder relationships* form foundations; Value (2): a*ccess to information* throughout the project lifecycle; Value (3): *comfort, health, and safety* embedded across all phases; and Value (4): *building and community longevity*, addressing long-term impacts. Each value encompasses two to three factors, as illustrated in Figure 1, with natural overlaps reflecting the dynamic nature of resident engagement, creating layered opportunities for co-design and collaboration.

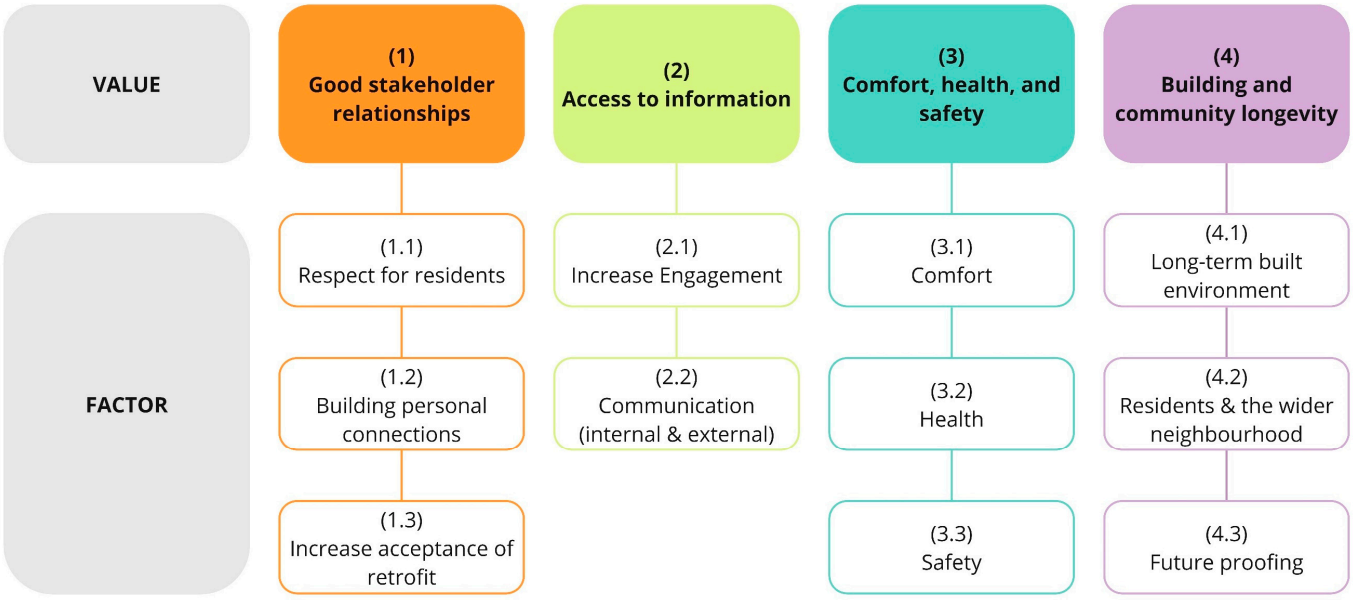

Figure 1. Diagram of residents' retrofit values and underlying factors.

3.1. Value (1): Good Stakeholder Relationships

Resident and institutional stakeholders both indicated the need for good stakeholder relationships built on trust and communication to facilitate project acceptance, although perspectives on how to achieve this varied. Figure 2 illustrates the three underlying factors that emerged: respect for residents, building personal connections, and increasing retrofit acceptance.

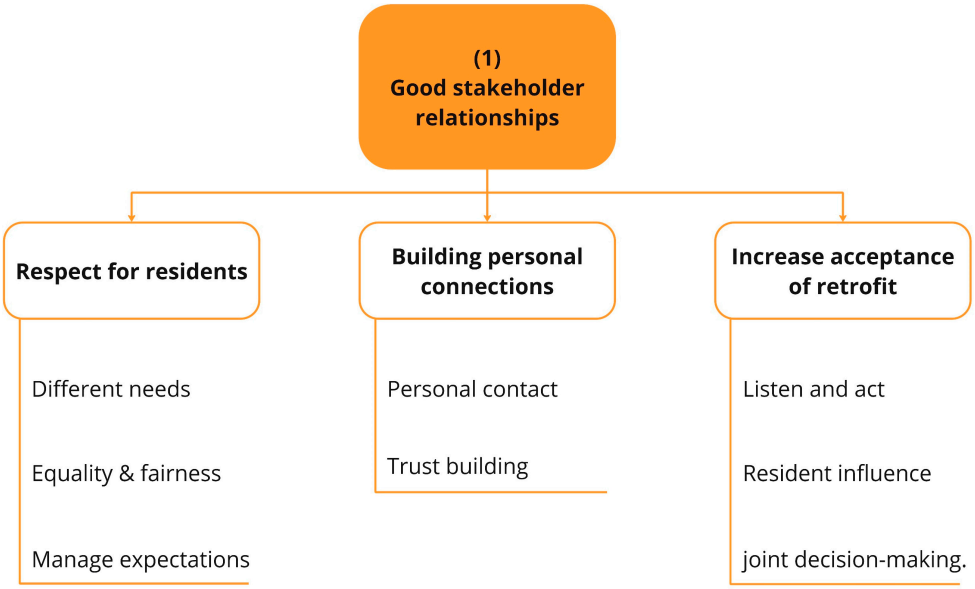

Figure 2. Map of Value (1): good stakeholder relationships.

3.1.1. Factor (1.1): Respect for Residents

Accepting residents as expert stakeholders in the retrofit decision-making process was acknowledged by all participants. Resident Liaison Officers (RLOs) were identified as important mediators between diverging resident needs, by all participants. However, residents were highly aware of different priorities and choices specifically associated with disabilities. The architect noted each building's uniqueness due to construction methods, ageing processes, and maintenance histories, necessitating tailored retrofits.

> "*Each building was built differently, each building has aged differently, and each building has been maintained differently. And the combination of the three, every building is different*". (A).

Equality and fairness were valued, particularly by residents. They discussed inclusive meetings allowing all voices, difficulty observing estate progress, waiting for their own personal enjoyment of shared spaces, and concerns about social housing disappearance. Residents viewed technological innovation as ensuring equality with future sustainable energy homes, while institutional stakeholders worried about potential inequalities and the costs of technological failures not considered by residents. The architect further emphasised balancing quality spaces with affordable bills.

Institutional stakeholders stressed managing expectations, clarifying residents' influence in decision-making to maintain strong relationships and ensure trust. They advocated for early resident involvement, but not prematurely, to allow design developments to guide discussions and foster a sense of ownership.

> "*And everyone wants something different and has different priorities. So many people would've sacked off the sunken garden and turned it into a car park*". (HA_1).

3.1.2. Factor (1.2): Building Personal Connections

Participants valued one-to-one personal engagement. Residents emphasised maintaining direct communication, including access to on-site managers and RLOs for progress updates and problem-solving rather than automated phone calls. They desired more meetings to discuss personalised needs and design choices, with their views truly heard, while acknowledging potential limitations. Joint decision-making was emphasised to identify priorities collectively, with the architect highlighting engagement processes as opportunities to strengthen community bonds among residents.

One-to-one engagement was revealed as improving trust between all stakeholders, including residents and contractors. Residents valued their friendly relations with the construction team, HA, and RLOs, who were amenable to communication and finding tailored solutions.

> "*Without the help of certain people, I may not have been here. . . I spoke to certain people to help me out, including* [HA] *and people from* [contractor] *and the experience that I've had in my place where I am now has been amazing*." (R_2)

Institutional stakeholders discussed trust-building through engagement processes. According to the architect, without resident involvement in planning processes, the retrofit is not a good design. They also expressed that engaging residents too early could lead to a loss of interest and trust due to lengthy timelines. On-site presence and communication were deemed necessary to identify the right moment for resident engagement, although when remained unclear.

> "*I think if you go too early, you'll lose them* [residents] *because it's such a lengthy process and sometimes there's nothing going on and it's difficult to keep them engaged*." (HA_2).

3.1.3. Factor (1.3): Increase Acceptance of Retrofit

Residents desired immediate action on maintenance issues, noting how delays could decrease retrofit acceptance due to trust breakdown. For example, a resident's older neighbour waited nine days for boiler repairs while frightful noises kept the block awake nightly.

> "*There was a problem with the boiler and it went, every night for six days, 'boom! boom! boom!'. Nobody could sleep at all* [sic]. *We should not be put through that for another three days. Something should be done that instant*". (R_4).

Residents stressed that when decision-makers do not truly act on residents' opinions during the design stages, this has led to frustration, disempowerment, and trust breakdown; a sentiment echoed by one HA participant. Residents also desired demonstration dwellings to understand product choices.

HA participants acknowledged residents as central while noting influence limitations. Residents had decision-making power in gardens and events but wanted greater design influence through regular meetings, design consultations, and construction updates.

Joint decision-making was valued by all participants. Institutional stakeholders valued obtaining residents' views before drafting drawings to strengthen retrofit outcomes.

> "*It's not a good design if you take planning through without the acceptance of the residents. If you include the residents, it strengthens the outcome*". (A).

Early design outlines were considered necessary by institutional stakeholders to hold concrete discussions during engagement, but designs should not be finalised. The timing of engagement emerged as a key challenge, emphasising constant compromise.

3.2. Value (2) Access to Information

Access to information emerged as valuable throughout the entire retrofit process, with two factors shown in Figure 3: increasing engagement and communication strategies.

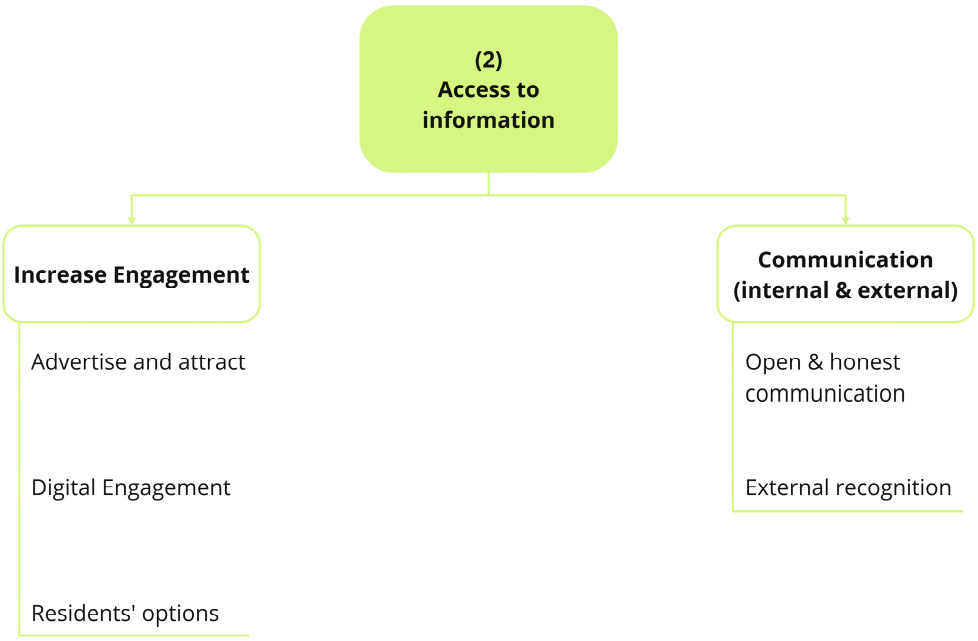

Figure 3. Map of Value (2): access to information.

3.2.1. Factor (2.1): Increase Engagement

Resident participants emphasised better advertising of retrofit meetings and local events, including film nights, senior lunches, and group trips.

> "*We do have meetings. But advertisement, definitely we need more. Because I didn't even know about the first phase, didn't know anything*." (R_2).

Suggestions included early and repeat notifications, notice boards on each floor, and visually attractive communications. While some suggestions existed, improvements would extend their reach. Notice boards, previously on every floor, were reduced to the management office. Visually attractive posters successfully increased attendance at senior lunches, while newsletters were often ignored due to uninspiring designs. However, HAs noted that communication formats were pre-determined and inflexible.

> "*People have said they don't read them* [newsletters] *either. People have missed trips and just said 'well, I didn't see that. I didn't read it'"* (HA_1) . . . "*I have actually heard people say they put it straight in the bin*." (R_1).

HA participants valued digital communication, using Zoom meetings and QR code questionnaires. During retrofit design, digital plans were displayed in the communal sunken garden, although accessibility remained a concern. The online Ebrik platform (a construction project monitoring application and community engagement service) proved successful for viewing construction progress.

Residents had two material finishes and layout choices but desired more design consultations, yet HA participants valued these options for engaging residents and diminishing objections, thus reducing delays.

3.2.2. Factor (2.2): Communication (Internal and External)

All participants valued open and honest communication, although timing was divisive. Residents desired early and continuous communication, valuing the RLO as on-site mediation, an on-site office for concerns, and continuous information about changes and delays to aid planning.

> "*You've got to plan your life. Things to do, visit the family abroad. Take a plane. And if you don't know exactly, you can't make those plans*." (R_3).

Institutional stakeholder participants, however, emphasised maintaining residents' interest and acceptance through tailored timing and engagement content, including one-to-one problem-solving. They explained meeting resident engagement requirements outlined in the Statement of Community Involvement planning obligation [50,51]. All participants noted difficulty navigating different priorities and being heard.

External communication was reported through official and community recognition. The HA participants highlighted their Building with Nature award, demonstrating a commitment to outdoor space quality.

> "*It's like I can see in my garden and it's like all growing and all the flowers and the birds are all flying around*." (R_2).

Residents emphasised rebuilding community ties through activities amid neighbourhood and community changes.

3.3. Value (3): Comfort, Health, and Safety

Comfort, health, and safety emerged as necessary throughout the retrofit process. Figure 4 illustrates these three distinct factors, which the analysis revealed as interconnected; changes to one factor created ripple effects across the others.

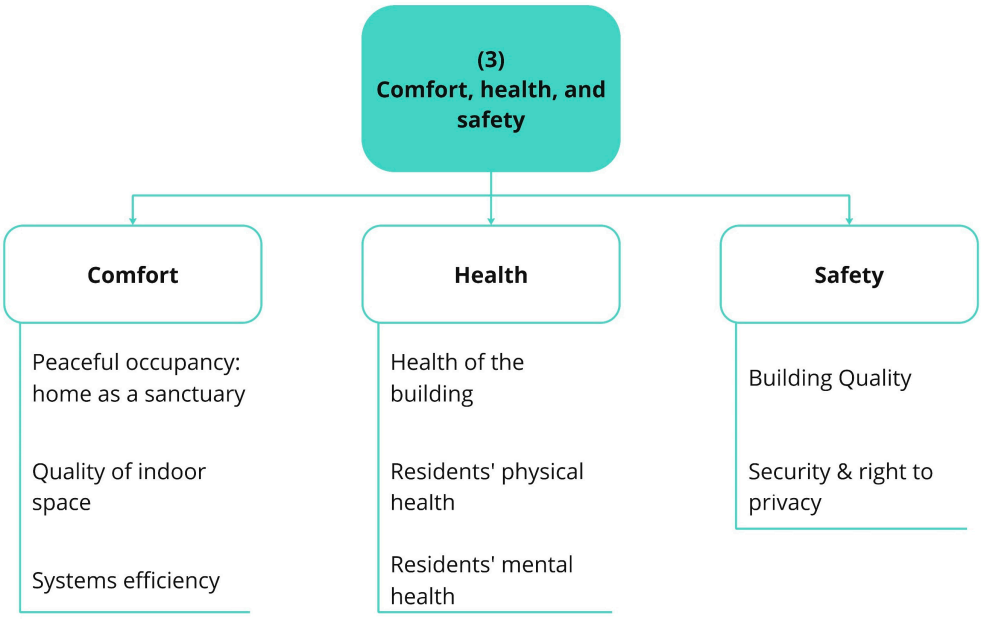

Figure 4. Map of Value (3): comfort, health, and safety.

3.3.1. Factor (3.1): Comfort

All participants valued the peaceful occupancy of homes as a sanctuary, emphasising quiet, personal space, and accessible green space. Participants discussed the right to enjoy and occupy space as desired, with residents reporting glazing and views as particularly

important. Construction time presented challenges; residents expressed difficulty with noise, sleep, and fatigue during the two-plus years of scaffolding.

Quality indoor space was valued, particularly daylight and insulation for noise protection and energy conservation. NEBs were identified as crucial, with strong daylight considered especially necessary for residents with health or mobility requirements.

> "*That's a personal question—depends on an individual. People with disabilities might agree* [to prioritise NEBs]. *Personally, I agree*." (R_2).

Efficient systems were considered a necessary retrofit and discussed as affordable comfort. HA participants cautiously agreed, citing high electricity bills in previous retrofit projects. While HA participants praised constant temperatures from GSHP technology, challenges included system misuse and changing heating habits. The architect questioned cultural expectations about optimal temperatures.

> "*Do you need the boiler at 25 °C? That's to do with the wider cultural context. I mean, when my dad was young, only half of your body gets warm because that's the bit that's facing the fire*". (A).

HA participants recognised "re-educating" residents on energy use, exploring strategies such as minimum heat guarantees. Additional considerations included improved doorbell systems and renewable energy sources, although cost-to-energy returns remained a barrier.

3.3.2. Factor (3.2): Health

Damp and mould were critical concerns for healthy indoor environments. Participants emphasised that indoor air quality requires effective insulation, ventilation, and cooling systems to maintain dry, healthy conditions. The architect participant stressed holistic design combining heat, hot water, and ventilation strategies. Poor building health, including annual mould, directly impacts physical wellbeing.

> "*During the winter, the mould appears in most of the walls. It seems that that does not have the efficient stuff on the walls to avoid this mould coming in*". (R_3).

The reverse is also true. Homes must meet residents' medical needs and should be adaptable to encourage longevity. Residents mentioned using healthy building materials, discussing fear of unhealthy modern fibres.

Mental health was equally important. Residents described their homes as sanctuaries from stress. Both residents and architects noted that significant changes could disrupt residents' wellbeing, given strong attachments to their homes.

> "*Maybe they've* [residents] *grown up with it* [the estate] *being a certain way and won't want to see a lot of change. They'll want to see improvement, care and for it to continue as part of their world*". (A).

3.3.3. Factor (3.3): Safety

Safety was identified by all as a key concern. Residents discussed material quality, architectural quality, and insulation. Between institutional stakeholders, insulation emerged alongside technical measures to ensure building safety: passive and mechanical ventilation, accessibility, and meeting legal requirements for Decent Homes Standards [52]. Meeting residents' medical and accessibility needs was also discussed.

> "*. . .they* [the old flats] *didn't meet Decent Homes Standards with the kitchen/bathroom situation, so we had to do something with those ones and that's why the decision to remodel them came*". (HA_2).

All participants analysed security and privacy. The retrofit is legally obligated to fulfil Secured by Design [53] criteria from the planning application, including secure outdoor space and entrances. However, some residents desired greater home security, including cameras linked to entrance doorbells.

> "*I also think we should have some security inside for each flat. Because we've got nothing outside our doors, you know, something inside that can see who's outside our door. For somebody to ring, that can be dangerous.*" (R_4).

HA participants valued secure outdoor space, noting that retrofit plans included garden fencing to limit access to residents.

3.4. Value (4) Building and Community Longevity

Longevity addresses both the physical safeguarding of the project and residents and sustained social engagement between residents and the community. Figure 5 identifies three supporting factors: long-term built environment, residents and the wider neighbourhood, and future proofing.

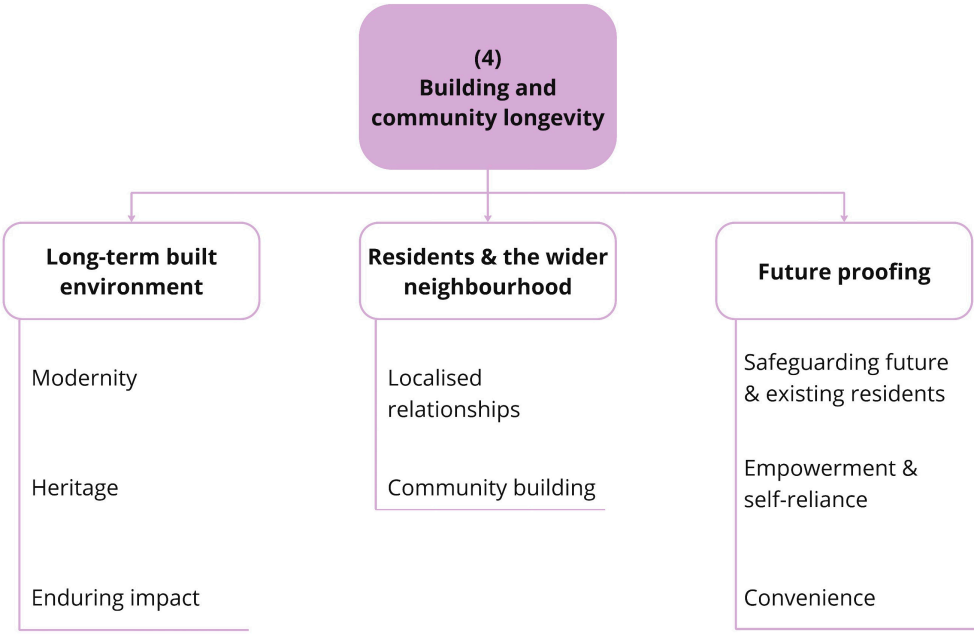

Figure 5. Map of Value (4): building and community longevity.

3.4.1. Factor (4.1): Long-Term Built Environment

All participants emphasised building modernisation. Layout changes saw bedsits converted to varied apartment sizes based on resident surveys. HAs implemented GSHP and electric radiators, showcasing the project's innovative nature. Residents appreciated the quietness and efficiency of modern appliances.

Heritage emerged through preservation and pride. HAs emphasised maintaining historical integrity through aesthetics, while residents valued inoffensive functional improvements, including window replacements to improve natural light. The architect viewed heritage as a guiding framework rather than a limitation.

> "*. . .it's not so much limiting as it's guiding. . .one of the big challenges was ventilating the lobby. . .they're very limited in what can be achieved with the technology.*" (A).

Heritage value and embodied carbon considerations drove refurbishment over demolition. Residents expressed pride in preserving building character, drawing parallels to

local preservation efforts. The emotional connection to heritage was crucial for maintaining community identity.

Enduring impact of retrofit manifested through resident stewardship, cumulative learning, and quality-of-life improvement. HAs noted that engagement increases pride and care for homes, reducing turnover and re-letting costs. The architect viewed each retrofit as a learning opportunity; issues from previous retrofits arising after one year emphasised the importance of sustained resident involvement. All participants reported quality-of-life improvement as a central goal.

> "*All of them [stakeholders] have to agree to make residents' lives much better*." (R_3).

3.4.2. Factor (4.2): Residents and the Wider Neighbourhood

Residents valued neighbourhood integration, fondly recalling the community's fêtes organised by the former Tenants Association, with local business contributions. However, neighbourhood gentrification concerned residents as upscale establishments replaced community spaces, such as local laundromats.

> "*The shops aren't for your local people now. I mean to go in there and buy a croissant is like £4.99*" (R_1). "*They think only about money*" (R_3). "*Exactly that, yes*". (R_4).

HA participants and the architect focused instead on local employment opportunities, including local tradespeople, job training, and apprenticeships. They noted that the wealthy area's low unemployment, however, drew workers from further afield. This created logistical challenges with material storage, transport, and parking, which reduced overall efficiency.

All participants valued community building from varying perspectives. Residents expressed feelings of disconnection from the wider neighbourhood, desiring reintegration to avoid further marginalisation. Residents recalled how historical community elements, including on-site management and community halls, fostered community cohesion. While HA participants focused on activities during construction, residents desired longer-term community reintegration through events, although no plans exist for this.

Social value was discussed by all participants to strengthen the community. The architect emphasised intangible benefits of engagement, HA participants leveraged it to secure tangible benefits including apprenticeships and community trips from developers, and residents recognised addressing intrusive neighbourhood behaviours and enjoying shared spaces.

> "*it strengthens the community by bringing everybody together to help shape the change that's going to happen, it's very intangible*". (A).

3.4.3. Factor (4.3) Future Proofing

Safeguarding for future and existing residents was discussed in several ways. Institutional stakeholders emphasised upskilling through apprenticeships and job training. Technology trials proved contentious; residents welcomed new technologies to reduce bills, but institutional stakeholders raised concerns about cost impacts on marginalised residents.

> "*I think it should be tested because it's gonna come a day where the world is going to be run by technology*." (R_3).

Existing resident care was discussed through home upgrades, green spaces, and affordable heating. HA participants emphasised investment in local services for future generations while acknowledging long-term residents' resistance to change.

All participants considered resident empowerment and self-reliance. Residents advocated do-it-yourself attitudes and resident-led initiatives, requesting support for home

modifications such as installing a bath. Training around energy use and new technologies emerged as crucial. HA participants focused on systems education methods beyond videos and leaflets, while the architect emphasised the role of design in fostering social interaction and empowerment.

> "*Having engagement activities with the resident group helps to bring people together, and that's where the social value comes from*." (A).

Convenience and adaptability were critical for futureproofing. Participants emphasised accessibility features including lifts and ground-floor amenities for less able-bodied, older people and residents at-risk of vulnerability. Adaptability for ageing-in-place and location convenience for reduced car dependence emerged as key priorities.

4. Discussion

This study identified four values that the focus group residents prioritised in retrofit contexts: good stakeholder relationships; access to information; comfort, health, and safety; and building and community longevity. The results both extend and challenge the existing co-design literature regarding stakeholder relationships, knowledge exchange, and social sustainability in retrofit contexts. While supporting end-user participation in design processes [14–17,19,36], our results reveal potential challenges and opportunities in balancing environmental and social sustainability goals through co-design in social housing retrofit [23,24]. This discussion examines these findings in relation to two research questions: (1) what do residents value in retrofit beyond energy performance, and (2) how can resident participation increase sustainability beyond carbon performance targets?

Regarding residents' values beyond energy performance, the focus group revealed priorities beyond energy efficiency. Value (1) shows the case progressing toward Arnstein's [31] higher rungs of citizen participation through the development of a formalised RSG to improve stakeholder relationships. Participating residents demonstrated their "situated knowledge" [9] regarding building performance, comfort requirements, and community needs, supporting findings on resident expertise [14,20,21]. However, residents discussed a lack of direct engagement that could have enabled knowledge integration. Residents' request for more direct engagement (Value 2) and improved dissemination channels could be interpreted as a breakdown of traditional communication methods [23], as evidenced by residents' complaints about removed notice boards and reliance on newsletters they reported throwing away. This highlights practical challenges in achieving socio-technical systems that Lovell [22] champions through close collaboration between social housing producers and consumers.

Results within comfort, health, and safety (Value 3) and building and community longevity (Value 4) suggest priorities extending beyond energy efficiency, aligning with the literature on NEBs [15,18,38]. These include: building trust through personal connections and respect; clear, consistent communication through multiple channels; health considerations including ventilation, damp prevention, and material quality; community integration and heritage preservation; and long-term adaptability for ageing-in-place. The focus group provided a forum for collective exploration of how retrofit decisions might impact community wellbeing, potentially generating "transformative knowledge" [9] by combining institutional stakeholder perspectives with resident insights. However, the effectiveness of this knowledge exchange in influencing actual decision-making requires critical examination.

Critical analyses of engagement effectiveness reveal systematic constraints. While residents expressed good stakeholder relationships as a priority, it remains unclear how to improve trust and communication within institutional barriers, supporting Morgan

et al.'s [23] findings on participation barriers. Indeed, residents' frustration when views were disregarded may reveal ongoing power imbalances, which are difficult to overcome when retrofit processes leave decision-making power with institutional stakeholders. This aligns with Armeni's [33] warning about superficial participation and Fylan et al.'s [17] emphasis on ensuring fairness and equity. In line with Sanders and Stappers' [36] framework, HA participants attempted to act as facilitators by providing engagement platforms but often defaulted to translation roles when technical constraints limited resident influence. This suggests institutional structures constrain meaningful co-design despite engagement methods; in this case, resident design input was limited to materials and gardens.

While Morgan et al. 23] relied on post-retrofit interviews, potentially missing opportunities for intervention, our focus group timing during the retrofit process appeared to enable real-time value identification. However, it remains unclear whether this methodological approach provided any meaningful advantage, as resident values had limited influence on decision-making processes despite the establishment of formal resident representation through the RSG. This suggests that even when institutional structures appear to grant residents power, the integration of resident values into decision-making may remain superficial. While these findings align with Arnstein's [31] warnings about tokenistic participation, more research would be needed to establish how formal participation mechanisms can achieve meaningful power-sharing. Additionally, it remains unclear whether these implementation failures represent systematic issues or were specific to this context.

Evidence for whether participation increased sustainability remains limited. Technical issues, such as mould problems, were addressed, yet communication improvements remained unresolved. Residents' external concerns, including neighbourhood gentrification and integration, fell beyond the project's scope and were not addressed. Further tensions emerged between technology adoption and resident wellbeing, particularly evident in heating systems discussions, supporting Walker et al.'s [19] findings on occupant behaviour in low-carbon retrofits. This indicates that co-design in social housing retrofit should carefully balance environmental goals with social sustainability to prevent resident disempowerment [23,24], although this study's findings cannot determine whether this balance was actually achieved.

The focus group revealed varying degrees of success in addressing resident concerns during the retrofit process. One-to-one engagement proved effective in some instances, as evidenced by R_2's positive experience with the Housing Association and contractors. However, this success appears to depend on individual circumstances and institutional willingness to accommodate personal needs, raising questions about the scalability and systematic capabilities of such approaches. The limitations of individualised approaches point toward systematic engagement frameworks rather than ad hoc individual responses. The complex question of engagement timing—with HA concerns about maintaining interest over long timeframes coupled with residents' demands for immediate involvement—highlights the challenge of balancing these competing needs. One potential approach might involve graduated engagement that starts early, growing in frequency alongside project momentum. As van Hoof & Boerenfijn [16] suggest, feedback could be integrated by scheduling when and how it should be gathered.

These findings highlight gaps in current retrofit policies and programmes. The UK's WHP focuses primarily on technical measures and energy performance targets, emphasising heat pump installations, insulation upgrades, and achieving specific carbon reduction goals [5]. While the programme addresses financial barriers through grants and funding schemes, it provides limited systematic integration of comfort preferences, community consultation, or residents' lived experiences in decision-making processes. Similarly, many energy efficiency programmes prioritise quantifiable outcomes—such as the target of

upgrading 300,000 homes with specific technologies—but offer little guidance on incorporating residents' priorities regarding building character, social relationships, or place attachment into retrofit planning.

In this case, the focus group residents prioritised sense of place and identity, community integration, and personalised communication—values not systematically addressed by current programmes. The emphasis on technical performance and standardised solutions in these programmes could contribute to persistent challenges reported in retrofit implementations, including low resident satisfaction, technology misuse, and community resistance to interventions. Incorporating the specific values of residents in each social housing context early in the design process may reduce implementation challenges. More research is required across diverse social housing contexts, however, to test whether including residents' values early would mitigate participation barriers and acceptance issues that continue to emerge in retrofit projects.

5. Conclusions

This study evaluated decision-making processes in relation to residents' values during an ongoing retrofit process. The research provides insights into how residents articulate retrofit priorities and reveals potential challenges in translating these values into outcomes. This study's primary findings suggest that while the identified values appear case-specific and emerged within an established culture of resident activism, the meaningful integration of resident priorities may require early co-design processes that can navigate tensions between residents' situated knowledge and institutional constraints. This research study also exposes significant challenges in translating resident values into implemented outcomes, suggesting that identifying values may be insufficient without corresponding shifts in decision-making power and project management approaches.

The four values identified extend beyond the energy performance priorities emphasised in current retrofit programmes, highlighting a possible gap between policy focus and resident priorities. Even when formal participation structures exist (such as the RSG), the meaningful integration of resident values into decision-making can remain limited by institutional power structures and technical constraints. One-to-one engagement approaches showed promise in specific instances but appeared to depend on individual circumstances and institutional willingness, raising questions about scalability. The timing of engagement also seemed to involve complex trade-offs between maintaining resident interest over long timeframes and ensuring early input into decision-making processes. These lessons suggest that while identifying resident values is important, the greater challenge lies in developing systematic approaches for translating these values into retrofit outcomes within existing institutional frameworks.

Several principles emerged from this study that could inform co-design approaches in social housing retrofit contexts:

- Graduated engagement strategies that evolve with project phases may help balance issues with engagement timings.
- Diverse communication channels could improve accessibility across different resident groups.
- Questioning which technical constraints truly limit resident input and finding innovative ways to involve residents in decisions typically reserved for professionals.
- Expanding retrofit objectives beyond energy performance to include community integration, building character preservation, and long-term social wellbeing might address broader resident priorities.

These findings point toward several areas where co-design practices might be adapted for social housing retrofit contexts:

1. Engagement timing would benefit from reconceptualisation as an ongoing process rather than discrete events.
2. Communication tools should be more diverse than traditional approaches.
3. Facilitator roles could be redefined to better balance technical constraints with resident influence.

Further research, however, would be needed to test their effectiveness.

This study contributes to knowledge by identifying four values that these social housing residents prioritised in retrofit contexts and highlighting potential challenges in participatory approaches. The results suggest how tenure status can create unique co-design challenges requiring modified approaches and support graduated engagement strategies that balance resident demands for early involvement with practical project constraints. However, questions remain about the broader applicability of these findings and the effectiveness of different approaches for integrating resident values into retrofit decision-making.

These findings raise important questions about whether the identified values represent retrofit-specific priorities or responses to broader housing experiences—such as previous negative experiences with housing associations, prolonged construction effects, or basic service expectations rather than co-design priorities. While this study successfully identifies and analyses four key resident retrofit values beyond energy performance targets, it opens questions for future research about systematic value integration methods, generalisability across contexts, and effective approaches for translating resident values into retrofit outcomes.

These adapted co-design practices raise important questions about implementation at scale. While this study lacks quantitative data on large-scale program implementation, the co-design approach demonstrated here appears compatible with large-scale retrofit initiatives such as the EPBD and WHP. With approximately 17% of UK households living in social housing, representing over three million homes to meet climate targets [54], there are legitimate scalability concerns. However, we estimate co-design processes could be completed within 13 months based on van Hoof & Boerenfijn's [16] collaborative retrofit methodology, with structured engagement phases to identify and incorporate resident values into the design process, achievable in approximately 8 weeks. Our companion study on professional stakeholder perspectives [55] reveals that early resident engagement can prevent costly post-completion problems and improve technical outcomes. This aligns with evidence that inadequate initial engagement creates delays, as Boess's ([14], p. 104) study demonstrates that "time not spent in the design phase became time spent later". Co-design frameworks delivered through intermediary organisations could enable scaled participation while potentially offsetting upfront time investments through reduced performance gaps and improved technical outcomes.

Further research examining scale-specific implementation strategies and standardised co-design protocols would determine their broader applicability while maintaining the resident-centred approaches essential for holistic sustainability outcomes. Additionally, future research should examine whether these four values emerge consistently across different social housing contexts, tenant demographics, and retrofit scales to determine their broader applicability. Future research should investigate methods for better integrating technical requirements within co-design processes while maintaining resident accessibility. Greater exploration is needed into strategies for sustaining engagement over long project timeframes and ensuring resident influence remains meaningful within practical constraints. Research should also examine how to effectively balance individual resident preferences with broader community needs in social housing retrofit decision-making.

6. Limitations

This study provides important insights into how residents value retrofit while identifying key areas for future research. The Sutton Estate case study provides an in-depth understanding of how residents articulate retrofit priorities in contexts with established resident activism and meaningful engagement opportunities. Research across diverse social housing contexts, however, is needed to explore the generalisability of results.

The resident participants' demographic profile (all female, ages 41–60+, and mostly engaged through the RSG) and the estate's unique heritage status represent important but specific perspectives. The convenience and snowball sampling approaches, combined with unavailable data regarding total resident numbers in the broader retrofit process, limits assessment of participant representativeness. Future research would benefit from exploring values across different resident demographics and housing types and using varied recruitment strategies to capture broader perspectives.

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and European Commission guidance. Ethical approval was obtained through the RE-DWELL project's Ethics and Data Management Committee, following GDPR requirements. This study adhered to the guidelines of La Salle, University of Ramon Llull, and was conducted in accordance with Regulation (EU) 2016/679 (General Data Protection Regulation), confidentiality principles, and national laws.

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study. All participants provided signed, informed consent after receiving participant information sheets detailing this study's purpose, confidentiality commitments, and their right to withdraw. Participants were fully informed about how their data would be used, the research purpose, and any potential risks involved in participation.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author due to privacy and confidentiality commitments made to participants during the informed consent process. The datasets cannot be made publicly available as participants were assured of confidentiality in the consent forms.

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Abbreviations

The following abbreviations are used in this manuscript:

DER	Deep Energy Retrofit;
EPBD	Energy Performance of Building Directive;
GSHP	Ground Source Heat Pump;
HA	Housing Association;

NEB	Non-Energy Benefits;
RLO	Resident Liaison Officer;
RSG	Resident Steering Group;
WHP	Warm Homes Plan.

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