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# Analysis of Procurement Routes and Contract Types for Housing Retrofit in the United Kingdom

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**Abstract:** The study focused on the procurement routes and the forms of contract, currently used in the UK housing retrofit industry. Importantly, the contracts between the clients and the contractors were investigated. This study used a qualitative approach with a critical literature review and semi-structured interview data collection for the methodology. The findings show that the housing retrofit industry does not use any standard form of contract in general. Most contractors use guarantees, warranties, and invoices instead of standard forms of contract. They usually use bespoke contracts if contract administration is required. This is because there is nothing wrong with the existing way of addressing contract administration in retrofit. As the UK needs to retrofit 30.1 million houses, there can be contractual disputes aggregating to 8.1 million properties or GBP 221.4 billion project value. The study recommends using standard forms of contract to avoid and reduce the detrimental effects of contractual disputes in housing retrofit in the future.

**Keywords:** construction contracts; housing retrofit; procurement; standard forms of contract; United Kingdom



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## 1. Introduction

Retrofit in the UK is highly fragmented from the point of view of contractors. Usually, one contractor undertakes only one measure. Due to this reason, the homeowner needs to go to several contractors to get all the required retrofit measures installed. This is a hassle for the homeowner [1,2]. Professional institutions such as BSI or TrustMark recommend the whole-house approach to housing retrofit [3–5]. Due to the fragmented nature of the retrofit market, it is difficult to drive the whole-house retrofit approach in a single iteration [2]. In addition to the above, transaction costs (non-construction costs during the process) associated with the retrofit works are discouraging homeowners from engaging in retrofit due to the existing fragmented nature of the retrofit industry [6]. If a single contractor is installing all the retrofit measures, they can save costs by sharing tools, equipment and services. For example, scaffolding for external wall insulation can be used to install solar panels on the roof. A proper stakeholder engagement model is required to drive housing retrofit, where all the parties can collaboratively achieve their objectives. The government, professional bodies, supply chains, and standards will work together for a synergistic outcome [7].

Retrofitting houses needs to be initiated by the homeowners or the landlord. There are government grants available for housing retrofit such as HUG, SHDF or ECO. These government grants should deploy a necessary contract administration activity according to the government procurement guidelines [8]. The scope of contract administration shall cover the activities related to the execution of a suitable contract document to allocate

rights and obligations among the project parties [9]. A total of 82.2% of the houses are owned by individual parties and these people are not expected to have a proper idea about contract administration in retrofit. This creates a situation of "moral hazard" [10], where the principal (homeowner or landlord) employs a contractor (agent) to carry out a retrofit. Since the homeowner/landlord is not a technical person, they do not know whether the contractor would work in the best interest of the client or not.

As far as the retrofit standards are concerned, PAS 2030:2023 [3] and PAS 2035:2023 [5] can be considered as government-endorsed quality specifications. Apart from those, there are other standards such as the AECB Carbonlite standard [11] and RICS residential retrofit standard [12] in the UK context. The AECB standard is complementary to the PAS 2035. The RICS residential retrofit standard was published in March 2024 and is still new to the industry. Considering these factors as well as the government endorsement, PAS 2035 was considered as the key standard for this study.

As per the PAS 2030:2023 and PAS 2035:2023, these specifications do not cover the supply chain directly. The contractors are called installers. They can be designers as well. Installers are required to take care of the supply chain side [3,5]. As the retrofit supply chain is highly fragmented, there is no collaboration among the supply chain/contractors [7,13]. In this case, the project management approach proposed by PAS 2035:2023 plays a vital role in creating the required collaboration of the retrofit measures provided by various installers. This will remove the unintended consequences, poor design, shallow retrofit, performance gap, accountability, and defects prevailing in the retrofit industry [5]. Each home counts report was commissioned by Dr. Peter Bonfield as a response to the failure of the Green Deal in 2013. The report made 27 recommendations to address the quality concerns of housing retrofit [14]. PAS 2035 was published accordingly to bring the required quality of retrofit and to avoid unintended consequences. The whole idea is to protect the interests of both the houses and their occupants [5]. Each Home Counts report recommends a single contract for every retrofit project. Neither the Each Home Counts report nor the PAS 2035 have proper recommendations about procurement or contract administration.

As far as the PAS 2035:2023 specification is further evaluated, there is a professional role called "Retrofit coordinator" to manage the whole retrofit project from start to end. The project delivery is the responsibility of the retrofit coordinator. A retrofit coordinator is an independent party who should ensure the best interest of the client and the public. Ideally, a retrofit coordinator is employed by the client directly or through an organisation to run retrofit assessment, design, installation, commissioning, monitoring, or evaluation. Any conflict of interest is to be declared by the retrofit coordinator [5]. The client shall make direct contracts with the contractors and suppliers, coordinated by the retrofit coordinator. The retrofit coordinator is obliged to deliver the project without bias to any party, ensuring the proper commissioning of the retrofit project under PAS 2035:2023 specification [5]. The role of the retrofit coordinator shall remove the "moral hazard" to a greater level.

The literature does not show significant journal articles related to contract administration in housing retrofit in the UK context. It seems that contract administration in housing retrofit is a poorly discussed topic. Even the PAS 2035:2023 specification is silent on contract administration. The RICS retrofit standard has identified this gap and suggested the role of a retrofit contract administrator. It has further discussed the contract administration in retrofit projects [12]. The government policies related to contract administration in construction are described under "The Construction Playbook" [8]. In line with the same, the Social Housing Retrofit Accelerator (SHRA) has published a toolkit for procurement in social housing retrofit. SHRA has recommended using a suitable contract form and given the flexibility to use either a custom contract or a standard form of contract. In the case of standard forms, they have recommended JCT (Joint Contract Tribunal) and NEC (New

Engineering Contracts) [15]. JCT forms of contract under the options of the design build, intermediate contracts with the contractor's design portion, and measured term contracts were observed to have been successfully used in the industry [16].

Considering the lack of academic publications and discussion, this article critically analyses the existing procurement routes and forms of contract in the UK housing retrofit industry with recommendations for industry best practices.

## 2. Literature Review

### *2.1. Housing Retrofit Client Types and Their Requirements*

As far as the tenures of the housing stock are concerned, three types of client can be identified for housing retrofit. The first client type is the owner-occupiers. They represent around 63.1% of the total housing stock. The other two segments are private rented and socially rented. They represent 19.1% and 17.7% of the housing stock, respectively. The socially rented housing stock can be further divided into two sectors: local authorities and housing associations [17]. Home Upgrade Grant (HUG) is aimed at owner-occupiers and private landlords [18]. The Social Housing Decarbonisation Fund (SHDF) is aimed at social housing landlords [15]. By considering the above, the three client types are: owner-occupiers, social housing landlords, and private landlords.

#### 2.1.1. Owner-Occupiers

According to the challenges observed in the housing retrofit industry, people are highly suspicious of whether they will get the promised outcome from the retrofit due to the moral hazard involved with the actions of retrofit professionals and contractors. This has become one of the major reasons why people are reluctant to engage in retrofitting their houses [19,20]. Considering these aspects, it is important to reduce the risk to owner-occupiers. That will help housing retrofit to be attractive to this segment. One of the key purposes of PAS 2035:2023 is to reduce the risk of unintended consequences and protect the interests of the clients as recommended by Each Home Counts report [5,14].

As the contractor will have to absorb most of the risks in this situation, there is a detrimental effect of increased costs due to a premium for additional risk. Another important aspect is the project management part of the retrofit project. The homeowner is not expected to have the capacity, resources and knowledge to properly manage the retrofit project and actively engage in the decision-making process. The retrofit coordinator role proposed by PAS 2035:2023 is required to fulfil this gap. In this situation, the contract administration involved with retrofitting owner-occupied properties needs to consider a procurement method which reduces the client's risk.

#### 2.1.2. Social Housing Landlords

Whether local authorities or housing associations, these social housing landlords can be expected to have some level of expertise in and knowledge of retrofit project delivery [15]. Due to this reason, the risk management capacity can be expected to maintain a certain level from social housing clients. There are contradictory findings as well. It was reported that 50% of the local authorities that secured funding for the Social Housing Decarbonisation Fund (SDHF) could not retrofit a single house [21]. Further, almost all social housing retrofit projects expect government funding such as the Social Housing Decarbonisation Fund [15]. Due to the number of houses needing retrofitting in a social housing project, there will be more contractors required for the project delivery. Project management responsibilities can be outsourced to a managing agent as a part of the project. By considering these aspects, it can be concluded that the social housing retrofit projects have larger scopes and requirements for scalability.

#### 2.1.3. Private Landlords

As far as the energy efficiency levels of the UK housing stock are concerned, the private rented sector has the worst energy performance level [22]. One of the reasons for this is the split interest in energy-efficiency housing retrofit. The landlords have to spend for the retrofit, but the benefit goes to the tenants. Further, the landlords are not in a position to recover the cost of energy retrofits with the rent [23]. Most of the existing grant schemes are not 100% available to private landlords. Even if they are available, a contribution is required [18]. The Minimum Energy Efficiency Standards (MEES) have been pushing landlords to retrofit their properties through regulatory measures. MEES measures were planned to tighten, increasing the minimum energy efficiency levels required in privately rented houses from 2025. The UK government abolished these MEES level increases to relieve the landlords. These U-turns of sustainability policy measures were criticised by industry experts [24].

Considering these aspects, it can be recommended that the procurement route associated with private landlords be similar to that of owner-occupiers. Private landlords also do not have a better understanding of the retrofit process, and they do not need to be involved in the process. Further, they will expect higher levels of certainty and hesitate to bear risks.

### *2.2. Procurement Routes*

Procurement is the whole process of acquiring goods and services. This is considered a strategic business activity. A collaborative approach is required during the early stages of the retrofit project with energy performance targets [25]. In the case of retrofit, it is getting the property retrofitted through contractors according to the client's requirements. When it comes to the procurement routes, four main procurement routes can be identified in the UK context. They are the traditional, design build, management contracting, and construction management procurement routes [9]. There can be several other classifications of procurement route under different criteria. For example, the UK government construction handbook has classified the procurement types under the openness of the tendering process [8]. Theoretically, they are tender approaches, but not procurement routes. The procurement routes explained in this study are based on the structure of dividing responsibilities of the construction project. The applicability of housing retrofit was also considered when shortlisting the following procurement routes. It was noted that the framework agreement is a common procurement (tendering) method in the retrofit industry [8,15]. Considering the same, this literature review also focuses on framework agreements as well.

#### 2.2.1. Traditional

This is one of the earliest methods of procurement. In this route, there are three parties to the contract: the employer, the contractor, and the designer. The employer employs a designer to design and supervise the project. A contractor is procured to build the design. Payments are made in agreed intervals or milestones upon the approval of construction work by the designer. A clear separation of responsibilities can be observed between the designer and the contractor. The procurement has a clear linear approach for the project delivery. The advantages of this procurement route can be identified as better control over the design by the employer. The selection of the main contractor is usually done by competitive bidding, and this can lead to achieving lower construction costs. The project delivery and responsibilities are linear and clear. Disadvantages can be noted as the longer times for project completion and potential disputes between the designer and the contractor. This method can be the best when design control is more important [9,26].

The traditional method of procurement is also considered as "General Contracting". Both this method and the design build method of procurement are observed in the Portugal

retrofit industry [27]. Traditional procurement is better when the goods and services that need to be procured already exist for competitive bidding. When it comes to retrofitting houses for climate change goals, the industry needs novel materials and services which may not be able to compete with market leaders. In this situation, Energiesprong UK proposes an innovative partnership method of procurement. This promotes collaboration and a guaranteed market for innovative products and services. In the innovative partnership method, the client works with a research and development contractor to develop an innovative solution to a problem. The client derives the benefit from the innovative product while the contractor benefits from reduced research and development costs, and guaranteed sales of the contract [28]. A similar procurement method was tested in Italy to support innovations in retrofit called "Public Procurement of Innovation" [29].

#### 2.2.2. Design Build

As a response to the inefficiencies of the traditional procurement route, the design build procurement route is used in the construction industry. In the design build, the contractor does the design part as well. The employer is not directly involved in the design. The employer states their required deliverables, and the contractor will design and build the asset accordingly. Usually, there is a fixed price, fixed duration, and agreed deliverables. This increases the certainty of the cost, time, and quality to the employer. The cost can be higher in design build as the contractor undertakes the design as well as need to absorb more risks. On the other hand, the cost can also be lower as the contractor can use their expertise to lower the costs and to come up with innovative designs and construction techniques subject to their expertise in a particular field. When the employer focuses more on shorter times, lower risks, and less engagement with the project, this procurement route can be the best [9,26].

According to De Oliveira et al. (2021), retrofit projects can be tendered under both traditional and design build routes with their own risks and benefits. They recommend appointing a design consultant to minimise the risks associated with any of these methods [27]. The London Borough of Hammersmith and Fulham (LBHF) council has entered this innovative partnership procurement with Energiesprong to retrofit 27 houses under the (SHDF) Social Housing Decarbonisation Fund. Further, they have used Collaborative procurement, which means one party procures on behalf of the others [30].

#### 2.2.3. Management Contracting

This procurement route is similar to the traditional procurement method, where the design is carried out by a separate designer employed by the employer, and construction is carried out by several subcontractors. The subcontractors do not have a direct contractual agreement with the employer, and they report to a management contractor. The management contractor is appointed early in the project's lifecycle. The management contractor is mainly involved with the project to manage the project and procure subcontractors according to the employer's requirements. The contractual agreement is only between the employer and the management contractor. Usually, the management contractor is paid as a cost—reimbursement for the subcontractor's work plus an administration fee. There can be different agreements as well. The advantage to the employer is the single point of contact, better control over the design, and flexibility of the project delivery. Further, the project delivery will be faster than the traditional route as the main contractor is appointed early in the project lifecycle [9,26].

JCT standard forms of contract have three contract documents for managing contracting. Accordingly, management contracting has been identified as an accepted procurement

route in the UK [31]. As per the literature review on the topic of management contracting, there was no considerable literature found either in scholarly articles or grey literature.

#### 2.2.4. Construction Management

The construction management procurement route is highly similar to the management contracting route. The difference is that the employer enters direct contracts with several subcontractors to get the work done. These subcontractors are managed by a single construction manager, appointed early in the project. The construction manager is paid a fee for managing the project. The design is carried out by a separate designer, construction is assigned to the subcontractors, and the construction manager manages the project on behalf of the employer. The advantages are better control over the design and better flexibility of project delivery. There is the risk of potential disputes between the parties and the employer is directly exposed to contractual obligations. Further, conflicts of interest of the construction manager can be harmful to the employer [9,26].

An active client is required to have this route of procurement [32] as the construction manager only oversees the subcontractors. In this situation, the client will have to manage the designers, quantity surveyors, structural engineers, and other project parties on their own. As the construction manager is appointed early in the project, this enables the project to be started earlier with the designs, and the subcontractors to be procured faster [33]. The construction management procurement route was particularly noteworthy in the Great Eastern Hotel v. John Laing (2005) case [34]. The defendant's construction manager had allegedly breached his obligation in the contract. The literature did not find more details about the practical applications of this procurement route.

#### 2.2.5. Framework Agreements

Frameworks or framework agreements are contracts between the client and contractors to procure goods and services, which are usually observed in both private and public construction projects. Framework agreements can also be observed in the procurement of subcontractors by main contractors. In these framework agreements, a manageable number of contractors are selected through a rigorous screening process. The framework agreement is enforced for a certain period, usually for a maximum of four years. The framework does not include any specific projects, apart from the nature of projects. When there is a particular construction need, the works are offered to the parties in the framework agreement. This could be a win-win situation for both the client and the contractors. Clients do not need to go through lengthy procurement processes while the contractors get the work easily. There is no guarantee that the contractors will get work. The client can call the shortlisted contractors and offer the work to the contractor who provides the best package of work [9,35]. Framework agreements are widely used in the public sector. The key problem is the poor understanding of the government officers to properly use framework agreements. For example, although the framework helps to shortlist the contractors, there should be a further economic test before awarding the contract [9]. This includes price comparisons to ensure they are reasonable. Another example is a poor understanding of the scope of work and the suitability of the contractor for the given scope. The framework does not simply override these requirements.

There are criticisms over using framework agreements for housing retrofit projects when it comes to social housing retrofit. The UK government has originally recommended framework agreements to procure contractors for minor construction works and maintenance works for the local authorities. In this case, there are criticisms that the framework agreements are not fit for housing retrofit [36]. The scholarly literature does not show much content related to the use of framework agreements in the UK public sector procurement.

It is noted that framework agreements are common in the European Union public procurement. Researchers argue that the most critical problem with framework agreements is the lack of transparency, especially during the award of the contract. The public client shall ensure the selection process is transparent and properly communicated to all the contractors of the framework. Every contractor has the same rights in the framework. However, this does not happen every time and public officers think they can give the contract to anybody in the contract as they wish [37].

As far as the framework agreements for retrofit are concerned, the recent framework agreement announced by Greater Manchester Combined Authority (GMCA) can be given as a recent example. According to this framework agreement, the GMCA procures retrofit services for the next four years. Examples of these services can be given as heat pumps, insulation, ventilation, doors, windows, solar systems, Turnkey solutions, PAS 2035 roles, and customer journey services [38]. It was noticed that the local authorities commonly use framework agreements for delivering retrofit projects under government grants.

Table 1 above compares the discussed characteristics of procurement types as a summary. Different procurement types have different levels of control, risk, speed, and flexibility. The discussion section will evaluate these factors in detail to see how they can be applied to housing retrofit procurement aspects.

**Table 1.** Comparison of procurement routes.

| | | Traditional | Design Build | Management Contracting | Construction Management | Framework Agreements |
|---|---|---|---|---|---|---|
| 1. | Client control | High control | Limited | Medium | High | Medium |
| 2. | Cost certainty | High | Medium | Medium | Low | Medium |
| 3. | Speed of delivery | Slow | Fast | Fast | Fast | Depends |
| 4. | Risk distribution | Client | Contractor | Shared | Client | Depends |
| 5. | Flexibility | Low | Medium | High | High | Medium |

### *2.3. Contract Types*

The second part of the literature review focuses on contract administration. Accordingly, three contract types were selected. These contracts were chosen considering the existing and potential application of these contracts in the housing retrofit industry. The first two contract types are New Engineering Contracts (NEC) and Joint Contract Tribunal (JCT) contracts. These are standard forms of contract in the UK construction industry. In addition to these, there are bespoke contracts. These contracts do not belong to standard forms of contract but are used by contractors with their own terms and conditions.

#### 2.3.1. New Engineering Contracts [NEC]

The NEC contracts are formed by the Institution of Civil Engineers of the UK. They were first issued in 1993, after considering the issues with adversarial-type contracts. NEC contracts are written in plain English for easy digestion by the parties, with the right balance of responsibilities to protect the interests of both the contractors and the clients. They have focused on the unique characteristics of the built environment. NEC have a series of contracts which can be used from the start to the end of any project, from small to

large. The NEC contracts are specially designed to reduce potential disputes in construction projects. The fourth version of NEC contracts was published in 2017 by further adapting to the changes in the construction industry [39].

Usually, the NEC contracts are designed for engineering projects. They are adaptable for building works as well. NEC forms of contract are largely used in framework agreements of government projects. The approach of the NEC contracts is to achieve excellence through collaboration [33]. NEC contracts have been proven to successfully manage contract administration in large-scale projects. The Crossrail project was one of the largest construction projects with a GBP 14.5 billion budget. The project was to build a 118-km-long railway including 42 km of new tunnels under London to improve the rail transport service. The NEC3 form of contract was used for this project [33,40]. It was reported that an NEC form of contract was used in the Energiesprong Retrofit project in London to retrofit 27 properties [30].

#### 2.3.2. Joint Contract Tribunal [JCT]

JCT contracts are the most popular type of contract in the United Kingdom for domestic projects. They represent around 80% of the total construction contracts executed in the UK [15]. JCT has several contract families suitable for any type of construction contract. These contracts can be used for large-scale construction projects as well as small house refurbishment activities by homeowners. The current version of the JCT contracts was published in 2016 [31]. The JCT contracts have been in the industry since 1931 and are mainly prominent in the UK domestic context. Earlier, the JCT contracts were written in legal language, which was not easily comprehensible to general construction professionals. Further, JCT contracts focused on solving problems and managing risks compared with the proactive approach of NEC contracts. However, JCT has relaxed the wording over time and has been increasing the proactiveness to avoid disputes rather than resolving disputes [31]. Unlike the NEC contracts, the JCT forms of contract are mainly designed for building works.

The Retrofit Academy (the official training partner for retrofit) has mainly recommended the JCT measure terms contract for retrofit projects led by local authorities to procure contractors on behalf of the homeowners. They do not prevent using other standard forms of contract [41].

#### 2.3.3. Bespoke Contracts (Non-Standard Forms)

According to the literature, it is not clear whether the standard forms of construction contract are widely used in the housing retrofit industry or not. It can be argued that an average homeowner does not have much contract administration knowledge. In this case, the bespoke contracts are used by the small-scale contractors for housing retrofit projects (if there is a contract). Considering this situation, the findings in the literature are validated by the retrofit industry experts in the discussion section. The advantage of the standard forms of contract is their effectiveness. When there is a dispute, it is easier to resolve the matter with standard forms of contract due to the availability of experts and case studies. These standard forms are tried and tested for a long time and there are professionals available who can resolve the problem easily. In this case, both the employer's and contractor's rights are protected [42]. These advantages may not be available with bespoke contracts. Dispute resolution for bespoke contracts can be time-consuming and expensive as every contract needs to be interpreted separately. The standard forms of contract are already interpreted by industry experts, and there are sufficient case laws available in the industry.

The Social Housing Retrofit Accelerator report recommends standard forms of contract over bespoke contracts. These bespoke contracts are heavily loaded with terms and

conditions which can reduce the appeal of the suppliers and contractors. Standard forms are proven to allocate risk and reward among the parties in a more transparent way [15]. In some cases, the parties have decided to include bespoke terms and conditions in standard forms of contract. For example, in the London Energiesprong project to retrofit 27 properties, the social landlord added some bespoke clauses to the NEC form of contract [30].

## 3. Materials and Methods

The data collection was done by way of semi-structured interviews with representatives of ten retrofit contractors in the UK retrofit industry. Three of the installers were small-scale contractors who provided one retrofit measure each. These installers did not work on any specific large-scale project but worked on their own installing single retrofit measures. Depending on the circumstances, they have been subcontracted by large contractors. Four other large-scale contractors provided integrated retrofit services. They delivered whole house retrofit solutions from design to commissioning. While they had their own team for several retrofit measures, they had a range of subcontractors who were recruited under framework agreements. These organisations work both on government-funded and individual projects commissioned by able-to-pay sector homeowners. In addition, three organisations were mainly involved in delivering government-funded retrofit projects. Two of them were engaged mainly with (HUG) Home Upgrade Grant projects. The other contractor was involved in a range of government-funded projects.

Table 2 shows the background details of the interviewees. All the contractors were recruited for interviews through convenient sampling. The interviews were conducted in person during the period from March 2024 to August 2024. The participants were recruited through industry events and exhibitions in Manchester and London related to housing retrofit.

**Table 2.** Interviewee details.

| | Role | Type of Services | Organisation | Projects | Education | Experience |
|---|---|---|---|---|---|---|
| 1. | Partner | Home improvements | Small | Local | Not declared | 20+ |
| 2. | Partner | Home improvements | Small | Local | Not declared | 10+ |
| 3. | Team member | Doors and windows | Small | Local | Not declared | 5+ |
| 4. | Director | Integrated services | Large | Able to pay | Masters | 20+ |
| 5. | Project manager | Integrated services | Large | Able to pay | Not declared | 10+ |
| 6. | Director | Integrated services | Large | Able to pay/grants | Masters | 20+ |
| 7. | Marketing manager | Integrated services | Large | Able to pay/grants | Bachelors | 5+ |
| 8. | Operations manager | Retrofit measures | Large | SDHF/HUG/ECO | Bachelors | 10+ |
| 9. | Quantity surveyor | Retrofit measures | Large | Grants—HUG | Bachelors | 5+ |
| 10. | Engineer | Heat Pump Installation | Large | Grants—HUG | Masters | 10+ |

A simple questionnaire was used to collect responses from the interviewees. There were four key questions in the questionnaire to stimulate the discussion. The questions were about the main procurement route in housing retrofit, the main form of contract,

problems associated with existing contracts, and perceptions towards standard forms of contract. Further questions were asked as the discussion continued. The ethical considerations are complied with according to the conditions of university ethics approval of the corresponding author's doctoral study.

## 4. Results

### 4.1. Main Procurement Route in Housing Retrofit

As far as the existing contracts in the retrofit industry are concerned, two scenarios can be identified. One is how the large contractors procure subcontractors. The other is how the contractors enter into agreements with the clients. All seven large-scale contractors said they procure subcontractors through framework agreements. The situation is complicated when these contractors are engaged with the clients.

When the three small-scale contractors were concerned, they were providing single measures to the clients. Two contractors were engaged in loft conversions, extensions, and wall and loft insulations. The other contractor was mainly involved in installing doors, windows, decks, and conservatories. According to the findings, they have never used formal agreements, neither bespoke contracts nor standard forms of contract. When there is work, they will first issue a quotation. After the installation, they will issue an invoice to be paid. Depending on the circumstances, a guarantee is given considering the materials, components, and the nature of the work.

Four large-scale contractors provided integrated retrofit measures. Mainly, they focused on the able-to-pay sector. Some of them were engaged in government-funded projects as well. These contractors were reported to provide overall retrofit services from assessment to evaluation. One of them said that they use bespoke contracts to enter into agreements with the clients. The interviewees said they were happy about the particular bespoke contract as it clearly defined the scope of the work. The contract defines what services to provide, what level of performance is expected, and what the guarantees and the dispute resolution procedure are. One contractor said they use the JCT design and build contracts for contract administration. The other two interviewees said they usually use quotations and invoices like small-scale contractors. When there was a need for a contract, they used some other forms. Although one contractor did not use a contract for retrofit, they were using JCT design build contracts for their new-build housing projects.

There is a different situation observed with the large-scale contractors working with the government grant schemes. These three contractors were contracted by the managing agent of the government grant on behalf of the local authority. A framework agreement was used to procure these contractors. These three contractors provided only certain measures in the project. Two contractors were mainly involved in insulation measures, and the other contractor was involved with heat pump solutions. Two scenarios could be identified with these contractors.

Two contractors who worked for the Home Upgrade Grant installed insulation measures for properties owned by owner-occupiers and private landlords. The clients apply for funding from the local authority. Once approved, the retrofit measures were installed by the contractors. The Local Authority paid the invoices on behalf of the clients under the government grant. The clients received the guarantees and warranties from the contractor according to the conditions imposed by PAS 2035. From the point of contract administration, there was no direct form of contract executed between the subcontractor and the client. In the other scenario, the heat pump installer was installing heat pump solutions. They were MCS certified. Accordingly, they had a contract executed between the client and the company under MCS certification guidelines.

The interviewees generally stated that the design part of some retrofit measures cannot be separated from the installation part. The replacement nature of retrofit installations has discouraged the industry from thinking about procurement routes in housing retrofit. This situation is mainly applicable to single measures. When it comes to retrofit projects with several retrofit measures, mostly there is a designer involved. Two interviewees (supplying integrated measures) said they had in-house retrofit designers to design retrofit measures. Further, subcontractors were working with them to install these measures. They were procured under framework agreements.

In general, the retrofit industry is not as straightforward as the new-build industry. The contractors are observed to be comfortable without formal contracts. There are bespoke agreements observed under the design build procurement route in housing retrofit in the able-to-pay sector projects. According to one large-scale contractor, the traditional procurement route can also be noted in some of the cases with the able-to-pay sector, where the homeowner approaches a designer and construction aspects are handed over to another party. Even if there was a separate designer involved in the retrofit project, it was unlikely that the works would be carried out under a properly executed traditional contract.

Considering these aspects, it can be noted that the main type of procurement in housing retrofit is design build. Large-scale contractors employ a designer to design the retrofit project and employ several installers to install the measures. Mainly, the retrofit designers, assessors, and coordinators are in-house while the installers are subcontracted. As the homeowner is not involved in selecting the installers or designers, design build seems to be the most appropriate term, compared to management contracting.

### *4.2. The Main Form of Contract in Housing Retrofit*

The four contractors who provided integrated retrofit services have focused on the able-to-pay sector. They were also involved in delivering projects under government grants. It was found that there were contracts executed between the homeowner and the contractor only in the able-to-pay sector where the homeowner paid for the retrofit. Apart from one contractor, these contracts were mainly bespoke contracts. The interviewees stated that they had seen JCT and Federation of Master Builders contracts on some occasions. One contractor who was involved in integrated retrofit services clearly said they use JCT design build contracts in all of the projects. They found that the use of a JCT design build contract properly allocates rights and obligations between the parties. Further, they wanted to reduce the potential disputes by using the JCT design to build a standard form of contract.

The three small-scale contractors had never used a formal contract, apart from the occasions they were procured by a main contractor under framework agreements. The reason for not using a formal contract was explained as the hesitation to enter into binding legal contracts with the clients. They see entering into formal contracts as an unnecessary commitment. Furthermore, they did not have the skills and resources to provide these administrative services. One small-scale contractor said that, although there are no formal contracts, they provide an invoice which creates obligations for them to ensure the performance of the installation. One of the large-scale contractor representatives said the small-scale contractors do whatever possible to avoid entering into formal agreements. He further said small-scale contractors do not realise the benefits and protections available with standard forms of contract.

When it comes to retrofit projects under government grants, there were no contracts executed between the homeowners and the contractors. There are warranties, guarantees, and certifications provided as a part of the service delivery. In the case of social housing, there were bespoke contracts executed between the social landlord and the managing agent. The managing agent used a framework agreement to procure retrofit installers. The purpose

of the framework agreement is to work with a pre-selected set of installers and to reduce the hassle and time involved with the formal tendering process. Small-scale housing retrofit installers work with the homeowners directly or they work under framework agreements with larger organisations. In any case, they only provide quotations and invoices to the homeowners. None of the small-scale contractors in the sample had ever used a formal contract with homeowners for their work.

Considering the scenario, the only standard form of contract used by any of these contractors was a JCT Design Build or MCS prescribed contract for heat pump installation. Apart from this, the other three large-scale contractors used bespoke contracts. They agreed that the enforceability of these contracts was unknown as they had never been faced with a legal dispute at the litigation level.

### *4.3. Problems Associated with Existing Contracts*

None of the interviewees answered this question properly. They did not have a proper idea about the nature of the issues involved with the existing contracts. None of the small-scale or large-scale contractors had faced a contractual dispute which escalated into arbitration or litigation. (The literature was also not helpful in finding contractual disputes in housing retrofit). When the small-scale contractors were asked why they did not need a contract, they all said there was nothing wrong with their existing practice. One contractor said none of the private clients had asked them for a contract. He further said,

"When everyone is happy with the way things are happening, why do we make our lives harder by bringing contracts?"

All the small-scale contractors agreed that they provide a satisfactory guarantee of their work to the client. They agreed that there were some defects in their work and there were some disputes sometimes. They had managed these disputes mutually without them being escalated to higher levels. On the other hand, these disputes were minor and there was no scope for lengthy and expensive arbitration procedures.

Another small-scale contractor highlighted the shortage of skills and resources required to draft, review, and execute contracts. As they cannot do these by themselves, they have to get support from a third party for contract administration. This increases the project cost. From one point of view, the clients are not asking for contracts. From another point of view, it will increase the project cost and diminish their competitive advantage. All these factors lead to one conclusion for them: no formal contracts are required.

When it comes to interviews with large-scale contractors, they usually need two contracts as discussed before. One is with the subcontractors. Almost all the subcontractor agreements were identified as framework agreements in the sample of seven large-scale contractors. Under the framework agreements, the subcontractors needed to give a defect notification period as agreed with the main contractor. For the purpose of this research, the question was about the contractual disputes with the homeowners/landlords in housing retrofit, not with the subcontractors.

The large-scale contractors had the experience of executing contracts with either the able-to-pay clients or social housing landlords. They also have not faced any extreme disputes that were escalated to arbitration or litigation levels. When they were asked about the problems associated with the existing bespoke contracts, they could not point out proper issues. One interviewee admitted that they do not have any idea about the performance levels of their bespoke contracts. Another interviewee (from the company that used JCT design build) said they have higher confidence about their contractual security as they have used a standard form of contract.

In general, it can be concluded that there are no considerable problems associated with the existing way of managing rights and obligations in housing retrofit without standard

forms of contract. Further, a case law search was done to identify any housing retrofit disputes between contractors and clients. The search did not yield any substantial findings. It can be argued that the term "Retrofit" is relatively new and the contract administration was not an outstanding area of concern in housing retrofit so far.

### 4.4. Perceptions Towards Standard Forms of Contract

The four large-scale contractors (mainly provided services to the able-to-pay sector) had an overall positive idea about adopting standard forms of contract for the housing retrofit projects. However, they did not see a clear requirement to adopt standard forms of contract, as the existing bespoke contracts and other forms of correspondence with the homeowners were already doing the right job. The interviewee (from the company using JCT design build) had confidence in their legal protection and the allocation of responsibilities. The other large-scale contractors also expressed that it would be better to use a standard form of contract over their existing bespoke contracts. One interviewee was already determined to explore the standard forms of contract for their projects with the insights received from the interview. In general, the perception towards the use of standard forms of contract was positive with the large-scale contractor segment work in the able-to-pay sector.

The three large-scale contractors working with retrofit projects under government grants were indifferent to the use of standard forms of contract. One contractor said they did not need to have a contract with the owner-occupiers and private landlords as they were already in a framework contract with the council under the government grant. They acknowledged that they would consider adopting a proper standard form of contract if they happened to work with homeowners directly.

The small-scale contractors needed answers to the problems of how to manage the additional back office and the additional costs associated with using standard forms of contract for contract administration. They said that they would consider standard forms of contract when it became clear that the use of standard forms of contract was beneficial to them. The general perception towards the standard form of contract was slightly negative. One small-scale contractor said they preferred anything which limited their responsibility in the project. This was endorsed by a representative of a large-scale contractor.

"The small-scale installers will do anything not to have a contract, although having a contract is beneficial for both the parties" in his own words.

In conclusion, it was clear that none of the interviewees had focused on the contract administration aspects of the retrofit projects. Contract administration was not their favourite topic to talk about. In reality, they had bigger challenges in housing retrofit projects. For example, managing skilled workers or addressing technical challenges. Some of the interviewees understood the importance of proper contract administration in retrofit projects, despite the relatively lower project values of housing retrofit projects compared to civil or new-build construction projects. In conclusion, large-scale contractors had a relatively positive attitude towards standard forms of contract, while small-scale contractors were not interested.

## 5. Discussion

Retrofit work deals with both risk and construction processes. In this sense, there is no difference between retrofit and other construction projects from a contract administration point of view. As far as the JCT contracts are considered, there are suitable forms of contract for small-scale retrofit projects and larger projects. For example, JCT has homeowner contracts for housing renovations with or without a consultant [31]. The retrofit coordinator

works as a construction consultant who oversees the project delivery in the best interest of the client [5].

When it comes to the UK government's recommendations for procurement in construction projects, the construction playbook provides valuable insights [8]. According to the construction playbook, the characteristics of procurement are emphasised under three topics: award method, responsibility for design, and responsibility for project management. The focus is related to tendering: open tendering or restricted tendering. The playbook further discusses framework agreements as they are commonly used to reduce procurement costs and keep prices low. Another important document for retrofit procurement is the guidance issued for social housing projects [15]. According to this toolkit, there are five procurement routes. They are focused on the openness and restrictiveness of the tendering process for the contractors, but not the allocation of responsibilities to the project parties. For the contract types, the toolkit introduces four types: NEC 3/4, FIDIC, JCT, and PPC 2000.

As far as the above-discussed procurement routes are concerned, traditional procurement can be more time-consuming and heavily complex for a housing retrofit project as there is a separate consultant who undertakes the design and consultancy responsibilities. The same goes for the management contracting procurement route as it requires a separate consultant for design and consultancy. Considering the nature and the scope of housing retrofit projects, both traditional and management contracting routes are not recommended. This is the same for mass-scale retrofit projects such as multi-family residential complexes, housing terraces, or city-wide retrofit projects under social housing retrofit projects. Even though the houses can share the same architectural plans, the state of maintenance and the retrofit requirements can be highly different from one house to another.

Another procurement route is design build. There is a possibility to use the design build procurement route when there is a large-scale contractor involved with the retrofit. These contractors have their own team consisting of retrofit subcontractors, designers, as well as retrofit coordinators. The design build contracts can be used with any type of client discussed before. This can be individual clients such as owner-occupiers and private landlords. Otherwise, design build contracts can be used with social landlords. There is no difference observed in the client type. Currently, one-stop shop retrofit solution providers are emerging in the UK retrofit industry. These contractors provide integrated retrofit services to clients from initial advice to monitoring and evaluation [43]. Practical constraints can be observed with the limited number of available contractors who provide such integrated housing retrofit solutions.

Finally, the construction management procurement route can be identified as the most aligned procurement route, when there is no large-scale contractor involved. This procurement route will work best with both individual clients and social housing landlords. The retrofit coordinator can work as the construction manager, which is already endorsed by the PAS 2035:2023. As there are different installers for different measures in the UK housing retrofit industry, the retrofit coordinator will manage them for effective project delivery. The contractual agreement will be between the homeowner and the contractors. In the case of social housing, the agreement will be between the social housing landlord and the subcontractors.

When it comes to deciding the contract administration in housing retrofit, the first aspect that needs to be focused on is the nature of the client. If the client is an individual such as an owner-occupier or a private landlord, the next focus needs to be on the supply chain. The contractor can be an entity which provides integrated services, or a one-stop shop solution provider. In this situation, a design build procurement route is recommended. A JCT or NEC design build contract is recommended as the standard form of contract.

Further, the JCT building contract and consultancy agreement for homeowners/occupiers can also be recommended as it is designed to work with a single contractor.

In the case of a fragmented supply chain where the works are attended by different subcontractors, the construction management procurement route can be recommended. For a recommendation for a standard form of contract, a JCT construction management contract is recommended. The client needs to evaluate several factors when deciding the supply chain type. Currently, the contractors providing integrated retrofit services are limited. In this case, the market availability of integrated contractors is a matter of concern. The other important aspect is the cost. Due to the single point of contact and the low risk and hassle to the contractor, the cost of the integrated retrofit services can be higher. In this situation, cost and availability can be the key determinants of the supply chain type.

If the client is a social landlord, similar recommendations can be given. If the social landlord is looking for integrated contractors, the design build procurement can be suggested. This can be a reason why the LBHF council has entered a design build contract with Energiesprong UK to retrofit 27 houses under the SHDF grant [30]. It is not practical to expect to have these types of one-stop shop solution or integrated retrofit delivery services. In such a situation, the social landlord can easily use the construction management procurement route to procure several subcontractors to install the retrofit measures with a separate retrofit coordinator service. In this situation, both the design build and construction management procurement routes can be considered. The selection depends on the social landlord's risk appetite and the expertise to run projects. A highly expertise risk-seeking landlord may use construction management where they can have more control over the project.

The availability of government funding is another important aspect to look at. Most of the social housing projects are run by government funding, for example SHDF, the Social Housing Decarbonisation Fund [15]. These grants are delivered through local authorities and combined authorities. There will be a greater influence from the funding body on the project for the selection of the procurement route and the contract type if the project is government-funded. According to the literature, most of the government-funded projects procure contractors through framework agreements [15,37]. They expect the contractors to enter into their own contracts with the clients.

By taking into consideration the above discussion, the following summary findings can be given. The execution of construction contracts is highly rare in the residential retrofit industry. The framework agreements used for government-funded projects only secure the interests of the local authority involved in the project delivery. The proper allocation of rights and obligations between the contractor and the client (homeowner/landlord) is not evident. Due to the scope of individual projects (single houses) and the growing stage of the housing retrofit industry, contractual disputes are not yet evident in the onset. Accordingly, the need for proper contract administration in the retrofit industry has not been visible for now.

## 6. Conclusions

The purpose of this study was to critically analyse the existing procurement routes and forms of contract in housing retrofit. As the number of procurement routes and forms of contract are exhaustive, the study focused only on five main procurement routes and two main standard forms of contract. Finally, empirical data collection was conducted with the retrofit contractors to ascertain their exposure towards contract administration and procurement in the UK housing retrofit industry. Considering the interview findings, the housing retrofit industry does not use construction contracts to a considerable level. In the cases where the contracts are executed, they are bespoke contracts. JCT and NEC

contracts were reported to be used in some instances. As the industry has just started to grow, there are not many case studies available where the contract administration of the retrofit went wrong. Because of this reason, there is no demand for formal contracts and the client awareness of the importance of formal contracts is low.

The UK has more than 30.1 million houses [44], and almost all the houses need some level of retrofit [45]. When the number of retrofitted houses grows, the disputes related to retrofit will also grow. According to the RIBA Construction and Law Report 2022, 27% of the construction projects in the UK have faced at least one dispute [46]. By adopting this ratio, it can be expected that 8.1 million projects will face some level of dispute. In monetary terms, this will equal GBP 221.4 billion, with an estimated total housing retrofit budget of GBP 820 billion [47]. In that situation, both the clients and the contractors may realise the need for a standard form of contract to resolve these disputes, although it is too late.

It is not rational to assume that only the guarantees, warranties, and invoices will be helpful to resolve these disputes. Even with the bespoke contracts, the problem might not be resolved well. Legal firms can find a point to make claims by identifying loopholes in these bespoke contracts. Considering these points, it is important to clearly define the responsibilities of the parties and have uniformity in contract administration in housing retrofit, preferably by using a standard form of contract.

The study recommends the design build procurement route to work with contractors who provide integrated retrofit services (one-stop shops). The construction management procurement route is recommended to work when there is more than one contractor. Digital versions of one-stop shops or Integrated Project Delivery (IPD) models adapted for housing retrofit shall promote industry collaboration, while supporting better contract administration [48,49]. These technological inputs may ease the adoption of standard forms of contract. Future research is recommended to evaluate how technological tools can facilitate contract administration in housing retrofit, providing ease of use and cost-efficiency to contractors.

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