EN

sHELTER

Promoting Energy Renovation

THE GUIDE

INNOVATE TO RENOVATE

Social housing plays a key role in the strategy to reach the ambitious energy objectives set in the EU agenda: 25 million social housing units account for 12% of the housing stock in the EU27 and these units are responsible for 18% of the total final energy consumption. The question is whether the energy renovation coordination models we are using can deliver a massive energy refurbishment of the social housing stock. In fact, the lack of optimised energy renovation models is very likely to impede this process. In many cases energy objectives are not even included in the renovation programmes of Social Housing Organisations (SHO). SHELTER has identified that improving the cooperation between professionals involved in renovation of social housing will be a major step towards meeting the aims of the European Union regarding the energy performance of buildings. Such an improvement will also deliver significant benefits in terms of higher comfort and lower fuel-bills for Social Housing tenants.

This Guide is the result of three years research into energy renovation delivery methods undertaken by the SHELTER project. The SHELTER project aims to identify better procedures for the energy renovation processes in the social housing sector, especially by improving coordination and cooperation between clients, advisers and contractors.

The SHELTER project has produced a deep analysis of existing energy renovation delivery methods and a European survey of current practice across Europe made through questionnaires and personal interviews with representatives of the housing sector across Europe. Different delivery methods, and especially: Step-by-Step renovation; Design-Bid-Build with energy performance award criteria and integrated delivery methods have been tested in six real refurbishment projects of the participating SHOs' building stock. The reports are available at www.shelterproject-iee.eu

The aim of this Guide is to propose possible alternatives for the energy renovation process for SHO. These alternatives have been shown to overcome difficulties some SHOs have experienced in their existing renovation processes.

In addition, this guide should inform associations of private homeowners in Bulgaria. These associations are commonplace in the majority of East European countries where the notion of social housing refers to the majority of the housing stock from the period 1945–1989. Developed by the totalitarian states, former eastern-block social housing is characterized by very limited size, quality, management and maintenance. As a result, Eastern Europe has a large number of condominium housing, mostly privatised after the political changes, of intrinsically low quality and in urgent need of renovation. The extent of renovation required is due to the lack of adequate management in past.

▲ The Guide is divided into three sections:

Section 1 describes the different delivery methods that a SHO can use for an energy renovation project, as identified in the SHELTER project. Here, "delivery method" means the process used by an SHO to organise the design, works and subsequent maintenance for a construction project. Each delivery method is analysed, describing the involvement and relationship of people in the different phases.

Section 2 introduces a "decision tree" that is aimed at guiding SHOs in the choice of the most appropriate delivery method depending on a number of identified key parameters that are related to the general policy and ambition of the SHO and to the specific characteristics of each refurbishment project.

Section 3 provides detailed guidance on specific tools that are necessary or may be useful to implement the chosen delivery method. This section describes how to implement and what actions that a SHO can take to improve its renovation process. Some specific examples and links to existing guides complete the landscape of available tools.

This guide is linked to another SHELTER publication "Recommendations for Public Authorities" that gives a number of recommendations on how to improve the coordination between professionals in the energy renovation of social housing.

THE PROJECT PARTNERS

Social Housing Organisations

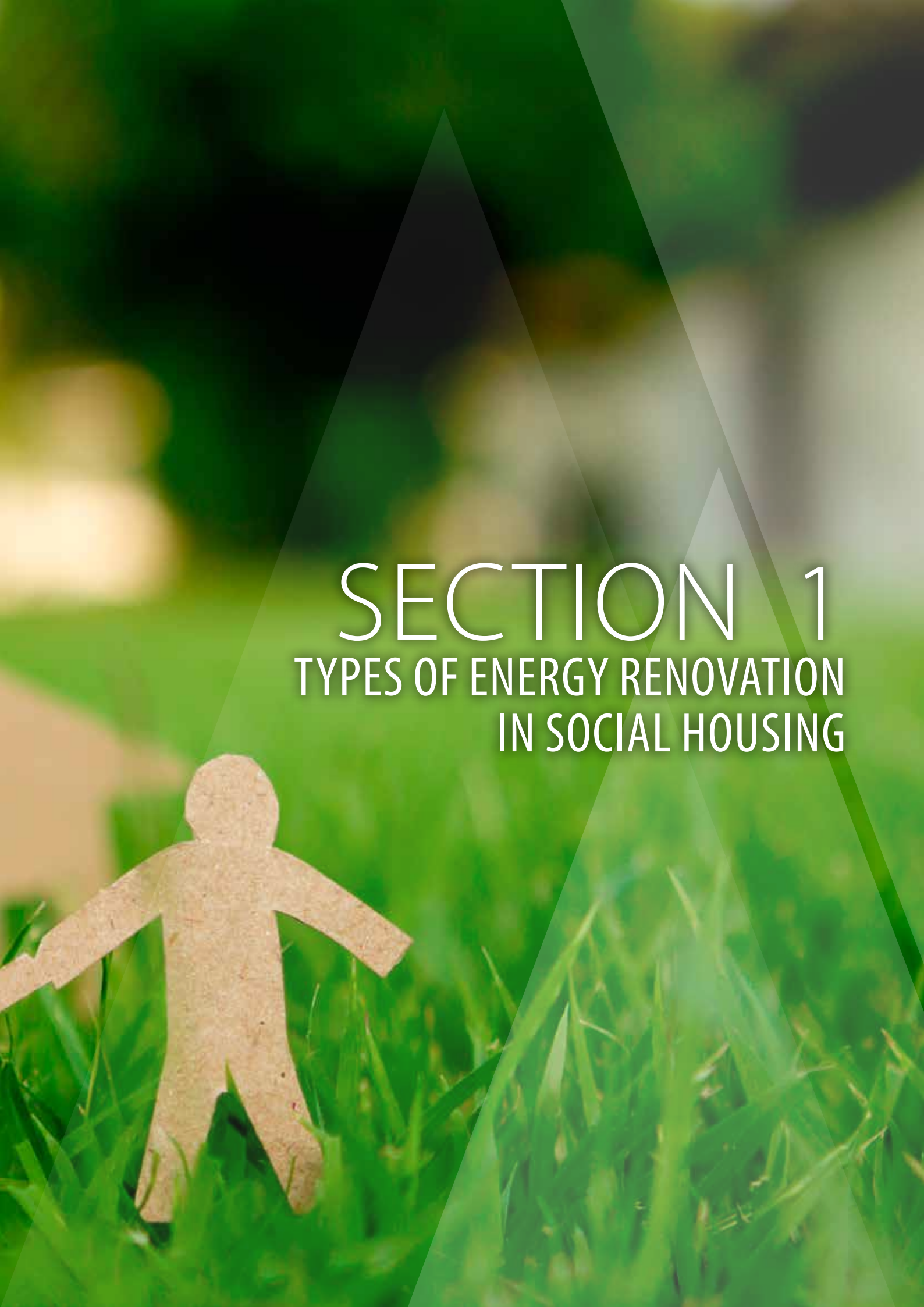
ARTE Genoa, Italy
Black Country Housing Group (BCHG), United Kingdom
Bulgarian Housing Association (BHA), Bulgaria
Dynacité, France
Logirep, France
Walloon Housing Association (SWL), Belgium

EU Professional Federations

Architect's Council of Europe (ACE)
CECODHAS, The federation of public, cooperative and social housing
European Builders Confederation (EBC)

Research Centre

OTB Research Institute for the Built Environment, Delft University of Technology, the Netherlands



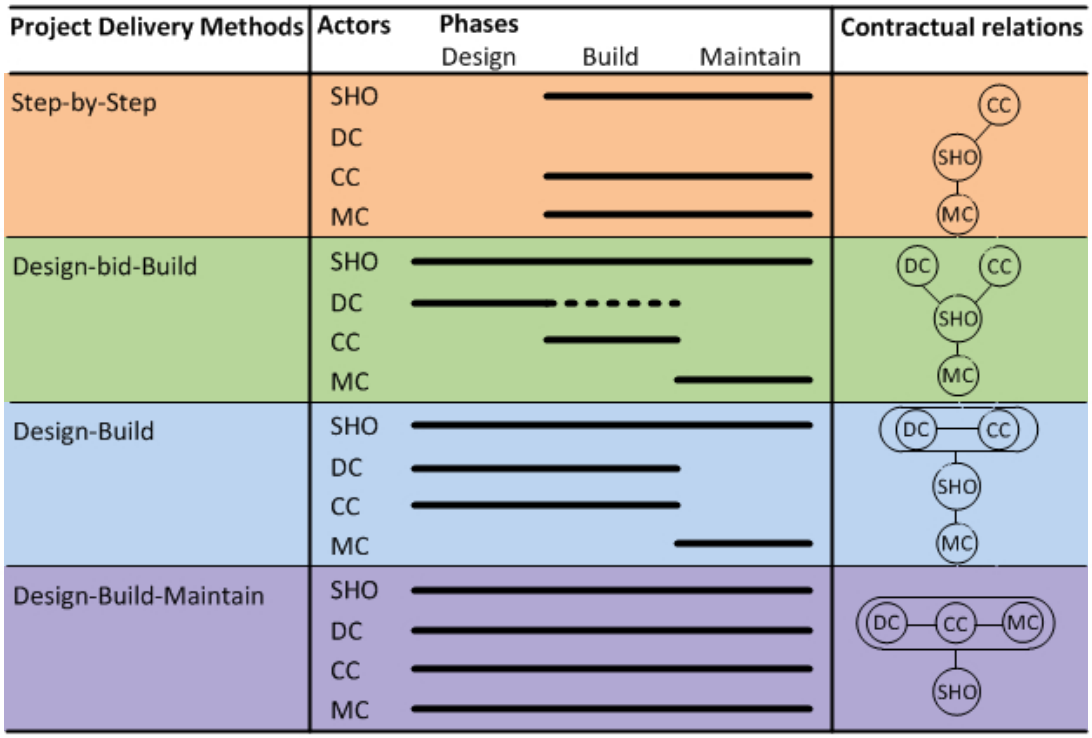
SECTION 1
TYPES OF ENERGY RENOVATION IN SOCIAL HOUSING

In the SHELTER project energy renovation is defined as any major renovation works that result in a significant improvement in the energy performance of the building and an extension of the building's service-life. Most SHOs are developing this kind of renovation in response to mandatory EU targets for carbon emission reductions and to protect their tenants from escalating fuel prices.

The renovation processes can be categorised by their project delivery method, i.e. the process used by the SHO to organise the design, works and subsequent maintenance for a construction project. SHELTER has identified four main renovation-project delivery methods that are used by social housing providers:

- **SbS** Step-by-Step (SbS)
- **DBB** Design-Bid-Build (DBB)
- **DB** Design-Build (DB)
- **DBM** Design-Build-Maintain (DBM)

Figure 1 shows who should be involved in the construction phases for each project delivery method and the contractual relationships between them. This is further explained in following paragraphs.



SHO: Social Housing Organisation / DC: Design Companies / CC: Construction Companies / MC: Maintenance Companies

Figure 1. People involved and contractual relationships per project delivery method

STEP-BY-STEP RENOVATIONS SbS

Step-by-step renovations can deliver major (energy) renovation when the replacement of a series of building components produces the same conditions as a major renovation. In order to optimise the service lives of building components a SHO might choose to split a major renovation into a series of minor renovations, i.e. roof insulation, insulation of façades, window replacement, heating system replacement, kitchen renovation, bathroom renovation electrical installations and interior design. In that case, renovation actions will be carried out by different construction companies and at different times. Cost-efficiency is delivered by procuring a large number of replacements but only when a particular component has reached the end of its service-life. With this project delivery method it is unusual to need a design phase because the interventions are mainly the replacement of building products and systems. A designer is only required where the appearance of a building has to be altered, where there will be changes to the interior design, where there might be structural alterations or where a complex building service is involved.

Step-by-step renovations differ from planned maintenance because step-by-step renovations can deliver better building performance than simply maintaining existing; inefficient systems. Figure 2, shows the difference between planned maintenance, step-by-step renovation and major renovation.

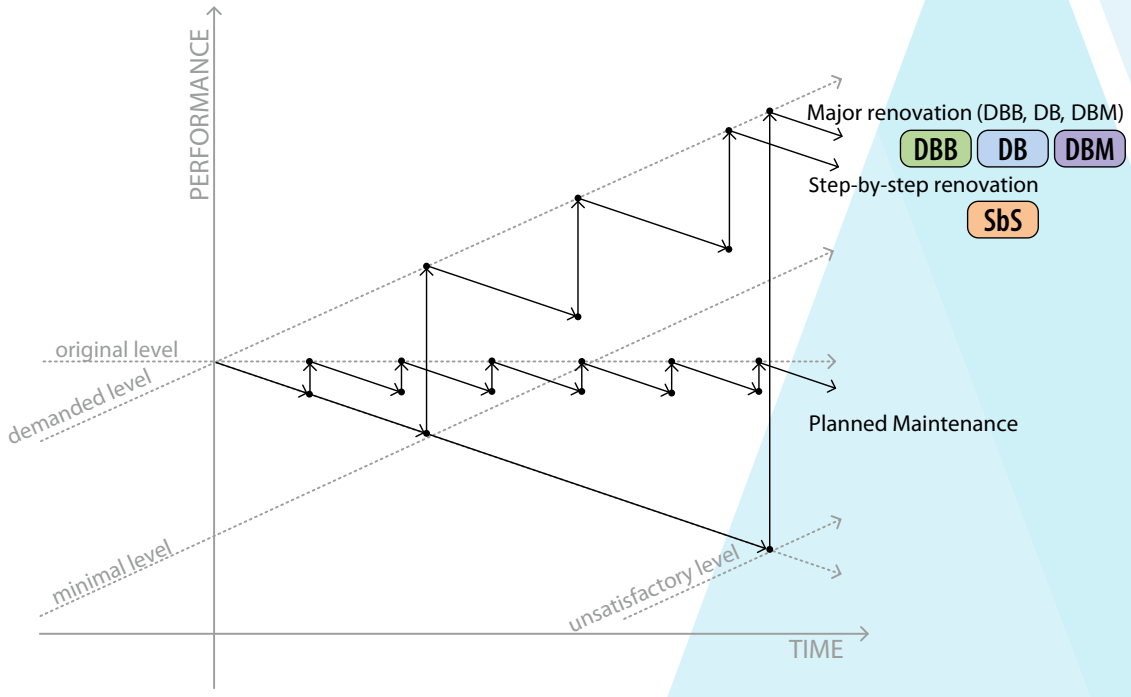


Figure 2. Step-by-step renovation versus planned maintenance and major renovation

As the renovation works are done by building component, there are several loops of tendering of construction and construction works within the maintenance phase. See Figure 3. Usually there is no design-related phase; therefore, there is no need to tender for a designer.

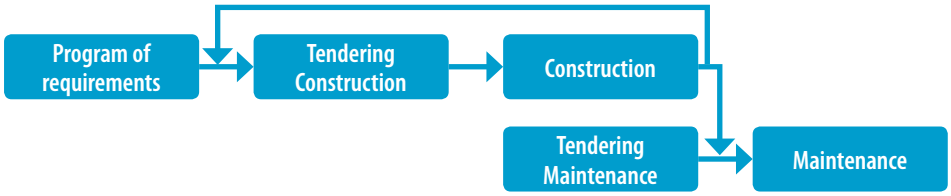


Figure 3. Phases of a renovation project using a step-by-step delivery method

The SHO engages with the construction companies and maintenance companies via contracts, see Figure 4, the social housing provider asks for a specific service and the contracted company delivers the requested service. There is no relationship between construction and maintenance companies and, usually, no design companies are involved. In a step-by-step renovation the construction companies and the maintenance companies (as well as the design companies whenever involved) are often various specialist SMEs; each one having a direct contract with the SHO.

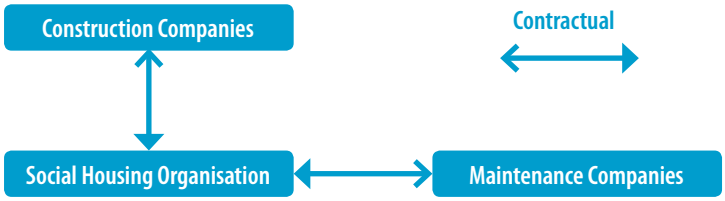


Figure 4. Type of relationships between people involved in step-by-step process

Design-Bid-Build DBB

In Design-Bid-Build project delivery, the different contracted parties: design companies; construction companies and maintenance companies are involved in the project one after the other; see Figure 5. First, the SHO tenders the design works. The appointed design companies develop the technical specifications that will be used to tender construction works and the successful contractor will deliver the specified works; albeit under the supervision of the designer. Once the works are finished responsibilities for maintaining the building are transferred to the SHO's maintenance team. That team will arrange maintenance works; usually by contracting with various specialist maintenance companies. Commonly, maintenance companies have a contract with the SHO for a fixed duration. Tendering procedures for maintenance are unlikely to have any impact on or connection with tenders for renovation projects.

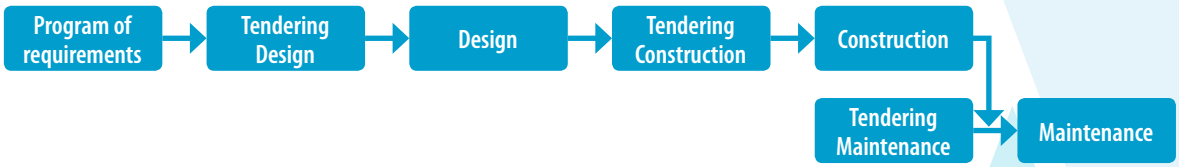


Figure 5. Phases of a renovation project using Design-Bid-Build delivery method

The SHO engages with the design companies via a consultative relationship, see Figure 6. The SHO defines its needs and the design companies propose solutions to satisfy these needs. The SHO engages with the construction companies and the maintenance companies via contracts. The specifications for the contracts with the construction companies are prepared by the design companies. The works carried out by the construction companies are often supervised by the design companies; however, the relationship between design companies and construction companies is only informative because there is no contract between them.

In a design-bid-build renovation approach the design companies are often a group of independent consultancy companies led by an architect's office. The different design companies can have a direct contract with the SHO or be subcontracted by the architect's office. The construction companies can be a group of SMEs with direct contracts with the SHO, or a group of SMEs subcontracted by a general contractor. The maintenance companies are often SMEs having a direct contract with the SHO.

Figure 6. Type of relationships between people involved in design-bid-build

When in-house capability exists, the SHO can develop its own designs and specifications and tender the works. According to the SHELTER survey, more than half of the SHOs use in-house designers, although the percentage differs from country to country.

Construction can be tendered either with a general contractor or in separate lots. Again, this depends on the internal capacity of the SHO to manage the works. According to the SHELTER survey, SHOs using the Design-Bid-Build delivery method use generally descriptive specifications. Only 30% of the SHOs use performance-based specifications.

There are two types of awarding procedure for tendering designs and works: lowest price or most economically advantageous offer. Although the most economically advantageous offer is quite widespread in the different European countries, there is still a large proportion of contracts, 40%, that is awarded to the lowest price; according to the SHELTER survey. The reasons given for awarding to the lowest price are:

- difficulties to be objective when using award criteria, feeling lack of transparency in the process;
- more work needed for the SHO if awarding to the most economically advantageous offer;
- most economically advantageous offer only worthwhile for bigger projects;
- specialist knowledge needed to make best use of award criteria

The options in Section 3 aim to overcome these barriers by providing some recommendations that will help achieving the best possible result when using the DBB delivery method.

Design-Build DB

In a Design-Build project delivery the SHO tenders the design and construction works in a single contract; see Figure 7. The contracted entity could be a single company, with or without subcontractors, or a consortium including design and construction companies. Once the works are finished, responsibilities for maintaining the building are transferred to the SHO's maintenance team. That team will arrange maintenance works; usually by contracting with various specialist maintenance companies. Commonly, maintenance companies have a contract with the SHO for a fixed duration. Tendering procedures for maintenance are unlikely to have any impact on or connection with tenders for renovation projects.

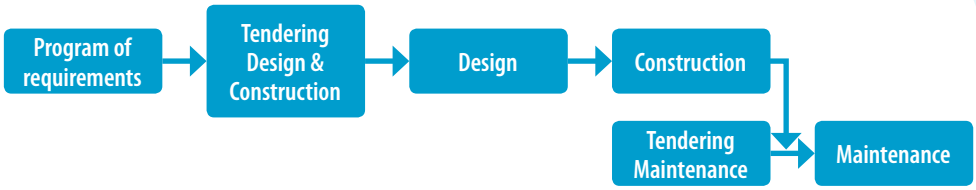


Figure 7. Phases of a renovation project using Design-Build delivery method

The SHO engages with a single entity comprising design companies and construction companies; via a consultative relationship (Figure 8). The SHO defines its needs and the single entity proposes solutions to satisfy these needs. The SHO engages with the maintenance companies via a contract.

The single entity could be a general contractor, that has several design and construction companies subcontracted, or it could be a consortium formed by design and construction companies. The number of companies in a consortium differs in every case and they often engage in a partnership arrangement as they have mutually defined objectives and they share the risks. The maintenance companies are often SMEs each having a direct contract with the SHO.

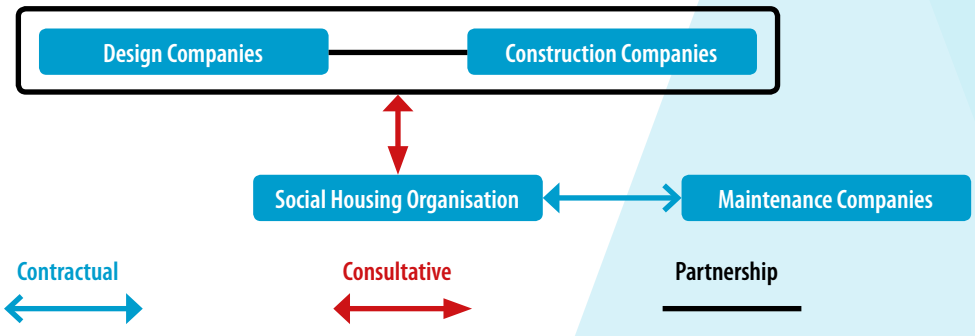


Figure 8. Type of relationships between people involved in design-build process

Design-Build-Maintain DBM

In a Design-Build-Maintain project delivery the SHO tenders the design, construction works and maintenance works in a single contract; see Figure 9. The contracted entity could be a single company, with or without subcontractors, or a consortium including design, construction and maintenance companies. In any case the people in charge of the design, construction and maintenance are involved in the project from the design phase onwards. The inclusion of the maintenance company in a single contract; with design and construction, offers the possibility to develop a guarantee of performance when the works are complete.

Figure 9. Phases of a renovation project using Design-Build-Maintain delivery method

The SHO engages with a single entity comprising design companies and construction companies via a consultative relationship (Figure 10). The SHO defines its needs and the single entity proposes solutions to satisfy these needs.

The single entity could be a general contractor that has several design, construction and maintenance companies subcontracted or it could be a consortium comprising design companies, construction companies and maintenance companies. The number of companies being part of the consortium differs in every case and they often engage through a partnership arrangement as they have mutually defined objectives and they share the risks.

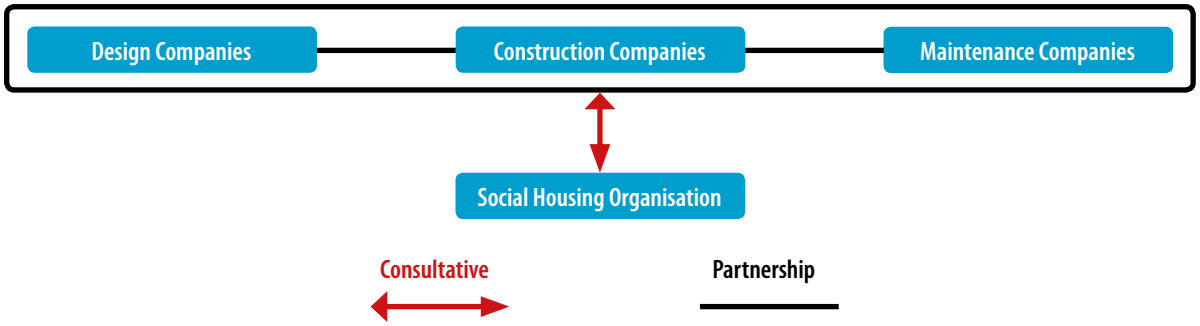


Figure 10. Type of relationships between people involved in design-build-maintain

Data used in this Guide come from the conclusions of the survey and interviews that the University of Delft has performed as part of the SHELTER project. More information about this work and data from the survey and interviews can be found in the SHELTER project publication "A European survey of energy renovation delivery methods"; **available at www.shelterproject-iee.eu**

SECTION 2
CHOOSING AN EFFECTIVE PROJECT DELIVERY METHOD

All the delivery methods presented in Chapter 2 can be used by a single SHO when renovating its building stock. The choice of the most effective delivery method is a question that has to be asked for each new renovation project.

The SHELTER project has defined a number of factors that can help a SHO decide which delivery method is most suitable for a given project. The decision tree in Figure 11 is intended to assist people to make these decisions.

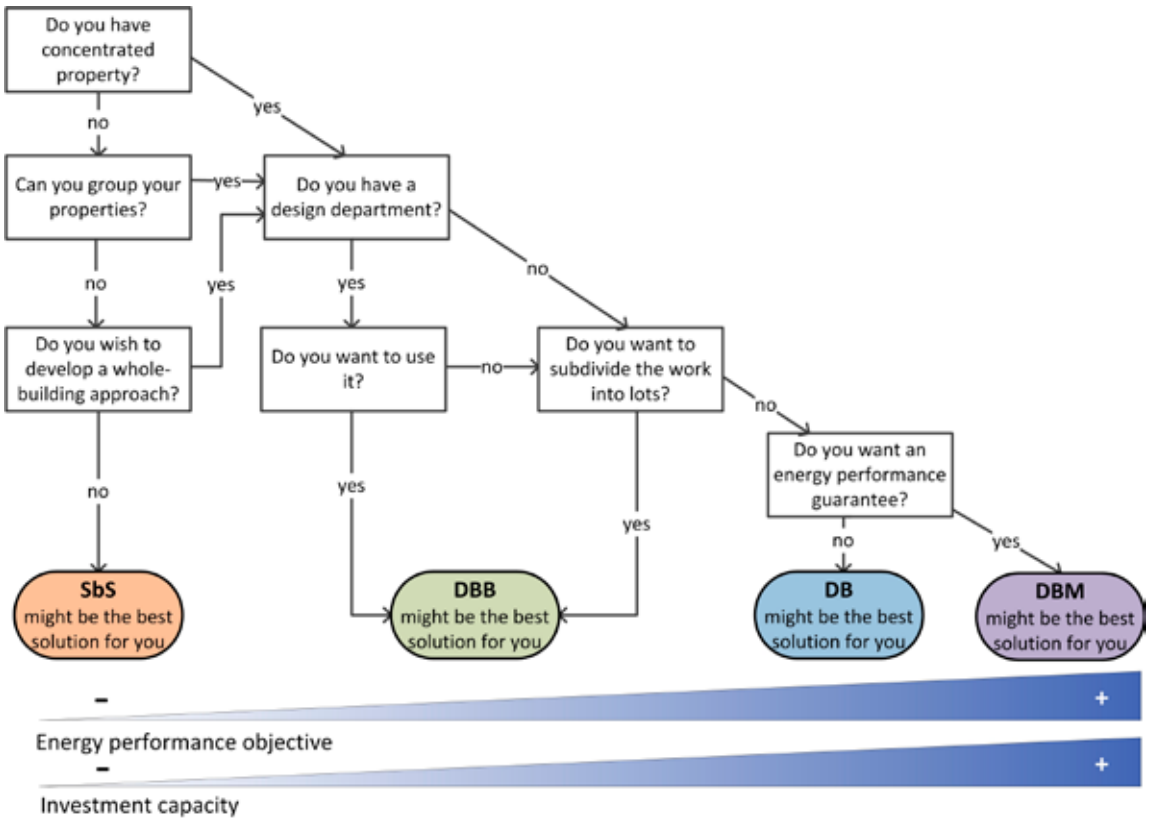


Figure 11. Project delivery method decision tree

A number of factors can influence the choice:

The horizontal factors (at the bottom of the diagram) reflect different degrees of ambition:

- Energy performance objective: the four delivery methods do not necessarily deliver the same performance at the end of the works. If high energy performance is essential, then a method allowing a whole-building approach, and particularly integrated delivery methods such as design-build or design-build-maintain are more appropriate. The design-build delivery method is particularly appropriate to high energy ambitions and renovation techniques dealing with prefabricated or multifunctional construction elements needing close cooperation between the design and construction.
- Investment capacity: step-by-step renovations require less investment capacity as the works are split into a series of minor renovations at different times and can therefore normally be funded from day-to-day revenue rather than necessitating borrowing. Conversely, using design-build-maintain implies developing an ambitious project requiring high investment capacity. Financing capacity is therefore a key decision factor. It is important to note that we refer here to initial investment capacity, regardless of whole-life costs and return on investment considerations.

Factors given by the characteristics of the SHO and of its housing stock:

- Characteristics of the building stock: the geographical location of the building stock is a key factor. When dealing with geographically spread properties, or when the SHO owns only a few apartments in a building, step-by-step renovations may be the only possibility unless properties can be grouped.
- In-house capacity: in-house design capacity and willingness to work in separate lots can make design-bid-build the most appropriate delivery method.

The following table gives a synthesis of the advantages and disadvantages of each method; identified by SHELTER.

SbS	+	Splits renovation into small interventions
		Stimulates building components whole-life costing approach
		Easier to secure specific subsidies
		Facilitates intervention over pepper-potted stock
	–	Limits interactions between components
		Favours components with short pay-back time
		Prevents cooperation between construction teams
DBB	+	All people involved know their role well
		Well suited to tendering for the lowest price
	–	Lack of collaboration between people involved
		Harder to manage liability
DB	+	Improves certainty of price for renovation works
		Completed in shorter time than DBB
		Performance-based specifications can be implemented
	–	Direct involvement of SMEs is more complicated
		Precludes referee role of design companies
		Presupposes a change in the role of the people involved
DBM	+	Substantially improves the certainty of price
		Transfers the majority of design risk from SHO to contractor
		Easier to use performance-based specifications
		Stimulates project whole-life costing approach
	–	Direct involvement of SMEs more complicated
		Precludes referee role of design companies
		Presupposes a change in the role of the people involved
		Presupposes change in management strategy

Table 1. Project delivery method advantages and disadvantages


ENERGY

SECTION 3
IMPLEMENTING EFFECTIVE ENERGY RENOVATION PROJECTS

When a SHO decides to improve the energy performance of a building, it must choose a project delivery method. Results of the SHELTER project show that the DBM approach offers the maximum potential to deliver energy savings. This project delivery method facilitates the collaboration between the different people involved as well as their commitment to achieve common project goals. It is possible, however, to use other project delivery methods and still obtain substantial energy savings, by following the recommendations within this guide.

In Table 2 options that SHOs could take when implementing an effective energy renovation project are listed per project delivery method.

Strategy				
- Introduce energy efficiency as one of the key parameters	SbS	DBB	DB	DBM
- Group properties by typology and geography	SbS			
Tendering and contracting				
- Use award criteria	SbS	DBB	DB	DBM
- Use framework agreements	SbS	DBB	DB	DBM
- Use performance-based specifications			DB	DBM
- Use competitive dialogue			DB	DBM
- Use Energy Performance Contracting				DBM
Design				
- Design models by typology of dwellings	SbS			
- Invite maintenance companies to participate in design phase		DBB	DB	
- Strengthen the design team's role	SbS	DBB	DB	DBM
Construction				
- Organise meetings with all the project team members		DBB		
Maintenance				
- Agree transfer process from construction to maintenance	SbS	DBB	DB	

Table 2. Key actions per phase and project delivery method

3.1 Strategy

Introduce energy efficiency as one of the key parameters

SbS DBB DB DBM

Why

To ensure the integration of energy efficiency improvements as part of wider renovation objectives. To prioritise the renovation projects with larger potential energy savings. To guarantee lower costs for the energy efficiency measures, in comparison with doing the work in isolation.

How

Add energy performance information to the housing stock asset management data, for example by recording certified energy performance of dwellings (which is already mandatory in several European countries). Take into account energy efficiency information when defining housing stock strategies and renovation plans.

Example

The French SHO, Dynacité, has integrated energy performance as an indicator in its housing renovation strategy. Energy performance is analysed with other indicators, like external architectural quality, social impacts and commercial capability. These indicators allow Dynacité to prioritise buildings on which to concentrate its renovation capacities. Dynacité has labelled 100% of its housing stock during the year 2011 for their "energy note". In addition to Energy Performance Certificates, Dynacité also includes the dilapidation of the heating system and, the type of fuel used (gas, electricity, wood, etc.) in its "energy note". They now plan to prioritise the renovation of dwellings rated as class E or worse.

Know more

Managing the assets: a guide for housing associations, National Housing Federation.
ⓘ http://bit.ly/18jWI1e

Concerted action EPBD, EU. ⓘ www.epbd-ca.eu

Linked to recommendation 1 of the document "Recommendations for Public Authorities".

Group properties by typology and geography

SbS

Why

To facilitate the implementation of measures in a larger amount of properties reducing its price per unit. This can be enhanced if additional, neighbouring properties owned by other people/organisations can be included with the landlord's own properties.

How

Add housing typology information to the housing stock asset management data. Group properties by typology and geography. Take into account the typology and geographical information when defining the renovation plans.

Example

By focussing its attention strategically; by typology and by geography, the UK SHO, Black Country Housing Group, generated savings of £80,000 on a £1.0M programme, i.e. 8% before competitive pricing effects. It was also possible to concentrate solid-wall insulation on an estate where BCHG owns a significant number in a pepper-potted estate.

Know more

Typology Approach for Building Stock Energy Assessment, TABULA. ⓘ www.building-typology.eu

3.2 Tendering and contracting

Use award criteria

SbS DBB DB DBM

Why

To encourage competition on quality rather than price.

How

Define award criteria related to the main goals to be achieved by the renovation project. Choose award criteria that are easy to evaluate. Define evaluation procedures for the award criteria. Explain clearly, to the organisations who are tendering, the criteria and evaluation procedures; at the beginning of the selection process.

Example

The French SHO Dynacité has used the following award criteria in its DBM energy renovation project in Nurieux:

1. Technical criteria - 55%
    - 1.1. Works methodology (14%)
    - 1.2. Energy performance objective (20%)
    - 1.3. Quality of the maintenance (14%)
    - 1.4. Tenant's guidance (7%)
2. Price 45%

To evaluate the technical criteria, Dynacité had created a reference offer, which included all of the technical aspects Dynacité wanted to implement in its project. The tender submissions were compared to this reference offer. The tender that was the closest to the reference offer was chosen.

The French SHO Logirep has used the following award criteria for its DBM energy renovation project in Vitry-sur-Seine (Paris region):

1. Price (30%)
2. Energy savings proposed (10%)
3. Energy saving measures proposed (15%)
4. Obtaining the French BBC certificate (high energy performing building corresponding to a theoretical consumption of 104 kWh/m2/year) (5%)
5. Technical report (25%)
6. Architectural quality of the project (15%)

The Italian SHO ARTE Genoa has used the following criteria for its DBB deep renovation project Via Sertoli n.9 in Genoa:

1. Economic bid (30%)
2. Technical bid (20%) (particular attention is reserved to the works program)
3. Technical bid for energy saving (50%)

The technical bid for energy savings was divided in sub-criteria

1. Efficiency of the heating and hot-water system (6%)
2. Efficiency of the photovoltaic system (3%) points
3. Efficiency of the solar thermal system (3%)
4. Most valuable energy saving in terms of thermal inertia of the insulating shell of the building (8 %)
5. Energy saving/recovering lifts (3%)
6. Efficiency of the data communication system connected to the terminals of the technical offices of ARTE (3%)
7. Term for system maintenance (9 %)
8. Energy saving from thermal performance of windows, French windows and landing doors; including frames. (5%)
9. Increase in the global energy performance of the building (10%)

Dynacité project information in Power House Europe ⓘ http://bit.ly/18jZKgF
Logirep project information in Power House Europe ⓘ http://bit.ly/15X73hQ
Arte project information in Power House Europe ⓘ http://bit.ly/1577p64

Know more

Construction Green Public procurement (GPP) Product Sheet, European Commission.
ⓘ http://bit.ly/12hm47j

Linked to the recommendation 2 of the document "Recommendations for Public Authorities".

Use framework agreements

SbS DBB DB DBM

Why

When a SHO has an on-going demand for works and services and the exact quantities are unknown, they can simplify the tender using framework agreements.

How

Tender a framework agreement for specific types of work or services. Select a single provider or pre-select multiple providers for that specific type of work or service for a set period e.g. four years.

In the UK it has been shown to be advantageous to tender a large programme of works on multiple sites in a partnering arrangement known as a Framework Agreement. This approach enables a proper economic test to be undertaken through a formal procurement but without knowing the specifics of design, specification or even, perhaps, specific addresses. Once the successful partners are appointed they collaborate to "design" the most efficient programme for the client.

Example

Through Framework agreements, lessons learned on early interventions can be transferred to later interventions. Improvements can be in performance and/or cost. Cost savings can be shared, in order to incentivise all parties to seek them. Collaborative working practices, within Frameworks, have also been shown to improve the relationships between partners.

Black Country Housing Group employed Framework agreements for trial projects in their SHELTER pilot; for all of these reasons. They employed a specialist consultant to develop the framework agreement such that the contracts between the various parties were written "back-to-back". This was essential to ensure that no one contract made it impossible to execute one of the other contracts.

Know more

Framework agreement guide, SIGMA Support for Improvement in Governance and Management.
ⓘ http://bit.ly/11zmAyu

Use performance-based specifications

DB DBM

Why	To allow the candidates to propose several alternatives for the required functionality. To define clear actions and responsibilities if the required performance is not being achieved.
How	Choose which performance parameters are to be used in the specifications and define minimum or maximum values (e.g. dwelling temperature 20-22°C, heating consumption 50kWh/m^2). Define the methods to evaluate the parameters chosen. Define the penalties and bonuses (where applicable) in relation to the performance achieved.
Example	The French SHO Logirep has used performance-based specifications in its energy renovation project of Vitry-sur-Seine. One of the performance-parameters defined in specifications was actual energy consumption. The contractor was engaged to reduce actual energy consumption by 40%, in comparison with a "0 level" that had been assessed by an independent engineering firm. This target had been included in the tendering procedure. The invitation to tender asked for 30% of energy reduction (also defined by an external engineering firm). We speak here of actual energy consumption for heating and hot water, not estimated consumption. Therefore, the behaviour of the tenants has an influence on the contracted performance. This risk was owned by the successful consortium. The consortium included a social worker, responsible for working with the tenants in order to promote more energy efficient behaviour. No penalties are applied for under-performance during the first year after the end of the works, which is a "test year". During this first year, the guaranteed solar performance is agreed. After the "test year", if the reduction in energy consumption is greater than contracted, the gains are shared 50/50 between the consortium and the tenants. In case of underperformance, 100% of the extra cost is paid by the consortium.
Know more	Project information in Power House Europe. ⓘ http://bit.ly/15X73hQ Performance specification guide, U.S. Department of Defence ⓘ http://bit.ly/ZxJ597

Linked to the recommendations 2 and 3 of the document "Recommendations for Public Authorities".

Use competitive dialogue

DB DBM

Why	To improve the quality of the offers. To make sure that pre-selected organisations, invited to tender, understand the functional specifications in the same way as the SHO before they make their offers.
How	Announce that the tender will make use of competitive dialogue as a tendering procedure. It is advisable that the pre-selection reduces the number of candidates to three. Define a schedule of meetings with the candidates, organised in rounds. Make sure that all candidates always have the same information from you, so that none gets a competitive advantage but do not share proposals from one candidate with his/her competitors. Take into consideration that compensation for the unsuccessful candidates is reasonable practice.
Example	The French SHO Dynacité has made use of a competitive dialogue in one round in its energy renovation project in Nurieux. The tendering procedure, from publishing the offer until awarding the contract took about 9 months. The competitive dialogue offered Dynacité the possibility to better understand and evaluate the offers made by the different candidates. It also allowed improving the initial program of works of the project, thanks to the solutions presented and explained by the candidates. The competitive dialogue gave Dynacité the possibility to evaluate the professionalism and the motivation of candidates, demonstrated by the presentations and discussions.
Know more	The competitive dialogue. Government of the Netherlands. ⓘ http://bit.ly/1013n6t

Linked to the recommendation 5 of the document "Recommendations for Public Authorities".

Use Energy Performance Contracting

DBM

Why	To stress the importance of energy efficiency as a performance criterion. To guarantee the successful achievement of the contracted energy performance. To access third party finance schemes.
How	Define energy performance as the key performance criterion. Define the evaluation procedure to check that the contracted performance is being achieved. Define penalties where the performance is not achieved and bonus (share of the savings) where the results are better than defined.
Example	The French SHO ICF Nord-Est has made use of Energy Performance Contracting for the renovation 64 dwellings in Schiltigheim, guaranteeing energy savings of 47%. The contract used had several features: - Refurbishment works to upgrade the standard of comfort of both the dwellings and the common areas - Energy renovation with substantial investments in the building shell to achieve a guaranteed level of energy performance - Energy performance guarantee for the buildings for 19 years, through an operation and maintenance contract - Financing of energy renovations, which are progressively repaid by the Client , subject to achieving the guaranteed energy performance
Know more	Project information ⓘ http://bit.ly/100m007 Handbook on Energy Performance Contracting in Social Housing with third party financing, FRESH. ⓘ http://bit.ly/100n7YC Energy Exploitation and Performance Contracting for Low Income and Social Housing, ECOLISH ⓘ http://bit.ly/140CVVM Toolbox for Energy Performance Contracting, EESI ⓘ http://bit.ly/17vvBM0 Innovative financing mechanisms for energy renovation. (in French) ⓘ http://bit.ly/12Pu9Tv

Linked to recommendations 3 and 5 of the document "Recommendations for Public Authorities".

3.3 Design

Design models by typology of dwellings

SbS

Why	To take into account positive interactions between different renovations works, i.e. roof replacement and installation of solar cells. To ensure that architectural quality is at least maintained, if not enhanced.
How	Making a renovation design model that can be applied to different dwellings with the same typology. Defining the renovation works to be performed based on this model for the dwelling of this typology.
Example	The UK SHO Black Country Housing Group has categorised its property by building type. This includes the 3-dimentional characteristics of the building together with the specification and condition of key elements, such as the type of heating system present. It also operates a "void standard" repair specification that is applied to all properties when a tenant leaves and before a new tenant takes up residence. Through their SHELTER project this approach has been modified to inform the future step-by-step renovation of the housing stock. Each dwelling type has an improvement specification that will deliver an 80% carbon savings (c.f. 1990); by 2050.
Know more	UK's National Building Specification Scheduler, enables the specification of work packages by dwelling type. ⓘ http://bit.ly/11T6Zv8

Linked to the recommendation 6 of the document "Recommendations for Public Authorities".

Invite maintenance companies to participate in design phase

DBB DB

Why	To give useful advice to the design team during the design phase.
How	Invite maintenance companies that are already working for the SHO to participate as advisors in the design process.
Example	An employee of the maintenance service department of the French SHO Dynacité participated in the design phase of renovation projects. Dynacité has also created a tool for the selection of heating systems. This tool uses a simple calculation of investment and maintenance costs. Designers and technical advisors are contractually obliged to use this tool and to propose to Dynacité three possible alternatives for the heating system, including life cycle costs.
Know more	Cost Optimum and Standard Solutions for Maintenance and Management of the Social housing Stock, AFTER ⓘ http://afterproject.eu

Linked to recommendations 4 and 5 of the document "Recommendations for Public Authorities".

Strengthen the design team's role

SbS DBB DB DBM

Why

To benefit from the multiplicity of disciplines that designers (architects and engineers) encompass and to support an integrated approach to project planning. To overcome difficulties in the renovation process which arise from conflicts between urban planning and energy regulations. To avoid the selected project delivery method compromising the design.

How

Supporting lead-designers, e.g. architects, to undertake the task of coordinating project team members. Designers can go beyond their traditional role in the building process. Their role within partnering projects (apart from coordinating) can be in relation to cost estimating, project scheduling, construction supervising, safety regulations and sustainability aspects. Designers can be directly contracted by the client to provide a quality control service.

Example

In December 2012 the Dutch Institute for Architecture (NAI) and Vernieuwing Bouw (a network organisation for innovation in building processes) organised a meeting about the role of architects in partnering projects similar to those of "Slim & Snel". The conclusions that were drawn for architects are briefly listed below:

- Architects cannot choose their traditional role in the building process. Instead they have to seek for a new role within partnering projects
- The competences of architects are important. Their skills, especially in visualisation at the start of the building process, are of great value. Their contribution brings an added value to a building project.
- Architects should focus more on product/process repeatable products.

As indicated by the above conclusions, a whole new perspective for the role of architects arises through the innovative renovation approaches followed in the Netherlands, as part of the "Energiesprong" program. Until now, in the fragmented construction "chain", the client has been responsible for the technical specification of a building. For this the client relied on specialised consultants not only for the forming of a proposal, but also for the definition of the problem. Different consultants provided various solutions the final result of which was usually a non- coherent translation into specifications and drawings. Innovative solutions are now examined in the Slim & Snel project, for the renovation of a large part of the Dutch housing stock. Slim & Snel- as part of the "Energiesprong" program- focuses on collaboration processes between all the different stakeholders involved in the construction sector. Based on 3 different starting models (that deal with different processes for putting the problem into context and forming a solution), four experimental projects are under way. In all projects "Slim & Snel" directly involves housing associations, designers and contractors, municipalities and end users to implement innovative renovation concepts and innovative collaboration processes. Among the preliminary conclusions of this process is that the degree to which this integrated design approach can be achieved is highly dependent on the way that the cooperation among the different stakeholders and people takes place. This is a challenge that architects can successfully address by going beyond their traditional roles and assuming a coordinating role in the renovation process.

Know more

Innovation for Energy Efficient Renovation in Dutch Social Housing ⓘ http://bit.ly/157c2x0

The role of the architect in the supply chain integration (in Dutch) ⓘ http://bit.ly/11T7CoF

Linked to recommendations 6,7,8 of the document" Recommendations for Public Authorities".

3.4 Construction

Organise meetings with all the project team members	DBB
Why	To help to create a collaborative environment between contractors, subcontractors and designers. To have a better knowledge of the parties involved.
How	Organising a meeting at the beginning of the construction phase with designers, contractors and subcontractors. Organising a meeting after the first construction phase of the renovation to evaluate the results and propose modifications in case needed.
Example	The pilot development of Bulgarian Housing Association successfully implemented an innovative project management model for subsidised renovation of multi-story apartment buildings. This model strongly relies on the active collaboration of all parties involved. The main result achieved has been a clear understanding that a project management unit is needed specifically to provide co-ordination. This is especially in regard to the professional leadership of the overall project development process. The project management unit is required to guarantee the integrity of the project process, phase by phase. This governed the relationships between the different people in the energy renovation of condominiums; through regular meetings with all the project team members. Regular meetings provided efficiency in the project development process; in terms of costs and timing. The main impacts of the project collaboration trial are related to the greater cost effectiveness of the renovation; in terms of greater energy savings for the same cost of renovation which means better return on investment. This is mainly achieved by the improved bidding procedures for the different type of construction works. In addition, the process led to a better quality of the construction works; mainly due to the improved coordination between the different parties such as designers, contractors and subcontractors. Finally, this innovative project collaboration reduced the overall construction time.
Know more	Energy renovation of Bulgarian homes. Support for energy efficiency in multifamily residential buildings. ⓘ http://bit.ly/12XmpzR

Linked to recommendations 4 and 6 of the document "Recommendations for Public Authorities".

3.5 Maintenance

Agree transfer process from construction to maintenance	SbS DBB DB
Why	To ensure that there is a proper knowledge transfer about the installation from the construction company to the maintenance companies at the end of the works.
How	Planning several meetings between the construction and maintenance companies during the first year of operation.
Example	The sustainable building rating system BREEAM details the value of a Building User Guide in transferring information about the building to subsequent managers and users. This includes maintenance contractors. In order to produce such a guide the design team regularly agrees what needs to be in the Building User Manual and how it should be communicated. This is especially important for complex building services, such as combined heat and power systems. BCHG used this model during a recent new-build project and implemented it, for the first time in renovation, in their SHELTER pilot project.
Know more	Soft Landing guidance, BSRIA. ⓘ http://bit.ly/13J4lYT Make energy change happen toolkit, Changing Behaviour. ⓘ http://mechanisms.energychange.info Developing and implementing effective household energy awareness, BewareE. ⓘ http://bit.ly/11T8Mj0

Linked to recommendations 4, 5 and 17 of the document "Recommendations for Public Authorities".