Deliverable D2.3 Success & Fail Factors of Organizing Demand

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Contents

LIST OF FIGURES

LIST OF TABLES

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Summary

The REFURB project focuses on the complex interplay of barriers through coordinated process organization, innovation and optimization. This report is part of work package 2 ("demand side mapping"), and focuses on the options for organizing the demand, based on best practice experiences. The demand side of the REFURB project refers to private homeowners, which is a diverse group of decision makers in energy efficiency investments that is not well organised and has a limited capacity and ambition to inquire about technical details of energy efficiency solutions.

To gain understanding of the possible ways to improve the organisation of the fragmented demand side, this REFURB report (D2.3) focusses on available and working "demand aggregation schemes". The observation is that improving the organisation of the demand side makes it easier for homeowners to be convinced of the best suitable renovation measures. In almost all regions participating in the REFURB project best practices on schemes to aggregate the demand side exist, e.g. energy collectives. This report analyses 10 demand aggregation schemes in all countries participating in the REFURB project:

- Better housing (DK)
- Buurkracht (NL)
- Green Business Growth (DK)
- Slim Wonen in Leeuwarden (NL)
- Stroomversnelling Koop (NL)
- Tartu apartment schemes (EE)
- Evening school for homeowners (DK)
- The ZEROhome program (DK)
- Pluimstraat Kortrijk (BE)
- Dampoort Gent (BE)
- COA Freiburg (DE)
- Ecofund (SL)

The term "*demand aggregation scheme*" is not widespread in the field of energy renovation of homes. A demand aggregation scheme refers to the ways de demand side can be organized. It is defined within the REFURB project as:

A method for cooperation of homeowners, or national / regional / local program to organize the demand side so the group of homeowners are assisted in their housing renovation process to overcome barriers, and to improve the position of the demand side, e.g. towards the supply side. Demand aggregation schemes target more renovations, and/or improve the renovation e.g. in term of energy efficiency.

This report results in a description of critical success factors and fail factors of demand aggregation schemes based upon the analysis of the above-listed schemes, potential drop-out moments and a set of recommendations of the best way to organize the demand side.

The main **critical success factors** are:

- Independent advice – averse to conflict of interest
- Unburdening – reducing the hassle and burdens of a renovation process
- Energy saving - a perspective on saving energy and money

- Governmental participation – involvement of a neutral player
- Independent decisions - homeowners are not forces into a certain solution
- Peer pressure & ambassadors – acquaintances and peers are involved to convince homeowners
- Financial incentives and solutions – to support homeowners with upfront investment costs
- Not only financial incentives – also other solutions to convince homeowners
- Personal and tailor-made approach - adapted to the particular situation of home, homeowner and family
- Targeted recruitment – focus on well-defined segments of the demand side

The critical **fail factors** are:

- Weak financial architecture of the scheme – no solid business plan to target high volumes of homeowners
- Only focussing on awareness schemes - taking homeowners into a customer journey for a renovation does not stop with awareness rising
- Fail to deal with NZEB - the complexity and added value of this standard should be recognized.
- Engagement of key stakeholders is missing - the right stakeholders on the field should be involved, not too to-down
- Too generic approach to convince homeowners – a non-personal approach increases the drop-out
- Weak links in the chain - all services provided, from all partners, must be of good quality
- Too dependent on volunteers – their commitment can be unpredictable
- Too dependent on external financial funding & subsidies – changes in this external funding can harm the demand aggregation scheme
- External fail factors – things you can't influence, but can influence you

The analysed demand aggregation schemes made use of several strategies to reduce the **drop-out moments**. Drop out moments relate to the moments homeowners decide not to go further in the renovation process, and leave the 'customer journey' (cfr. REFURB Report D2.5). These strategies to reduce the drop-out moments are considered to be effective:

- A personal approach – not limited to "generic" advice
- Creating a kind of "communities" with other participants – e.g. in a neighbourhood
- Offering homeowners a long-term perspective to start a renovation – being present for a longer period
- A toolkit of solutions and knowledge – to overcome all sorts of problems that pop up
- Integrated advice – non-contradictory expertise for all kinds of problems
- Performant communication – flexible and adapted to the context
- A meticulous planning of the renovation works – to avoid additional work and costs

Based on these lessons learned of all these schemes, a set of **10 recommendations to organize the demand side are presented**:

- Copy the success of other schemes – others paved the way
- Regard energy saving as a process, not a service or product – it is not a one-off action

- Respond to the heterogeneity of the demand side – every dwelling and homeowner is different
- Offer holistic and tailor-made solutions with a personal approach – homeowners expect more from their renovation than improving energy performance
- Gain the confidence of the homeowner – difficult but essential
- Make the scheme available for a longer period – the scheme must be available when the homeowner is ready, not the way around
- Trigger, don't push – seduce the homeowner to take the right decision
- Activate the homeowners with latent renovation intentions – this is a great potential
- Design a funding plan for the scheme, from pilot to upscaling – a solid business model makes it run over a longer period
- Enable supply side to connect with demand aggregation scheme – the supply side must be ready to deliver and meet the expectations created

1 Introduction

1.1 THE REFURB-PROJECT: UPSCALING NZEB-RENOVATION

Renovation in the residential sector towards increased energy efficiency is seriously lagging behind the political targets for energy renovation. As more than sufficient technological solutions are available, focus must be on removing non-technological barriers and introducing effective drivers. The main barriers relate to fragmentation of the renovation offer, resulting in inefficient or only partial solutions. One way to solve this is the use of a '1-stop-shop concept'. Many have been put in practice. Some were successful, others not. They might lack an understanding of the concerns and demands of homeowners.

The REFURB project focuses on the complex interplay of barriers through coordinated process organization, innovation and optimization. Work package 2 and work package 3 are dedicated to analyse demand and supply side. This report is part of work package 2 ("demand side mapping"), and focuses on the options for organizing the demand, based on best practice experiences. The demand side of the REFURB project refers to private homeowners, which is a diverse group of decision makers in energy efficiency investments that is not well organised and has a limited capacity and ambition to inquire about technical details of energy efficiency solutions.

In Work Package 2 a segmentation of the demand side is established (report D2.1), and insights are gained into the wishes, needs and motives of homeowners (not) to invest in energy efficiency measures (report D2.2). Negative motives are barriers (psychological, social, financial and other negative arguments to not carry out a renovation. These originate in motivations, desires, needs and the financial situation of homeowners), the positive counterpart are "drivers", positive arguments to carry out a renovation.

To gain further understanding of the possible ways to improve the organisation of the fragmented demand side, this REFURB report (D2.3) focusses on available and working "demand aggregation schemes". The in-depth analysis of these schemes allows defining improved approaches to seduce homeowners to integrate NZEB-ambitions within their renovation, with energy saving translated into their 'language'.

The observation is that a better organisation of the demand side makes it easier for homeowners to be convinced of the best suitable renovation measures. Demand aggregation schemes support the organisation of the renovation process, and reduce the number of potential "drop out moments". These are the moments in which the homeowner decides not to proceed with an (NZEB)-renovation because of an (unforeseen) barrier, e.g. lack of time, lack of trust in the supply side, lack of financial possibilities etc. E.g. by taking up energy saving together with friends or with the neighbourhood, or under guidance of a renovation coach, the drop-out moments can be countered.

In almost all regions participating in the REFURB project best practices on schemes to aggregate the demand side exist, e.g. energy collectives. Often these can be linked with 1-stop-shop concepts (a service in which the homeowner is offered the convenience of having multiple renovation solutions of the supply side met in one location).

This report analyses demand aggregation in practically all countries participating in the REFURB project like *Buurkracht* (NL), ZEROhome (DK), or building block renovation (BE). These existing schemes are analysed for their effectiveness and appropriateness in renovation.

This report results in a **description of critical success factors and fail factors** of demand aggregation schemes, and a set of recommendations of **the best way to organize the demand side**.

Throughout the remainder of this report a general framework for a method to analyse demand aggregation schemes in depth is made (chapter 2). Then the following chapters (3 to 4) conclude on the highlights from the analysed cases, the success and fail factors, and how to avoid drop-outs. Chapter 5 concludes with the lessons learned.

Based on this report on the options to organize the demand side, local differences in demand side drivers and barriers are examined (report D2.4), and improved approaches to seduce homeowners to integrate NZEB ambitions within their renovation are designed (report D2.5).

1.2 DEFINITION OF DEMAND AGGREGATION SCHEMES

The term "*demand aggregation scheme*" is not widespread in the field of energy renovation of homes. It is introduced in the REFURB project as it is a very useful concept in the logic of REFURB. With a central challenge to increase the number of NZEB renovations, barriers can be tackled on (1) the demand side, (2) the supply side, and (3) where demand and supply side meet. There are ways to improve the organisation of the demand side (highlighted in Work Package 2); there are ways to improve the organisation of the supply side (Work Package 3, and better ways to connect supply and demand side (Work package 4).

A demand aggregation scheme refers to the ways de demand side can be organized. It is defined within the REFURB project as:

A method for cooperation of homeowners, or national / regional / local program to organize the demand side so the group of homeowners are assisted in their housing renovation process to overcome barriers, and to improve the position of the demand side, e.g. towards the supply side. Demand aggregation schemes target more renovations, and/or improve the renovation e.g. in term of energy efficiency.

Thus a demand aggregation scheme can refer to a collective initiative of homeowners, or to a kind of service, that enables the homeowners to carry out an (NZEB)-renovation.

The term "1-stop-shop" is used more frequently in the field of housing renovation[1]. In a 1-stop-shop, the focus is rather on the organization of the supply side to offer the demand side holistic and integrated retrofit solutions. The renovation process may involve many companies. The client finds it difficult to consult all necessary information (examples, technical solutions, companies, quality assurance, financial support...). A "1-stop-shop" concept can cluster innovative technologies and solutions of companies and present these as a holistic renovation solution.

Broadly speaking, a demand aggregation scheme focusses on process innovation from the perspective of the demand side and will tackle the barriers homeowners first meet (what renovation is needed, how to organize renovation process, how to finance etc.), whereas 1-stop-shop concepts focus on process improvements of the supply side and the barriers the supply side meets (how to integrate solutions

[1] E.g. in the project "One Stop Shop" about innovations for sustainable renovation to move from demonstration projects towards a high-volume market. www.one-stop-shop.org

technically, how to approach demand side etc.). But it is clear that both perspectives will meet somewhere in the middle.

2 Criteria & method to analyse demand aggregation schemes in depth

2.1 METHOD

The method to analyse the best practices is to describe them in detail, making use of a checklist. The overview of this set of criteria (checklist) to describe the best practices is presented from chapter 2.2 to chapter 2.7. A full template of the checklist is annexed.

The set of criteria was developed during a dedicated REFURB partner workshop in October 2015. The set of criteria is based on the experience of the REFURB partners, and the required output for further activities in the REFURB project (e.g. Work Package 4 on the constitution of the compelling offer).

2.2 OPERATIONAL DESCRIPTION

2.2.1 Partners, stakeholders & roles

The role of partners, stakeholders is assessed by making use of stakeholder analysis in project management, using 2 main dimensions: the interest of stakeholders, and the influence/power of stakeholders. This description is completed with extra information on all stakeholders:

- What is their role in the scheme? Who initiated the scheme? Who are the main partners? Who facilitates? Who gives the advice (e.g. energy consultant)? Who has which responsibilities? Etc.
- What are the efforts and the benefits for them, financial and non-financial?

2.2.2 Financing of the scheme

The financial assessment of the schemes included following questions:

- How the model is financed, i.e. what provides for the operational costs of the scheme?
- Who pays, and who benefits from it?
- How much did/does it cost for participants?
- How to sustain the scheme?
- What is the business potential? Who can earn from it?
- Apart from the financing of the model itself, are there any other financial incentives for those who participate in the scheme? These can be part of the scheme but also external e.g. general subsidies regardless of the participation in the scheme.

2.2.3 Quality of the scheme

The quality assessment of the schemes dealt with following issues:

- How is quality control done?

- Who is responsible for quality control?
- Are there quality issues?

2.2.4 Multi-level governance of the scheme

Multi-level governance refers to the involvement of multiple stakeholders on different (policy) levels. This is described making use of following questions:

- Is there interaction or cooperation with stakeholders on different levels, e.g. national, regional level, local?
- Describe the triple helix cooperation of the scheme (knowledge partners, public sector, and private sector).

2.2.5 Timing

As last operational dimension, the timing of schemes is described:

- From when to when was the scheme operational, or is it still operational?
- Why has it stopped (if applicable)?
- How much time for preparation was needed?
- Home much time is needed to go through the scheme as a homeowner?

2.3 SEGMENTS, DRIVERS & BARRIES

2.3.1 Market Segments

In report D.2.1 of the REFURB project, a framework to segment the demand side has been developed, based on dwelling and dweller characteristics.

The market segments that are targeted in the schemes (if any), are described based on the matrix-system of report D2.1:

- Which the dwelling characteristics (Figure 1) are relevant?
- Which dweller characteristics (Figure 2) are relevant?

E.g. a scheme can be designed for people with high awareness and/or high income, for dwellings with high energy saving potential, for existing cooperatives or existing groups of home-owners, or for low-income homeowners living in deprived neighbourhoods with poor housing quality.

For every characteristic, the analysis indicates whether:

- This characteristic is important for the targeted segment of the scheme
- The scheme was more or less successful for dwellings or homeowners with this characteristic

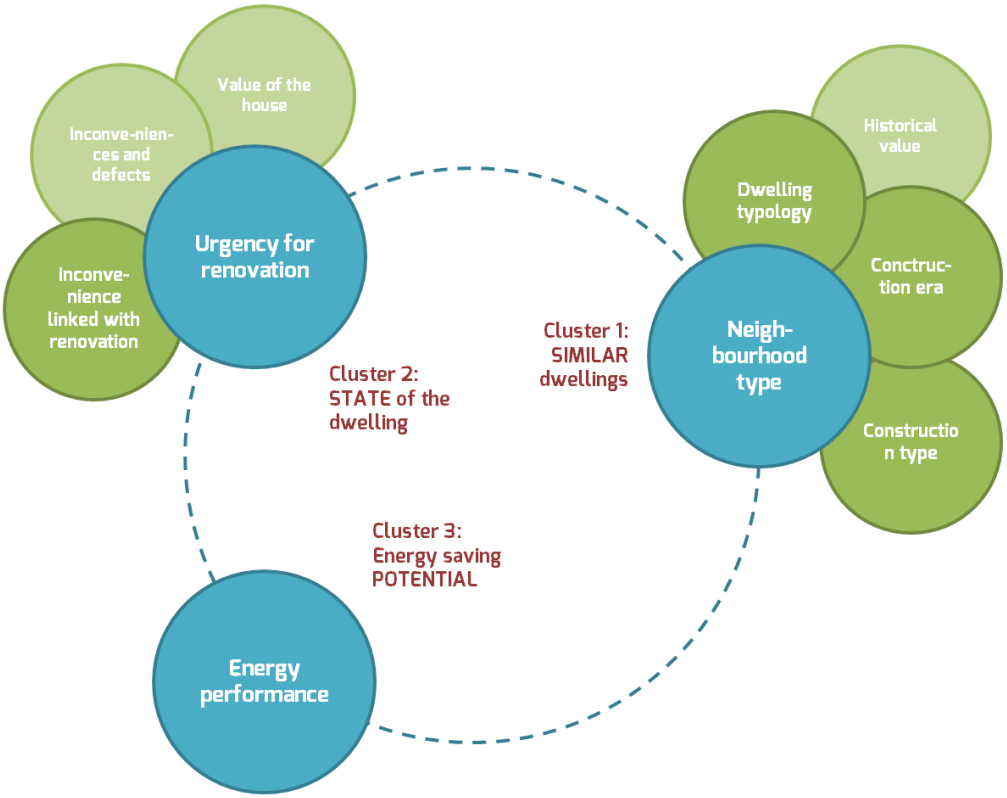

Figure 1: Overview of clusters of relevant dwelling characteristic, from the REFURB report D.2.1

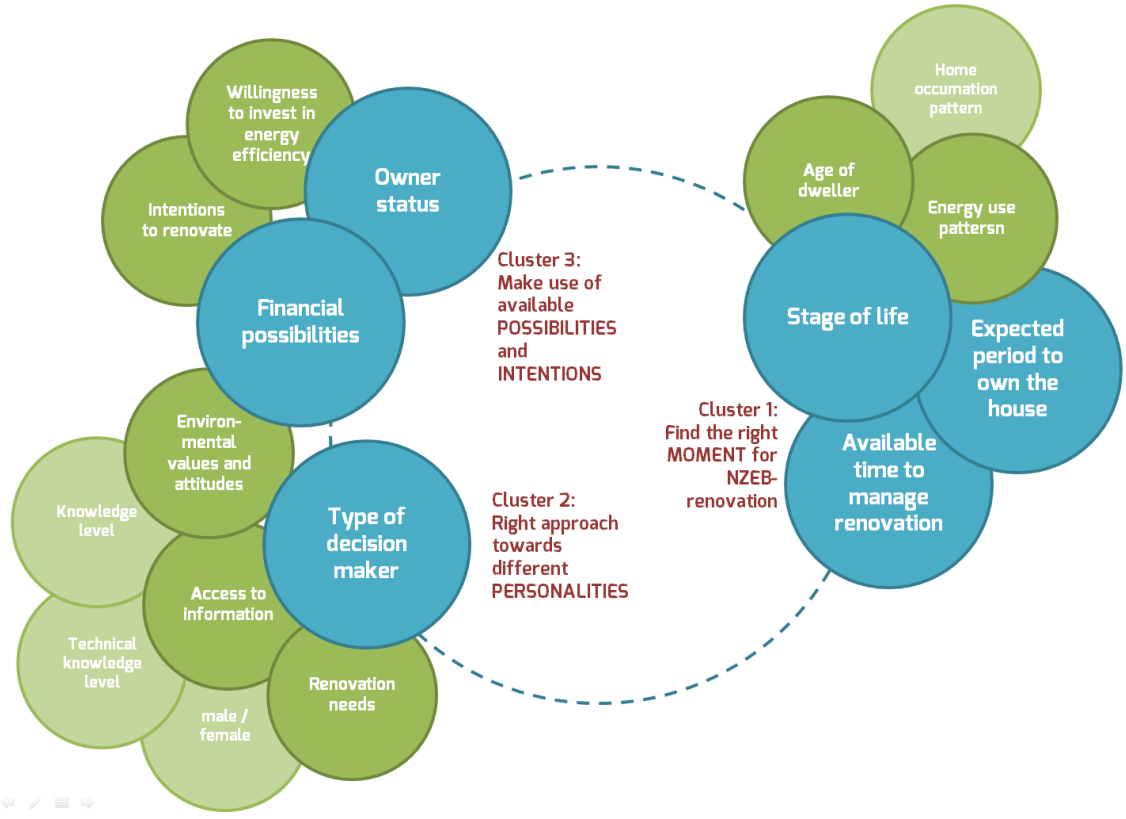

Figure 2 Overview of clusters of relevant dweller characteristics, from the REFURB report D.2.1

2.3.2 Aggregation strategy

De demand aggregation schemes “aggregate” the demand in a certain way. The strategy of the schemes to aggregate the demand is described through these questions:

- How is the aggregation of the demand side realized? How the upscaling is organized?
- Is there any cooperation between the homeowners (decision makers) of the demand side? How is this cooperation organized?
- Are existing collectives involved, e.g. cooperatives, owner associations, other types of associations?

2.3.3 Drivers & barriers

In report D.2.2 of the REFURB project, a framework to define the drivers and barriers on the demand side has been developed. Drivers and barriers can be technical, financial, social & behavioural and context barriers (Figure 3).

Based on the description of report D2.2, the analysis of the demand aggregation schemes is described:

- The main barriers the scheme tackles, that hinder homeowners to invest in (NZEB) renovation.
- The main drivers the scheme is making use of to convince homeowners to invest in (NZEB) renovation.

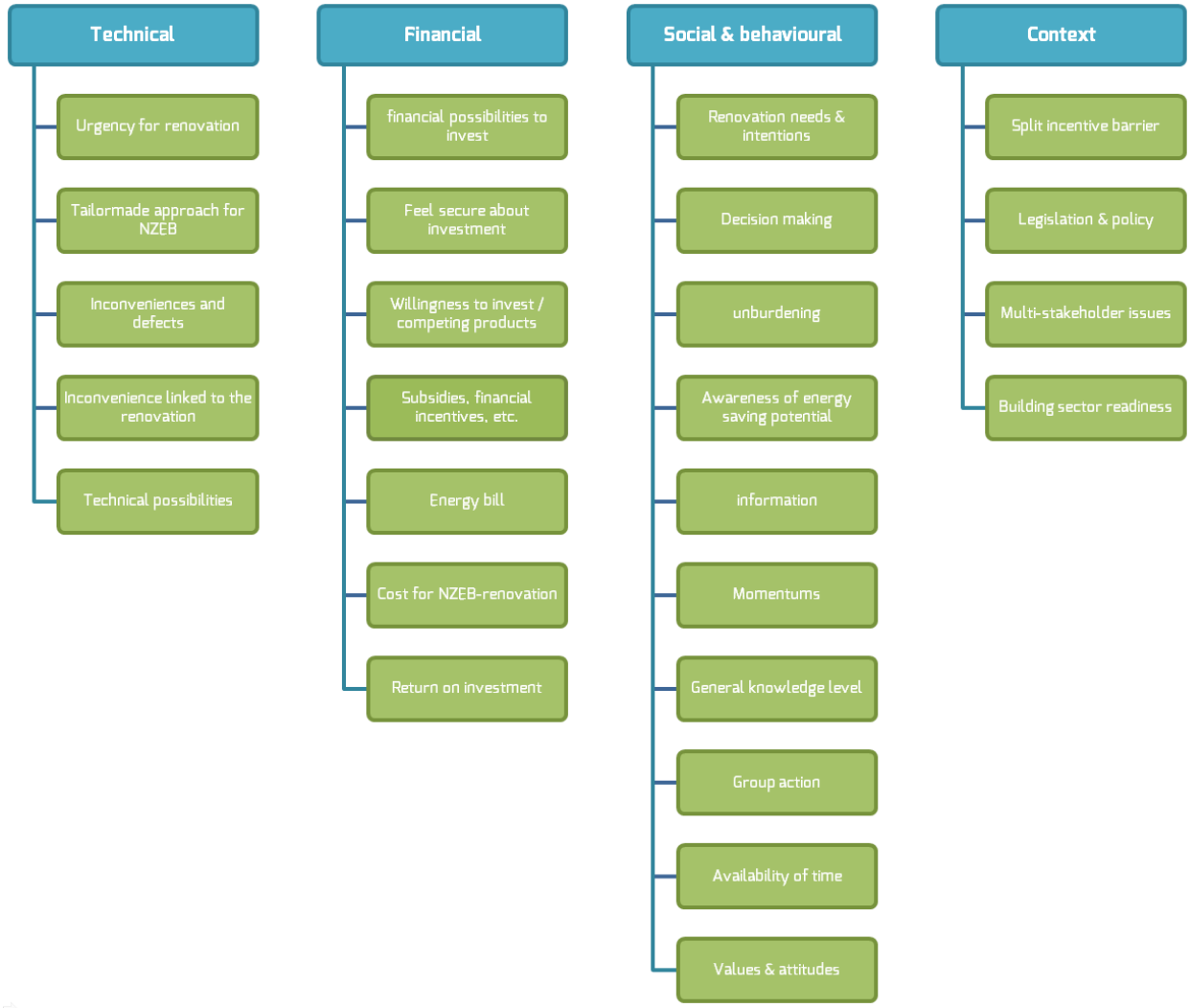

Figure 3: Clustering of drivers and barriers for NZEB renovations, based upon BPIE and ZenN

2.4 THE OFFER FOR THE HOMEOWNER

2.4.1 Offer homeowners get

In a demand aggregation scheme, the homeowner gets an offer to convince him/her to start a renovation.

- What is in the package the demand aggregation scheme offers? Which solutions are in it, e.g. an energy concept?
- What is the price the homeowner has to pay?
- Is this package integrating technical, financial and organisational solutions?

2.4.2 Tools to support cooperation

The demand aggregation scheme contains some tools for cooperation. Wat are the tools to support the cooperation? E.g. an on-line platform, a toolkit, personal advice, guidance, etc.

2.4.3 Involvement of the supply side

The demand aggregations schemes sometimes include offers of the supply side (building sector, contractors, and suppliers). In this section, this is described through following questions:

- Does the scheme include an offer of the supply side?
- Can the supply side access the scheme in an open or closed platform?
- Are there requirements on social corporate responsibility?

2.4.4 Communication

The demand aggregation schemes make use of means of communication towards the homeowners, e.g. to recruit them.

- How are the homeowners recruited?
- How are they approached?
- What are the communication strategies?

2.5 IMPACT & SUCCES

2.5.1 Impact

To assess the impact of the demand aggregation schemes, a set of issues are described:

- What is the potential impact of the targeted market segment, in terms of number of dwellings, CO2-reduction, investments, cost saving, energy efficiency, renewable energy production?
- Assess the impact of the implemented scheme, making use of the same indicators: number of dwellings, CO2-reduction, investments, cost saving, energy efficiency, renewable energy production?
- What is the success rate?
- Relate the impact of the scheme to the cost of the scheme: how many investments / carbon reduction are generated in relation to the cost of the scheme?
- Did the supply side provide new solutions?
- Were there any other (unexpected) benefits or successes realized by the scheme?

2.5.2 Drop-out moments

Drop-out moments relate to the moments homeowners decide not to go further. So there are some “moments of truth” where homeowners decide to go further or not. This is also called a “funnel”, a series of events that a homeowner goes through before successfully deciding to go for an (NZEB) renovation.

The drop-out moments of the demand aggregation schemes need first to be described, followed by description of

- The motivation for dropping out

- The successful techniques to counter drop-out moments
- Strategies to be reduced further?

2.5.3 NZEB-ambitions

Not in all demand aggregation schemes, NZEB was part of the renovation ambition. Therefore, it was described whether the scheme takes NZEB ambitions or other energy efficiency ambitions into account.

- Does this affect the scheme in a positive or negative way?
- What would be the impact on the scheme if NZEB ambitions were added?

2.6 SUCCES & FAIL FACTORS

The success and fail factors of each best practice demand aggregation scheme are listed and described.

- A success factor is a factor that increased the success of the scheme.
- A fail factor is a factor that limits the success of the scheme, or a main risk that the scheme has countered (otherwise it would have been less successful).

An indicative list of success factors (Table 1) and fail factors (Table 2) was provided, based on the experience of the REFURB partners, discussed in a the REFURB workshop on WP2 in October 2015.

Table 1 Success factors of demand aggregation schemes

Success factors	examples
Peer pressure	Involving existing communities such as neighbourhoods
Ambassadors	Involvement of ambassadors that homeowners trust, e.g. a cooperation with a rural area organisation
Personal approach	Door knocking instead of a website or brochure
Independent decisions	Homeowners can make an independent decision and are not forced into a solution.
Independent advice	People can rely on the advice: it does not cover interests of certain companies or solutions.
Free experts	The advice is free, otherwise it is a barrier
Targeted recruitment	A coherent market segments with a high potential for success; fist start with community leaders; a segment with a favourable socio-economic position
Unburdening	Active guidance, making it less complex and time-intensive for all types of expertise: financial, technical, organisational…
Incentives	Provide financial and non-financial incentives, like new information (e.g. a thermo-photo), a smart meter, a tailored feasibility plan, discount on products and services…
Finance	Provide a good finance of the scheme. Low cost or free for participation
Energy saving	Perspective for energy savings with participants
Government	Governmental participation in the program

Table 2 Fail factors of demand aggregation schemes

Fail factors	examples
Volunteers	Volunteers are good, but it is hard to count on them if there is a strict timing
Financial architecture of the scheme	An unbalance of the architecture (some stakeholders win, other pay); an expensive system that needs constant financial input.
Quality of all links in the chain	e.g. craftsmen that are not able to deliver NZEB-renovations
NZEB	Overview towards NZEB is missing in all steps of the scheme, from communication to implementation.
Local engagement is missing	Too top down, no community connection
Beyond awareness schemes	Fail to go beyond awareness schemes and reach the homeowners to invest.

For every case, the 5 most important factors leading to the success of the scheme were listed. These can be chosen from Table 1 and Table 2, but also other success factors can be identified.

For these factors it can be clarified whether they are internal success/fail factors or external:

- An internal success factor is a factor that the stakeholders in the demand aggregation scheme can influence to a large extent. E.g., communication strategy towards targeted segment, personal advice...
- An external success factor is a factor that the stakeholders in the demand aggregation scheme have little impact on. E.g., national decision on tax deduction for NZEB renovation, EPB legislation...

2.7 LESSONS LEARNED

To conclude, the 5 most important lessons learned of the scheme to better organize the demand side are listed.

3 Highlights from demand aggregation schemes

In this chapter, the 12 analysed demand aggregation schemes are summarized. A full description is attached as an annex to this report.

The analysis of every demand aggregation scheme was done through filling out the checklist (chapter 2) by the REFURB-partners for each respective case, making use of the interviews with scheme-initiators and scheme-users, but also with available information on the schemes like websites, reports, articles and communication material. Sometimes, not all questions of the checklist could be answered for all cases, e.g. because there was no information available, or it was not relevant.

The results of these case analyses are attached to this report in the annex, including a description of the sources that the analysis is based on for every case.

3.1 BETTER HOUSING (DK)

The 'Better Housing' demand aggregation scheme meets the Danish renovation strategy and the target of reducing the energy use of single family homes in Denmark. 50% of all the energy use in homes in Denmark is used in single family homes.

The Better Housing scheme is based upon the improvement of the quality of renovation advice. The supply side thinks the demand side needs more qualified advice. In Denmark, therefore, a focus on continued or in-service training of the good ambassadors, master craftsmen and energy advisers to be Better Housing advisers. Better Housing is based on principles of making it easier for the homeowner to get through the energy renovation process with a 1-stop-shop concept. The homeowners have the possibility to find an educated and qualified energy "Better Housing" adviser, who can guide the homeowner through the renovation process. The Better Housing adviser offers a Better Housing Plan (based upon an energy check-up and calculation of energy savings in an on-line tool).

Better Housing is financed by the Danish national Energy Agency. The initiative consists of education of Better Housing-consultants (who can guide homeowners in prioritizing a holistic and hopefully deep refurbishment, step by step), a national awareness-raising campaign, meetings/workshops with stakeholders who can support the initiative, and education of Better Housing Consultants. Those stakeholders are financial consultants, real estate consultants, municipalities, DIY's etc.

3.2 BUURKRACHT (NL)

'*Buurkracht*' was initiated by Enexis NV, an energy grid company in the Netherlands, in order to facilitate the energy transition in the Netherlands. *Buurkracht* focuses on organising the demand side (homeowners) to save energy. Buurtkracht supports bottom-up initiatives in neighbourhoods/villages mobilizing their neighbours to save energy. So, it is their initiative, Buurtkracht plays a servant role in supporting them with

all kinds of tools and a step-by-step plan designed to tackle all the barriers that prevent benevolent people from taking energy saving measures.

The main barriers tackled are: taking energy saving measures is complex; suppliers are distrusted, high upfront investment, no clear insight into the benefits before investing, and no insight into the benefits after realisation.

Main drivers: insight in the effects of a renovation enables getting to grips with a renovation process, comparison with others gives meaning, energy saving causes a domino effect (after taking one measure, the next will follow), doing it together locally gives momentum and drive and adds to trust.

Buurkracht's neighbourhood facilitator/coach is at the heart of the process, supporting local heroes / initiators (called 'the neighbourhood team') as much (or as little!) as they want. He or she provides them with plans, a neighbourhood webpage, tips and tricks, all kinds of communication tools, and organizes the installation of smart meters in every home (to be able to monitor individual energy consumption and compare it with others) etc.

Buurkracht is active in 102 neighbourhoods and has well over 5.000 participants (January 2016). Neighbourhoods typically consist of 50-500 households.

3.3 GREEN BUSINESS GROWTH (DK)

'CLEAN Green Business Growth' (CLEAN GBG) holds a holistic approach and targets segments from the entire value chain from homeowner, craftsmen, public authorities and political stakeholders.

The craftsmen go through vocational and energy training in order to develop their businesses further and to meet the demand from the market. The method is to provide master craftsmen with continued training to know more on general green solutions, and teach them how to promote and develop their businesses into a greener and more energy-friendly model. The master craftsmen then function as ambassadors for enhancing the energy part of an upcoming renovation when meeting customers.

The homeowner is targeted through awareness-raising activities such as energy fairs and events. Every activity seeks to bridge the demand side (homeowners) with the supply side (energy craftsmen) on a local and regional level.

The impact is a business growth rate of 29% for trained energy master craftsmen, compared to the general branch growth in the rest of Denmark. In 2010-2013 it created a documented 165 new green jobs within energy efficiency in buildings and has in total generated a documented 14 million Euros turnover increase for partners. CLEAN GBG subscribes the success of the project to the close bottom-up approach, marketing support and close connection to SMEs.

3.4 SLIM WONEN IN LEEUWARDEN (NL)

'*Slim Wonen in Leeuwarden'* is a scheme initiated by Leeuwarden council in cooperation with an association of buildings firms (the association 'SLIM'), and local active volunteers. Basically the scheme is designed as a 1-stop-shop principle, mainly aimed at home renovation/ energy saving investments up to € 20.000. The scheme has been running since 2013.

The scheme aims to help and advise homeowners and offer special deals at selected moments. The key difference with many other '1-stop-shops', or marketing in general, is that a customer management system is used. This is based on tailoring the provision of information or offers to the stage of awareness or demand in which the customer is. Therefore the 'customer journey' is central. Additionally, the scheme works with firms that offer a 1-stop-shop service and a unique quality assurance promise.

All homeowners who live in the council area have in one way or another received information about the 1-stop-shop (30.000 homes). About 2.500 homeowners have carried out renovations after having contacted the service.

The scheme is part of an integrated strategy and does not only provide a help desk. Cooperation with local groups (volunteers) and energy cooperation's active in the districts is important, as well as general publicity, Facebook, calls to action, specific renovation offers etc.

For NZEB renovations the scheme can provide lessons on which marketing strategies are effective in persuading homeowners to invest. Key factors are trust, quality assurance, providing the right information at the right time/effective marketing.

The project is being scaled up from the end of 2015. Cooperation between all Frisian councils, as part of a national program, has resulted in a regional project.

3.5 STROOMVERSNELLING KOOP (NL)

'Stroomversnelling' is a Dutch-based cooperation that strives to combine supply and demand, regarding the refurbishment of private terraced homes (building period: 1950-1980), on a large scale and in a quick manner. In this way zero-energy buildings can be realised, which results in savings and a more comfortable way of living for the homeowner.

The cooperation consists of 200 parties, including municipalities, energy cooperatives, construction companies, distribution channels, financial institutions and real estate agencies. The founders concluded that with an investment of € 45.000 the monthly repayment and interest costs are equal to or lower than the energy usage costs prior to the refurbishment.

The renovation can be financed by the homeowner's private money or with the use of a loan or additional mortgage. The affiliated financial institutions are willing to explore an additional loan construction, making use of the energy costs savings of the homeowner.

Several pilots have already been completed and communicated, and multiple municipalities are currently developing their first pilots.

3.6 TARTU APARTMENT SCHEMES (EE)

Apartment homes built between 1960 and 1990 constitute the most prominent housing segment in Estonia (approximately 50%). The Estonian practice of renovating those apartment homes consists of several mutually complementing schemes:

- soft loans for renovation,

- subsidies for construction activities leading to renovation and
- For the preparation of a renovation.

In 2009 a financing scheme was launched. A soft loan was made available for housing associations wishing to renovate their homes. The funds allocated for the loan were provided by EBRD, the Council of the European Development Bank, the Estonian Government and the KredEx Fund. The loan fund was designed to be revolving.

In 2010 a subsidy for renovation was added to the scheme. Housing associations were eligible to apply for 15%, 25% or 35% subsidy for their overall renovation budget depending on depth of renovation. The subsidies consisted of € 37,7 Million of which € 28,7 Million came from selling Certified Emission Reductions to Luxembourg and € 9 Million form smaller dealings. These funds were exhausted by 2014.

In 2015 a similar scheme of subsidies was continued with funds provided by the Estonian Government. The scheme was improved in details and consisted mainly of 25% and 40% subsidies with a few exceptions.

By 2014 7% of the total national target of dwellings has been renovated.

The main factors of success turned out to be first of all –and by far- the existence of good examples in the regions and the simplicity of the application process. The main barrier was the lack of information and awareness.

Housing associations were encouraged to renovate deeper by graduating subsidies according to the depth of the renovation. This factor was especially considered in subsidies after 2015 where the lowest subsidies were removed and the highest possible subsidies were raised. Additionally, the requirements to meet criteria of deep renovation were raised.

3.7 EVENING SCHOOL FOR HOMEOWNERS (DK)

Different organizations in Denmark have offered the private homeowners a training program. The training program was organised as an evening school or course and it gave the participants knowledge about energy consumption, different housing types, energy renovation solutions and energy-efficient behaviour.

The concept is a win-win situation for many: the homeowners get a higher level of knowledge of their own home's energy performance; the topic is new for evening schools enabling them to target new groups of users; the municipality is interested in energy consumption reduction; and local energy master craftsmen are capable of complex energy renovations. This value chain creates a green motion towards local job creation and CO_2 reduction. The evening class concept is adjustable to local terms.

ProjectZero's concept is called: "ZEROlicense – *license to your own home"*. The homeowners are offered two different courses: one with focus on the envelope and technical solutions, and one with focus on energy-efficient behaviour. Each course extends over two evenings. The ZERO license is designed to ensure that persons with this license know about energy savings and energy-efficient behaviour in their home.

3.8 THE ZEROHOME PROGRAM (DK)

Late 2010 ProjectZero launched its ZERObolig (ZEROhome) program focused on engaging homeowners in energy retrofitting the areas of app. 16.800 private owned homes. The program was focused on qualified ways to improve the individual homes' current energy standards.

The ZEROhome program was supported by national funds such as "Fornyelsesfonden.dk" and "Vaekstforum for the Region of South Denmark", and served also as role model for how energy retrofits of private homes can create new green jobs.

To help answering the homeowners' question "what needs to be done?", the ZEROhome program offered a free energy review/consultation carried out in their homes. The consultant's name was Charlie, and he became a synonym with the ZEROhome program. During the consultation the energy consumption was reviewed, improvement opportunities and costs discussed and an action plan defined.

Next step was to connect the homeowners with qualified craftsmen to get the job done in a qualified way. To secure the ZEROhome-program, ProjectZero together with the technical college and vocational school (EUC Syd) has implemented a craftsmen training program to improve their energy understanding and energy consulting competences.

Homeowners often need to finance the retrofit, and ZEROhome therefore has worked with the areas' banks to secure a good understanding of the cash-flow in energy retrofits and competitive loans for the homeowners.

Real estate agents, consulting engineers and architects are other partners of the program. Together with local architects the ZEROhome project developed an inspirational catalogue to help the homeowners integrate their own ideas into their energy retrofit and create a cheaper, better and more climate-friendly living.

Demonstrating the creation of new green jobs was an important part of the ZEROhome program. Demonstrating the job creation was an integrated part of the project. By creating more awareness, interest and desire for energy retrofit the project generated more than 100 jobs in the construction industry.

This analysis is based upon ProjectZero's in-house knowledge and experience.

3.9 PLUIMSTRAAT KORTRIJK (BE)

The name "Pluimstraat Kortrijk" refers to a neighbourhood in the city of Kortrijk (Belgium), an area of approximately 200 dwellings. The poor housing quality inspired the City of Kortrijk, the social service of the city of Kortrijk and other public stakeholders, to set up a renovation program. The goal was to upgrade the neighbourhood through improving housing quality (including energy performance) and improved social cohesion.

The program combined a substantial financial incentive (a "now or never"-subsidy) with the assistance of the homeowner in the renovation process by a "renovation guide". He connected the homeowner with the best available solutions (technical, financial, legal, building sector, social issues…) in a tailored and very personal approach. While a lot of homeowners acknowledge the importance of a renovation it did not happen because it is a low-income neighbourhood with residents with other priorities. . The program ran

for 3 years, so homeowners were invited to make advantage of the program in this timeframe. This collective approach was successful, as more than 1/3rd of all homes were (partly) renovated, for a total of over € 1,5 Million of investments.

3.10 DAMPOORT GENT (BE)

"Dampoort Gent" is a neighbourhood in the city of Ghent (Belgium, 250.000 inhabitants), a 19th century residential area, mainly middle- and lower-class. In this neighbourhood, a lot of initiatives are taken to upgrade the living conditions and well-being, including upgrading the quality of the homes as there are many issues.

The scheme referred to as "Dampoort Gent" that is analysed here, is a mix of 2 parallel, ongoing projects that both make use of renovation guidance, which is the central tool to stimulate and upscale the demand side for housing renovation:

- "Dampoort Knapt Op" (DKO), which tests the implementation of a "Community Land Trust" (CLT) to tackle financial barriers with low-income homeowners that own a dwelling with major quality issues, and improve the community through stewardship. A limited number of homeowners are targeted.
- "Renoseec" (RS) is a living lab project which sets up a trajectory to guide homeowners for NZEB-renovation, focused on low-income homeowners, middle class homeowners, and the private rental sector, and testing a number of tools and principles (collective renovation, group purchasing, ESCO, intelligent building model, LCA, standardized renovation modules etc.). A limited number of homeowners are targeted.

Both projects are pilots that do not aim to achieve large numbers of renovation, but rather test tools to overcome existing barriers, and make use of the "renovation guidance" as the central driver. Both projects build on the experience of a former project, "Bouwblokrenovatie Dampoort" (2004-2008).

4 Critical success & fail factors

4.1 MAIN SUCCESS FACTORS

4.1.1 Independent advice

Independent advice is averse to conflict of interest (e.g. commercial gains). Independent advice builds trust and confidence with the homeowners.

Homeowners can rely on the advice they get: it does not cover interests of certain companies or solutions. This is very much linked with the confidence of the homeowner in the program.

In the ZEROhome program (DK), the consultant (called "Charlie") is not a seller from the supply side. The only thing he wants to "sell" is energy renovation to gain energy savings – no brand or technology is paying him to promote specific products.

In COA Freiburg (DE) independent advice is provide by the energy consultant and the construction engineer, which is credible and convinced the owners of the necessity of the renovation and the positive results.

In the Dampoort Gent (BE), convincing people to invest in a housing renovation requires confidence of the homeowner in the independent renovation guide and the program. Homeowners need to trust the information and advice they get.

In Slim Wonen in Leeuwarden (NL), the quality of advice and the offers is linked to the trust issue. It may not be attached to a building company. The homeowner must recognize the extra value of the service, be it in information or in offers/quotes.

In the Tartu scheme apartments (EE), consultants are provided by KredEx Fund - an impartial body.

4.1.2 Unburdening

A renovation process is generally perceived as a hassle, an administrative, financial, managerial burden with a lot of unpleasant surprises and uncomfortable situations.

A very important success factor is the active guidance, which makes renovations less complex and time-intensive homeowners, and offers all types of expertise: financial, technical, organisation etc.

In Pluimstraat Kortrijk (BE), a renovation guide secures active guidance and is considered as the main trigger for numerous homeowners, showing the way through the complex process of housing renovation. All problems that homeowners face with their home are tackled within one renovation (moisture, drought, safety issue etc.). By tackling these problems, energy renovation could be integrated in a total renovation. So the offered solutions were not limited to energy, but to all housing quality issues.

In COA Freiburg (DE) homeowners were unburdened through good project management. The energy consultant and the construction engineer were responsible for the project management together with the administration. A well-managed process avoids discord and doubts, which could endanger the success of the project.

4.1.3 Energy saving

Participants need to have a clear perspective on the future energy savings (and cost savings).

Expected energy savings were calculated in advance as a part of the energy audit in the Tartu apartments schemes (EE).

The ZEROhome program (DK) stimulated people that are motivated by savings and money. But they need advice on how to do it the best way; therefor they use the ZEROhome program.

4.1.4 Governmental participation

Governmental participation in the program is important to establish confidence as they are perceived as neutral serving the interest of all stakeholders.

In Slim Wonen in Leeuwarden (NL), the goal of participation of the local Government is to establish trust. In terms of organizing/facilitating but also in terms of being a trustworthy partner/body for the building firms and homeowners.

The project Dampoort Gent (BE) is led by public partners, which are perceived to be more neutral, opposed to the building sector which is perceived by some homeowners to abuse the limited knowledge of the homeowner on renovation.

This factor is very much linked to the success factor of independent advice.

4.1.5 Independent decisions

Homeowners can make an independent decision and are not forced into a solution.

Buurkracht is non-commercial and free. Buurtkracht supports local, bottom-up initiatives and does not make offers to homeowners. The neighbourhood decides on its own who they want as suppliers. Homeowners decide themselves if they want to join.

The evening schools (DK) allow independent solutions for Do-It-Yourself (DIY). The homeowner can choose which renovation to start and they can choose to use DIY solutions without a craftsman involved.

4.1.6 Peer pressure and ambassadors

People need to be able to compare and/or identify with peers in order to take a decision. People generally have more confidence in acquaintances than external experts.

Involving existing communities such as neighbourhoods improves the success, for example in Stroomversnelling (NL). ProjectZERO (DK) establishes a common will to make it happen in Sonderborg. Citizens want to participate in the realisation of the ProjectZero vision.

Some demand aggregation schemes involve ambassadors that homeowners trust. This can be a person (e.g. a peer), as well an organisation. E.g. a rural area organisation or a family organisation that the homeowner

is member of, or is well known and trusted by the homeowner. Another example is the involvement of "community leaders".

4.1.7 Financial incentives and solutions for homeowners

A lot of upfront financial investment is needed, so any solutions to making this financial burden lighter is welcomed.

In some schemes, important tools and solutions for financing the renovation is available. For example subsidies or easy loans and guarantees in Stroomversnelling (NL), attractive financing options provided by the L-Bank at low interest rates in COA Freiburg (DE), a now-or-never subsidy in *Pluimstraat* Kortrijk (BE) etc. An exclusive solution that only is available in the scheme will increase the success of the scheme (e.g. special subsidy or funding solution like the "CLT" in Dampoort Gent (BE).

4.1.8 Not only financial incentives

Homeowners need more than only financial incentives to finance the renovation (cheap loans, subsidies…), they need other support.

Provide non-financial incentives, like new information (e.g. a thermo-photo), a smart meter, a tailored feasibility plan, go hand in hand with financial incentives.

Most programs provide services that proved to be major incentives. E.g. energy audit like in Dampoort Gent (BE), the renovation guide like in *Pluimstraat* Kortrijk (BE), or the expertise, advice and action plan like in the ZEROhome program (DK). Buurtkracht (NL) gave homeowners insight in their energy consumption (through our smart meters). This is a powerful tool in making people aware, but it only if combined with comparing the own energy consumption to others. That gives meaning and triggers people to action.

4.1.9 Personal and tailor-made approach

Every home is different, every homeowner is different, and every family is different. A personal and/or tailor-made touch will increase the success.

In Buurtkracht (NL) the neighbourhood team goes door knocking to make a personal connection with their neighbours, building on the social cohesion in the neighbourhood. In Dampoort Gent (BE) a tailor-made solution for every dwelling and homeowner is created, it is not one fixed solution (e.g. for roof insulation) that is promoted for all participants.

If the program has a toolkit of solutions (technical, financial, organisational) available to tackle all barriers homeowners meet, this will increase the success. Otherwise homeowners tend to drop out, e.g. because of a lack of interesting financial solutions.

Slim Wonen in Leeuwarden (NL) focused on the customer journey, recognizing that investment decisions are not made in one go. The program takes into account the different needs of the homeowners at different stages in the decision-making process. Also Buurtkracht (NL) focusses on a carefully designed customer process to ensure that homeowners make a successful journey through the energy savings jungle by lifting barriers and applying triggers to keep people going.

As the supply side usually seeks economies of scale through the upscaling of standard solution, this means a good balance needs to be sought between standardisation and tailoring in order to have a successful scheme.

4.1.10 Targeted recruitment

A targeted approach to recruit in a well-defined group of homeowners with some similar characteristics (a segment).

Messages which are too general are non-messages. General messages lack an 'identification 'potential and hold a 'none of my business' potential.

The program is more successful if focussed on coherent market segments with a high potential for success, and with a well thought out communication and market strategy (e.g. first start with community leaders; a segment with a favourable socio-economic position...)

4.1.11 Other success factors

Beyond the 10 success factors, other success factors were mentioned in the analyses, such as:

- A continuous informational flow (COA Freiburg, DE) in order to keep everybody satisfied in the process. In this project, since there were owners of 339 apartments to be attended to, a weekly consultation hour was offered.
- A Long term approach/commitment, like in 'Slim Wonen in Leeuwarden' (NL). To fund the scheme it is necessary to have long-term commitment from all partners.

4.1.12 Overview

In Table 3, an overview of the identified main success factor is given for all analysed cases. In all cases, maximum 5 success factors –the most important- were identified. Only the 5 most important needed to be chosen while usually more than 5 were applicable.

Table 3: overview of the success factors in the analysed cases. In all cases, maximum 5 most success factors –the most important- were identified. Other success factors also may apply off course.

Success factors	Better Housing (DK)	Buurkracht (NL)	Green Business Growth (DK)	Slim Wonen in Leeuwarden (NL)	Stroomversnelling (NL)	Tartu scheme apartments (EE)	Evening schools (DK)	ZERO home (DK)	Pluimstraat Kortrijk (BE)	Dampoort Gent (BE)	DE	SLO	TOTAL
Independent advice				X	X	X	X	X		X	X		**7**
Unburdening				X	X					X X	X		**5**
Personal and tailor-made approach		X		X					X	X			**4**

Energy saving				X		X	X	X					**4**
Governmental participation				X	X	X				X			**4**
Peer pressure & ambassadors		X			X	X		X					**4**
Financial incentives and solutions for homeowners					X	X			X		X		**3**
Independent decisions.		X					X	X					**3**
Not only financial incentives		X						X		XX			**2**
Targeted recruitment						X		X					**2**
Others				X (1)							X (2)		**3**

(1) Long-term approach (2) Continuous informational flow

4.1 MAIN FAIL FACTORS

4.1.1 Weak financial architecture of the scheme

The support offered – and many of the listed success factors require substantial support which homeowners not necessarily want to pay for- requires the necessary financing. The failure of a scheme is closely linked to its financial health.

The business model behind the demand aggregation scheme allows offering the services (Who pays? Who benefits?). Most of the analysed schemes implement successful techniques, but often tend to be labour-intensive, e.g. the renovation guidance, the tailor-made advice etc. The fact that the scheme needs constant financial input makes it risky. Some of these schemes cannot exist under pure market conditions, in the way they are financially designed now.

E.g. the project Dampoort Gent (BE) is now a pilot, and depending on public funding. There is a market potential for the higher income groups, but not for the low-income homeowners, where the public sector can/should finance. Establishing confidence between homeowner and the renovation guide needs investment of time, and this is costly.

The COA Freiburg (DE) noted that the financing can be difficult due to banking regulations if no special programs are available as there were in the example. Limited financial possibilities of single members can add to the problem.

4.1.2 Only focussing on awareness schemes

Merely awareness rising leaves the homeowner in the jungle of (coloured) information and advice. For many, merely awareness raising causes a drop-out from the very first moment they become aware.

A potential fail factor is the inability to go beyond awareness rising and be unsuccessful in motivating the homeowners to invest in an energy renovation. Most of the analysed programs offer support to homeowners in their renovation process. But this needs motivated homeowners. E.g. in the evening schools (DK) it is observed that many homeowners don't know that it would be a good idea for them to renovate their home. One of the reasons is that the energy bill is too low – the energy is too cheap. And they don't see immediate savings.

So it is important not only to show homeowners the advantages of an energy renovation (financial argumentation, comfort & quality argumentation), to convince them, but also to go beyond that and trigger them to start the renovation. Sometimes the homeowner needs assistance in all steps of the renovation and it should be clear for him where to find this, otherwise no successful renovation will be achieved.

4.1.3 Fail to deal with NZEB

The NZEB level requires much more of a homeowner then a simple renovation. It equally requires much more of all other stakeholders from the supply side in the process. If the complexity of this standard is not recognized this ambition level can become a failure factor.

Raising the energy efficiency ambition to the NZEB level (Nearly Zero Energy Building) complicates the process and requires specific expertise.

The NZEB ambition is relatively new, and the transposition of this EU directive into national standards takes time. Especially the NZEB standard for renovation can be a bottleneck if they are not clearly defined at national level and/or insufficiently known by architects, contractors, local public actors etc.

This leads to a lot of uncertainty and lack on knowhow on NZEB. E.g. does it apply for renovations that do not need a building permit? Will the regulation change within the next years? How should I change my product or service to be in line with the NZEB standards? What are the required renovation measures to achieve the NZEB level in my dwelling, and is it feasible? If I choose for cavity wall insulation now, can I achieve the NZEB level later?

So the NZEB issue can raise a lot of questions if an overview of how to work towards NZEB is missing in all steps of the scheme, from communication to implementation.

NZEB is not necessarily a product homeowners want. E.g. Leeuwarden observed a low interest by homeowners to renovate to NZEB. This relates to the observations made in the REFURB report D2.2 on drivers and barriers for homeowners to renovate to NZEB: homeowners renovate to e.g. increase comfort, to solve quality issues etc. An improved energy performance of the building is not a main driver to start a renovation. NZEB needs to be hooked to other needs the homeowner faces.

4.1.4 Engagement of key stakeholders is missing

The right stakeholders at the bottom need to be involved.

Good demand aggregation schemes are not too top-down, but have a community connection, and an involvement of key stakeholders that can deliver in the field. A good stakeholder analysis is essential. The involvement of the (local) public sector is considered as a success factor (see above, 4.1.4). A lack of support of local authorities is a potential fail factor if e.g. a pilot scheme is scaled up to target large numbers.

In Buurtkracht (NL), the involvement of the neighbourhood community is essential. If cohesion is low in a neighbourhood, it is difficult to mobilize people to save energy together.

4.1.5 Too generic approach to convince homeowners

There are no on-size-fits-all solutions; the approach is neither tailor-made nor personal. Both different dwellings as different dwellers make different solutions necessary.

Many analysed schemes are successful with some homeowner segments because of a very tailor-made and personal approach (cfr. success factors above, 4.1.9). A good knowledge on the drivers and barriers of the targeted homeowner segment is crucial, as this defines the required solutions that are available in the toolbox. E.g. for low-income homeowners living in low qualitative homes, solutions on financing and general housing quality improvement are essential. For higher incomes, it could rather focus on energy saving (as other problems do not occur).

In Dampoort Gent (BE), cultural barriers were observed. The connection with some homeowners with different cultural background (foreign language speakers, immigrants etc.) is difficult: not only because of a language barrier, but also on housing culture (incl. vision on renovation). Here, the approach was not personalized enough to be successful yet.

In Buurtkracht (NL), in neighbourhoods where the neighbourhood team decides not to go door knocking but just distributes leaflets or letters, participation is significantly lower. Most often the initiator has a technical background and or affinity with energy/energy saving. If a neighbourhood team consists only of these kinds of people, conversion is usually low because they are unable to connect with the larger majority in the neighbourhood. They do not speak the same 'language'.

4.1.6 Weak links in the chain

The strength of the chain is in the weakest link. If one link fails to provide the expected quality to the homeowner this reflects upon the whole scheme.

Participants in the scheme expect a good quality of all links in the scheme. And in a renovation process, there are a lot of links in the chain. A poor overall process gives no confidence and neither one nor more weak links in the chain. If e.g. craftsmen are not able to deliver NZEB renovations, the scheme will fail to deliver NZEB renovations. In Leeuwarden (NL), the right offer was not always available yet, or the key financing options were unavailable.

In Buurtkracht (NL), the neighbourhood team (volunteers) needs to have enough members (especially in relation to the size of the neighbourhood), otherwise progress is usually slow and the conversion rates low.

4.1.7 Volunteers

Volunteers are unpaid labour. They might be unpredictable, but they also require the necessary support.

In Buurtkracht (NL), all neighbourhood teams are volunteers. This means that they can drop out during the process and also means progress is relatively slow due to the restricted amount of time they can spend on *Buurkracht*.

4.1.8 Dependence on external financial funding & subsidies

Schemes are usually not built independently from their context and might depend upon it for its success, especially when the financial context is concerned.

Many schemes make use of external financial funding & subsidies. E.g. in *Pluimstraat* Kortrijk (B), homeowners are assisted to go through the administrative procedure to get national, regional and other subsidies, cheap loans and/or tax rebates. An unclear future for the loans and taxes can be a fail factor for the trust of the participant, is also observed in Stroomversnelling (NL).

4.1.9 External fail factors

Things your scheme can't influence can still influence your scheme.

Events external to the demand aggregation scheme can harm the success. E.g. ZEROhome (DK) reported the impact of the financial crisis. The majority of the population in Sonderborg is very financially aware and they want to have the money in their bank account before they use it – they don't want to have bank loans. An NZEB renovation is relatively expensive and requires most of the time a bank loan, especially not in financially less secure times.

4.1.10 Overview

In Table 4, an overview of the identified main fail factor is given for all analysed cases. In all cases, maximum 5 fail factors –the most important- were identified. Other fail factors also may apply off course.

Table 4: overview of fail factors in the analysed cases. In all cases, maximum 5 most fail factors –the most important- were identified. Other fail factors also may apply off course.

Fail factors	Better Housing (DK)	Buurkracht (NL)	Green Business Growth (DK)	Slim Wonen in Leeuwarden (NL)	Stroomversnelling (NL)	Tartu scheme apartments (EE)	Evening schools (DK)	ZERO home (DK)	Pluimstraat Kortrijk (BE)	Dampoort Gent (BE)	DE	SLO	TOTAL
Weak financial architecture of the scheme				X	X	X		X		X			**5**
Only focusing on awareness schemes				X			X	X		X			**4**
Fail to deal with NZEB					X	X	X	X					**4**
Engagement of key stakeholders is missing		X				X	X			X			**2**
Too generic approach to convince homeowners (not tailor-made and personal)		X								X			**2**
Too dependent on volunteers		X		X									**2**
Weak links in the chain		X		X									**2**
Others							X	X					**2**

4.2 STRATEGIES TO REDUCE THE DROP-OUT MOMENTS

The maturation process from considering energy renovation to action is long and therefore vulnerable to drop-outs. Drop out moments relate to the moments homeowners decide not to go further in the renovation process, and leave the 'customer journey' (cfr. REFURB Report D2.5). It is normal that the scheme starts with a large target group (a certain housing market segment, cf. the REFURB report D.2.1 on housing market segmentation), that the communication can reach a certain share, and that this number is reduced every further step in the process (e.g. homeowners provided with information, homeowners that carry out an energy audit, homeowners that use renovation guide, homeowners that decide to invest and so on)

So there are some "moments of truth" where homeowners decide to go further or not. This is also called a "funnel", a series of events that a homeowner goes through before to successfully decide on an NZEB renovation.

The housing renovation schemes implement strategies to reduce the number of drop out moments. From these cases, some conclusions are drawn.

4.2.1 Overview of the most important drop-out moments

In summary there are not one or multiple specific moments in the renovation process (including the preparation process) for homeowners when they decide not to proceed. Most drop-out moments can occur at any time, e.g. caused by unforeseen events. This varies from homeowner to homeowner. It can be said that a drop out moment is when a homeowners is not motivated enough or realizes it is impossible.

It might be that the analysed demand aggregation schemes were relatively successful in countering the drop-out moments, and therefore more "external" drop out moments are identified than "internal" drop-out moments (inherent to the scheme). Following drop-out moments are identified:

- The moment the homeowner realizes it is not the right moment for a renovation
- The moment the homeowner faces unexpected financial expenses
- The moment the size of the investment becomes clear
- The moment it proves to be impossible to finance the renovation
- The moment the homeowner is confronted with the building sector
- The moment the trust in the scheme has decreased too much
- The moment a decision needs to be taken with co-homeowners

The moment the homeowner realizes it is not the right moment for a renovation

For example *Buurkracht*, a carefully designed process, aimed at preventing people from dropping out. If a participant does not take energy saving measures, this has mainly to do with timing. People are aware of their consumption, are aware of options to do something about it, but it is just not the right moment. Because they do not have the money at this point in time because they were just fired. Or the children are still small and take up all the time and energy in the household.

Also other analyses report that homeowners realize they don't want to use the time needed and do not want to participate in e.g. training courses, or they deal with sudden family issues (e.g. divorce).

During the housing renovation process, homeowners gain more insights in e.g. technical possibilities and can realize it is not the right time for the initially planned renovation. E.g. the roof needs new tiles and they have to do that before installing solar panels etc.

The moment the homeowner faces unexpected financial expenses

Energy renovation is usually a heavy investment, and competes with other investments of the homeowner. Energy renovation is put at the bottom of the homeowner to-do list especially if there are other heavy financial posts up ahead, e.g. dental work, change of car, etc.

The moment the size of the investment becomes clear

In the initiation phase of a renovation, the set of measures is defined, the budget for renovation is calculated and the energy savings can be estimated. Sometimes homeowners consider the investment to be too high, or they expected it would be lower, they consider the return on investment too low, or they consider the investment budget too high in relation to the value of the home etc. This can be even more strengthened when the energy ambitions are higher than initially planned (which can lead to higher investment, e.g. more insulation, heat pump instead of gas boiler...).

The moment it proves to be impossible to finance the renovation

Many homeowners do not have enough savings to finance the renovation, and need funding from e.g. a bank. An important drop-out moment occurs when the homeowner concludes he does not get a loan, e.g. after a dialogue with a financial institute. Many homeowners are technically insolvent. Sometimes they hoped for easier access to finance when participating in the renovation program.

A similar event is when a subsidy scheme is stopped. Then financing the renovation can get more difficult or even impossible for some homeowners. Or others consider it less profitable and decide to drop out.

The moment the homeowner is confronted with the building sector

In the renovation process, the homeowner is confronted with the building sector. For some homeowners, this confrontation may lead to unpleasant experiences, which can lead to a drop-out. E.g. if there is an inability of the building companies to offer attractive, clear, trustworthy and innovative 'products'. If the craftsman says something different than the energy consultant. If the craftsman is bad at following up, and so on.

The moment the trust in the scheme has decreased too much

The homeowner must be confident of the renovation program he is participating in. This is a key success factor (chapter 4.1). Certain events can harm this confidence, which can be a reason for drop-out. For

example the moment of waiting for the next step can be a moment for drop-out if the process is not smooth, if homeowners get contradictory information (e.g. from scheme experts, from the building sector, from friends and relatives), if the renovation coaching does not offer the right social and technical skills etc.

The moment a decision needs to be taken with co-homeowners

A very particular drop-out moment occurs when the dwelling is co-owned by multiple homeowners, or in an apartment building. E.g. in the COA-renovation process (DE), the most critical moment is decision for or against the renovation, since by law there are certain shares of owners and apartments to be reached in order to be able to start. If the necessary majorities cannot be gathered, all consulting and planning done beforehand was in vain.

4.2.2 Overview of the main motivations for dropping out

The motivations for dropping out from a demand aggregation scheme correspond with the barriers that have been detected in the REFURB report D2.2 (demand side drivers and barriers for segments). Barriers are the psychological, social, financial and other negative arguments not to carry out a renovation. These originate in motivations, desires, needs and the financial situation of homeowners.

A demand aggregation scheme is able to overcome a number of barriers, but not all. Successful barriers that are overcome are e.g. making homeowners feel more secure about their investment, reduce the required knowledge and time of the homeowner to manage a renovation process, and active guidance through the decision making process.

The most important motivations for dropping out are clustered in technical, financial, social & behavioural, and context barriers. For an extensive description of these barriers, see the REFURB report D2.2.

Technical barriers

- The intended renovation is technically not possible or appropriate.

Financial barriers

- A lack of financial possibilities to invest
- A lack of willingness to invest / competing products (prioritization of other things)
- The cost for the (NZEB) renovation is too high
- No secure feeling about the investment, e.g. because of conflicting information or a lack of trust in the demand aggregation scheme.
- A low return on investment.

Social & behavioural barriers

- Values & attitudes (e.g. lack of motivation to have an energy efficient home; ignorance about the state of the home and energy consumption)
- Momentums (e.g. not the right time to carry out a renovation process)
- Availability of time
- Inadequate advice, unburdening and guidance (e.g. not providing enough solutions, the process is not smooth enough)

Context barriers:

- Building sector readiness (e.g. little experience with NZEB solutions, conflicting information)
- Multi-stakeholder issues (e.g. co-homeownership)
- Legislation & policy (e.g. subsidies are stopped)

4.2.3 Successful techniques to counter drop-out

All analysed demand aggregation schemes tackled a mix of barriers that hinder homeowners to invest in an energy efficiency renovation, and made use of a number of drivers to improve the organisation of the demand side and tempt homeowners to start a housing renovation.

In essence, the analysed demand aggregation schemes use a lot of techniques to reduce the drop-out moments between the phase the homeowner shows interest in an energy renovation and the moment the dwelling is renovated. An overview of the drivers and barriers the analysed demand aggregation schemes target is provided in chapter **Error! Reference source not found.**.

If these techniques were successful, the number of drop-out moments was reduced, and no specific techniques needed to be implemented for the further reduction of drop-outs. The remaining drop-out moments observed in the demand aggregation schemes are listed below, but should be considered together with the techniques used to tackle barriers. The successful techniques should also be read together with the recommendations to organize the demand side (chapter 5).

- A **personal approach** is considered to be very important. This includes a very personal service with personal contact, not some "generic" advice. E.g. *Stroomversnelling* (NL), with a step by step guidance, gives more insight information, etc. In the ZERO home (DK) program, a close dialogue and help with homeowners was provided all the way: they had the energy consultants' ("Charlie") telephone number and could call him if they were unsure about anything. The same goes for the case *Pluimstraat* (B) and other cases. All cases reported that it is very important to **create confidence** between homeowner and the renovation guide.

- Creating some kind of "**communities**" with other participants, e.g. in the same neighbourhood. Homeowners tend to be more convinced by "peers" who are running through a similar renovation process. E.g. in Dampoort Gent, some collective initiatives were set up: group purchasing, meetings with participants etc. So homeowners can learn to know each other and rely on peers for double-checking, helping hands etc.

- To offer a **long-term perspective**, e.g. in *Buurkracht* (Nl) which works on being present in a neighbourhood for multiple years, with a mix of new campaigns and repeating successful ones.

- To have a **toolkit of solutions and knowledge** to (help) to respond to all barriers that pop up (e.g. financial: CLT, help to apply for subsidies etc.). This toolkit must be tailor-made to the targeted segment of homeowners, e.g. a good financial solution for upfront investment.

- Not too limited to technical guidance, but **integrated advice**, e.g. also financial and social guidance. Offer reliable and qualitative expertise in all fields (e.g. involving an architect or technical expert).

- **Good communication**, especially in more complex situation. E.g. in the COA Freiburg (DE), drop-outs were avoided by constantly communicating with the investors/owners (consultation hour) and through the transparent information policy of the administration.

- A **meticulous planning of the construction work** guarantees a short construction period and reduces the risk of additional work or additional costs, which could demotivate the investors/owners.

5 Conclusions: options to organize the demand side

All in-depth analyses of the demand aggregation schemes end with a set of final lessons learned, summarizing the main conclusions. Based on these lessons learned of all these schemes, a set of 10 recommendations to organize the demand side are presented.

5.1 RECOMMENDATION 1: COPY THE SUCCES OF OTHER SCHEMES

There are many successful and less successful demand aggregation schemes. 12 have been analysed in depth. Chapter 4 of this report deals with:

- Their success factors (unburdening of homeowners in the renovation process, providing independent advice, involvement of public partners etc.)
- Their fail factors (design a good financial architecture for the scheme; give shape and substance to the NZEB-concept etc.)
- How to reduce the drop-out moments of homeowners (financial issues, problems with craftsmen, realizing it is too time consuming etc.).

5.2 RECOMMENDATION 2: REGARD ENERGY SAVING AS A PROCESS, NOT A SERVICE OR PRODUCT

Saving energy is a process, with many drop-out moments. It is certainly not a one-off 'action'. It takes homeowners time to gather knowledge and insights in order to get into the action mode and consider their options. The challenge is to understand why homeowners become part of the process and what triggers them.

Choices in the process are determined by restraints in time and budget on the one hand and personal drivers on the other hand. The report D.2.2 of the REFURB-project offers insight in the demand side drivers and barriers.

In order to get as many people as possible in the process, it is important to offer a mix in reasons why they should renovate, but also a mix in types of energy saving measures and solutions (technical, organizational, financial). So not just large investment options like insulation, but also small investment options and measures to change energy consumption behaviour. This way the threshold is lower for people to join and 'grow' throughout the process.

5.3 RECOMMENDATION 3: RESPOND TO THE HETEROGENEITY OF THE DEMAND SIDE

Although specific segments of homeowners are targeted, still a lot of heterogeneity was detected in several schemes. Every dwelling is different, every homeowner is different. E.g. with a neighbourhood approach, still a lot of differences in housing quality and preferred solutions are detected.

The renovation program cannot rely on one single solution, but rather on a set of solutions like a toolbox to overcome as much of technical, financial and other barriers as possible. The renovation program must be flexible to tune the approach to different homeowners.

To focus on a well-defined segment helps to narrow the set of solutions that need to be in the toolbox. E.g. when focusing on low-income homeowners, an adequate financial solution should be in the toolbox.

Homeowners can take decisions in a very different way, can have different knowledge levels, can have different interests, and have different reasons why they want to save energy. Reasons for energy renovation can be saving money, saving the environment and making the home a more comfortable place to live. It is important to cater for all these needs in all communications in order to get as many people as possible in the energy saving processes.

5.4 RECOMMENDATION 4: OFFER HOLISTIC AND TAILOR-MADE SOLUTIONS WITH A PERSONAL APPROACH

Most homeowners consider energy renovation only as one dimension of their home upgrade. Improving the building quality, the architecture, the comfort, the style… is considered inseparable from energy renovation when homeowners decide to start a renovation process. Most homeowners will not implement these improvements in sequential renovation processes, but within one large renovation process.

A demand aggregation scheme for NZEB renovation must be designed to be compatible with these other renovation needs of the homeowner. If a homeowner wants to insulate the roof, and wants to add a roof window, this must be possible. But it must be clear for the homeowner what scheme services he can and cannot rely on.

Some schemes prove to combine 2 challenges, e.g. upgrade the housing quality to minimum standard (from the view of housing quality policies) and make them far more energy efficient (from the view of climate and energy policies).As a consequence, the scheme must offer diverse competences. E.g. in a neighbourhood scheme, the size of the neighbourhood team and the mix of competences in the team are to a large extend responsible for the success rate. The size should be in accordance with the number of dwellings in the neighbourhood, otherwise the personal approach is just too much work. In this neighbourhood scheme, it is found that a minimum of 3 persons is needed in the team, with a flexible pool of people around that (for small jobs like distributing flyers, putting up posters etc.). This neighbourhood team should also incorporate the right mix of competences. Technical knowhow is needed (‘the expert’), social skills are needed (‘the connector’) and entrepreneurial skills are needed (‘the businessman’).

5.5 RECOMMENDATION 5: GAIN THE CONFIDENCE OF THE HOMEOWNER

Gaining confidence is a key element in the success of a demand aggregation scheme. Homeowners must be confident of the renovation program. And for every homeowner gaining confidence is different. Based on the analysed cases, multiple options to increase confidence are formulated:

- A personal approach, for example from a renovation guide who is able to "speak the own language". There should be a very low threshold to contact this person (e.g. door knocking, an office around the corner). The personality of this renovation guide will also play a role in establishing confidence (e.g. social skills, experience with renovation)
- Offer a range of knowledge. This knowledge is not only about technical issues, but also on legal issues (is it allowed?), financial issues (which subsidies are available?), organizational issues (how to apply for subsidies?), social issues (can you help me to solve a related problem?) It is not evident to find a renovation coach that has all this expertise, a team might be an option, e.g. with an architect or technical expert, a social assistant and other(s).
- Offer reliable knowledge. When making an important decision on investment for renovation, homeowners will ask for second opinions. Too much conflicting advice will reduce the confidence. High-quality advice demands high-quality advisors, e.g. building sector experts, financial experts.
- The demand aggregation scheme must be independent, for example through the involvement of (local) public sector, and not (only) supply-side driven.
- Positive publicity. Unfortunately the media love failure stories more than success stories. Failure stories get more leverage and can be very counterproductive. A first deeply renovated home under the scheme is convincing evidence for the result homeowners can expect.
- …

5.6 RECOMMENDATION 6: MAKE THE SCHEME AVAILABLE FOR A LONGER PERIOD

Timing is strongly related to 'energy saving is a process'. The right time is different for every individual homeowner, e.g. because they do not have the money at this point in time.

That's why it is important to take a long-term perspective and work on being present in a neighbourhood for multiple years, with a mix of new campaigns and repeating successful ones.

5.7 RECOMMENDATION 7: TRIGGER, DON'T PUSH

Homeowners need to take the final decision. Some homeowners can take decisions easily, others will still doubt even after a fully implemented renovation. But if homeowners feel they are pushed too much

into a certain direction, most will lose confidence in the renovation program with a high chance to drop out.

Homeowners can be triggered to implement solutions or concepts (e.g. NZEB), e.g. if very reliable expertise is available with good arguments tailored to the homeowner (e.g. saving money, more comfort, best future option, best for the climate), with financial incentives (subsidies, cheap loans) etc. It works far better to trigger homeowners to think about what they want to achieve, what they need for that and how they can be helped. This way it truly becomes -and remains- their initiative.

5.8 RECOMMENDATION 8: ACTIVATE THE HOMEOWNERS WITH LATENT RENOVATION INTENTIONS.

There is a potential with homeowners that have the intention to renovate, have thought about it, have taken some initiative to start a renovation process, that have a set of renovation measurements in mind… but did not push through the renovation because of (too many) barriers they encountered (financial, organizational, confidence in building sector, etc.). These latent renovation intentions can be seen as a huge driver for stimulating the renovation dynamics.

5.9 RECOMMENDATION 9: DESIGN A FUNDING PLAN FOR THE SCHEME, FROM PILOT TO UPSCALING

This recommendation is connected with recommendation 6 (make the scheme available for a longer period).

Some of the analysed demand aggregation schemes are pilot projects, to test the toolbox with technical, social, organizational and financial solutions. But it should be clarified how to upscale the scheme if it is successful. Sometimes a pilot may shows that there is business potential or not, and this can differ in the different homeowner segments (e.g. higher income homeowners are willing to pay for some services, the supply side is willing to co-fund if the renovation budget is substantial etc.).

A funding plan (business model) behind the demand aggregation scheme should allow offering the services to achieve the intended renovation acceleration. A good funding plan can be a challenge if the demand aggregation scheme tends to be labour-intensive, e.g. the renovation guidance, the tailor-made advice etc.

5.10 RECOMMENDATION 10: ENABLE SUPPLY SIDE TO CONNECT WITH DEMAND AGGREGATION SCHEME

A final challenge to be tackled is to connect the demand side aggregation scheme with the supply side. The supply side is as complex as the demand side, and consists of building material manufacturers

(from local to international), contractors (from very small to very large), architects, building experts, building sector services etc.

The transition towards NZEB needs to be both supply and demand driven, otherwise it will fail. If a certain demand arises and the (local) supply side is not able to deliver, the success of the scheme will be suboptimal e.g. due to a lack of knowledge or willingness, or a lack of experience to deal with an aggregated demand like a group purchase. The supply side must be allowed to develop new answers, new solutions, new business models etc. and connect these to the reorganized demand side.

A better connection between the demand and supply side is the core challenge to be tackled in the REFURB project. Answers are developed in Work Package 4, and will be available in the related reports.

Annex

The annex of this report contains:

- Full template of the checklist for the in-depth analysis of the demand aggregation schemes
- In depth analysis of 12 cases of demand aggregation schemes:
  - Better Housing (DK)
  - Buurkracht (NL)
  - Green Business Growth (DK)
  - Slim Wonen in Leeuwarden (NL)
  - Stroomversnelling (NL)
  - Tartu scheme apartments (EE)
  - Evening schools (DK)
  - ZERO home (DK)
  - Pluimstraat Kortrijk (BE)
  - Dampoort Gent (BE)
  - COA Freiburg (DE)
  - Ecofund (SL)