



## Deliverable D4.2

# Local tailoring and overview of regional differences

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## 2 Summary

All the country partners in the REFURB project have carried out a tailored analysis of their individual markets and have created a solid overview identifying key local segments, drivers and solutions for each country.

Through tables and visual graphics each country has created overviews of their identified segments, drivers and solutions and have cross-linked their findings in matrix overviews which systematically illustrate the connection between the local needs for supply and the demand.

Two main groups of segments have been identified across the countries:

- Single Family Houses (SFH) with Young Families (YF) and Empty Nesters (EN) as dwellers.
- Multi Family Houses (MFH) with Owners and Tenants as decision maker and dwellers.

### **Single Family Houses:**

**Belgium, The Netherlands and Denmark** have all identified the Single Family Houses with either a Young Family or an Empty Nester as the most relevant dweller segment for their country.

**Germany and Slovenia** have also identified the Single Family Houses as a main dwelling segment. However, Germany with focus on the more specific dweller group, under the Empty Nester category, identified as the Open Minded Sceptics and Slovenia with the Young Family as their main focus for a dweller segment in this category.

### **Multi Family Houses:**

**Germany** have identified the Multi Family Houses owned by a Housing Cooperative as a main segment and **Slovenia** and **Estonia** have identified the Multi Family Houses with privately owned apartments as their high potential segment. The dweller analysis of the Multi Family Houses is divided into an Owner (building Manager) and in the case of the Housing Cooperatives, a Tenant segment, living in the apartment as a dweller. Decisions for renovation in this segment are based on a democratic process guided by regulation specific for each country.

**Estonia** have identified a sub segment of dwellers who own their apartments, but do not live there, instead renting it out to a third party, typically students. This segment is named "Absentee Owners" and have similar drivers compared to the building Managers.

### **Drivers:**

For each segment the relevant local drivers have been identified and the similarities between countries are illustrated in the tables below, where the drivers highlighted in bold show that the driver has been identified as key by more than three countries.

Table 1 Key similar drivers across the partner counties

Dwelling Segment	Dweller Segment	Drivers
Single Family Houses	Young Family	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation (identified as KEY by three countries or more)</b></li> <li>• <b>Need financial Solution (identified as KEY by three countries or more)</b></li> <li>• <b>Adjust functionality to fit modern life style needs (identified as KEY by three countries or more)</b></li> <li>• No inconveniences (identified as KEY by two countries)</li> </ul>
	Empty Nester	<ul style="list-style-type: none"> <li>• Step by step (identified as KEY by two countries)</li> <li>• Solution as part of an investment (identified as KEY by two countries)</li> <li>• Low cost high comfort (identified as KEY by two countries)</li> <li>• Motivated by recognition (identified as KEY by two countries)</li> <li>• Financial possibilities (identified as KEY by two countries)</li> <li>• Expert advice (identified as KEY by two countries)</li> </ul>
Multi Family Houses	Housing Coop. Owner/Manager	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Housing Coop. Tenant	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Private Owner	<ul style="list-style-type: none"> <li>• Lowering cost</li> <li>• Open to new technologies</li> <li>• Comfort Living</li> </ul>
	Private Manager and Absentee Owner	<ul style="list-style-type: none"> <li>• Subsidies</li> </ul>

The drivers identified for the segments are mostly rational drivers. That is, drivers which speak directly to a given “pain” or “gain” for the dweller or building owner. It is important that these rational drivers are addressed to create a compelling renovation package design.

However, in the design of the compelling offer, it is also important to address the non-rational drivers in the decision process. The designs must be easy, accessible and affordable to attract a majority of the market in each country.

### **Solutions**

For each segment a list of key solutions has been identified addressing the identified drivers of the segment. The solution tendencies across the countries are illustrated in the table below. The solutions highlighted in bold show that the solution has been identified as key by more than two counties:



Table 2 Key similar solutions across the partner counties

Dwelling Segment	Dweller Segment	Non technological solution
Single Family Houses	Young Family	<ul style="list-style-type: none"> <li>• One-stop-shop</li> <li>• Visualization of Renovation</li> <li>• Renovation grants and loans</li> <li>• Best practice/ Cases</li> </ul>
	Empty Nester	<ul style="list-style-type: none"> <li>• Step by Step</li> <li>• Holistic financial plan</li> <li>• Investment plan</li> <li>• Local partnerships who can fill in a staged approach</li> <li>• Expert advice (free and independent)</li> <li>• Best practice/ Cases</li> </ul>
Multi Family Houses	Housing Coop. Owner/Manager	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Housing Coop. Tenant	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Private Owner	<ul style="list-style-type: none"> <li>• Subsidies</li> </ul>
	Private Manager and Absentee Owner	<ul style="list-style-type: none"> <li>• Subsidies</li> </ul>

As can be seen from the analysis there are similarities between the countries which each country can use as inspiration for the further work in designing compelling renovation packages for the identified high potential segments. This report serves as a tool for the development of NZEB solutions across Europe.

# 3 Introduction

## 3.1 BACKGROUND

Deep renovations of the residential sector working towards Nearly Zero Energy Buildings (NZEB), is lagging behind the European political ambitions for energy renovation. The overall REFURB project focuses on bringing forward solutions to solve the complex interplay between the supply side and the demand side of an NZEB renovation and bring forward solutions for “An offer you can’t refuse” targeting the residential sector.

The supply and demand side of an NZEB renovation have been documented and described in previous REFURB reports and the first steps towards bridging the gap between supply and demand has been analysed in the report “**Demand – Supply Combinations**” (Deliverable 4.1), where also the overall framework, method and approach to reach a compelling offer for the homeowner is described in detail.

## 3.2 CONSTITUTING THE COMPELLING OFFER

“Constituting the compelling offer” is the main title of Work package 4 of the REFURB project. The core objective of work package 4 is to **combine findings and information derived in other REFURB work packages**. Through systematic analysis and iterative steps the complexity of the area is untangled and work package 4 will provide an overview of general and specific clusters of solutions for “an offer you can’t refuse” for the residential sector. Work package 4 consists of the following deliverables, where this report is deliverable 4.2 (D4.2):

- D4.1 Report: Demand - supply combinations
- **D4.2 Report: Local tailoring and overview of regional differences**
- D4.3 Report: Supportive financial constructions
- D4.4 Report: Renovation packages
- D4.5 Report: Online customer tool and market approach

An overview of the interaction between other work packages and deliverables relative to work package 4, can be found in the report “Demand – Supply Combinations” (Deliverable 4.1)

## 3.3 SCOPE

The scope of this report is to create a solid overview of **the local segments of the demand side of the housing market, their drivers and solutions, and to cross-link these in matrix overviews which systematically illustrate the connection points** between supply and demand.

The goal is to provide valuable local insight to be used as the basis for the further local development of renovation packages, tools and financial solutions, working towards the development of “an offer you can’t refuse” for NZEB renovations. The general tendencies and differences between the regions will be



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identified and will serve as a knowledge base and inspiration between the partners in the REFURB project as well as for key stakeholders within the residential renovation sector.

# 4 Method

The overall method and approach to reach “a compelling offer” for NZEB renovation for the residential sector is to gather insights from the demand side (the segments and drivers) and the supply side (the solutions) and insert this into a framework where it is possible to overview the interplay between the different influencing elements.

### The general 4 step method

The interplay between supply and demand is complex and consists of many factors. In order to generate an overview, it becomes important to **make good choices and select key segments, drivers and solutions**. The complexity of the area and the 4 step selection process of narrowing down the amount of variables and identifying the key elements, is roughly illustrated in Figure 1 below.

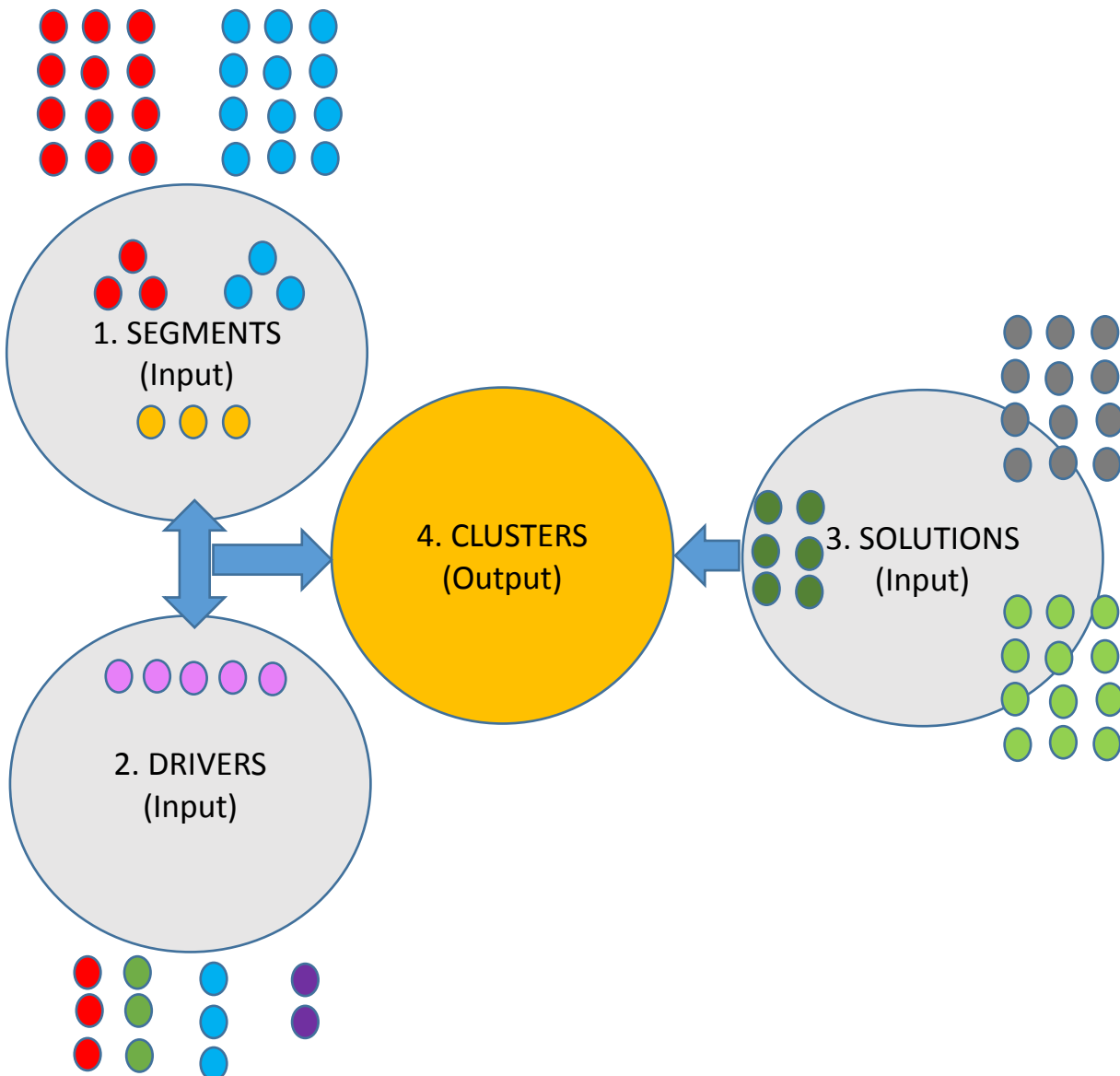


Figure 1 Diagram illustrating the filtration/selection process for Segments, Drivers and Solutions.

In Figure 1, the following 4 steps are illustrated:

1. The **Segment** circle consist of a dweller type (the person) and a dwelling category (the building) illustrated with the blue and red bubbles. Key segments are identified and combined into a maximum of 2-3 overall segments, illustrated by the yellow bubbles<sup>1</sup>
2. The **Driver** circle consist of drivers categorized into four main groups (technical, social, financial and context) illustrated by the red, green, blue and purple bubbles, key drivers relevant to the chosen overall segment are identified, illustrated by the pink bubbles.
3. The **Solutions** circle consist of the technological and the non-technological solutions illustrated with light green and grey bubbles, key solutions, relevant to the drivers of the segment, is identified, illustrated by the dark green bubbles.
4. The **Cluster** circle illustrates the **output**. The filtration and narrowing down of the variables and selections makes it possible to create a specific overview of the key segments, drivers and solutions.

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<sup>1</sup> In the report Demand Side segmentation in EU and regions (D2.1) two high potential dwelling segments were identified as the “Post war suburbs” and “Terraced houses” and the high potential dwelling segments were identified as “Young Families”, “Empty Nesters” and “Energy Convinced”

## 5 Country Analysis

In the following the specific local choices relevant for the individual countries and regions are made, creating the local tailoring of the fundamental cluster of segments, drivers and solutions.

### 5.1 NETHERLANDS

A very interesting dwelling segment in the Netherlands to renovate to NZEB standard is “the single family houses” (SFH) built up until 1964. What makes this dwelling segment interesting is a combination of 3 factors: 1) the number of dwellings that is privately owned (the market potential), 2) the (poor) energy performance and 3) the value of these houses (relating to a higher income / possibility to invest).

The most promising dweller segments for the Netherlands are Empty Nesters and Young Families as both segments are in stages of their lives where the “right moment” for a renovation is likely to happen. Young Families are just moving in their SFH built up until 1964<sup>2</sup> and want to renovate and modernize, Empty Nesters need to remodel their SFH built up until 1964 to their new future needs as active seniors with no children living at home anymore and planning for their retirement.

Based upon barriers and drivers Young Families can be ‘enticed’ to NZEB in one go, provided that the right guidance and financing is provided. Empty Nesters can be enticed with a staged approach where energy efficiency fits neatly in a total approach of their new life phase.

#### 5.1.1 Segments

Table 3 Summary of dweller characteristics

Dweller characteristics	Young family	Empty Nester
<b>The right MOMENT</b>		
<ul style="list-style-type: none"> <li>Stage of life</li> </ul>	They are at the point in their life where they are typically buying their first house and decide either to buy a new one or renovate an older one	They need to remodel the house to their new future needs as active seniors with no children living at home anymore and are planning for their retirement
<ul style="list-style-type: none"> <li>Time to manage renovation project</li> </ul>	Very limited time	Enough time
<ul style="list-style-type: none"> <li>Expected period to own the house</li> </ul>	10-20 years	10 – 30 years
<ul style="list-style-type: none"> <li>Age of dweller</li> </ul>	30-45 years old	50 – 65 years old
<ul style="list-style-type: none"> <li>Energy use patters</li> </ul>	Peaks in the morning getting reading for school and work, and in the evening cooking/cleaning and getting ready for bed	Morning and evening peaks, but after retirement usage during the day will increase
<ul style="list-style-type: none"> <li>Home occupation pattern</li> </ul>	The house is empty during the day and occupied in the evenings	The occupancy is changing from empty during the day on

<sup>2</sup> Within this group we would also name the sub section of terraced houses (with high energy bills) built up to 1980.

	and in weekends.	weekdays to one or two people being home all day
<b>Different PERSONALITIES</b>		
<ul style="list-style-type: none"> <li>Type of decision maker</li> </ul>	<ul style="list-style-type: none"> <li>First mover</li> <li>Academic education with well-paid jobs</li> <li>Well educated and informed</li> <li>Needs to feel secure as they are inexperienced homeowners</li> <li>Have limited time and are therefore looking for fast and reliable answers.</li> </ul>	<ul style="list-style-type: none"> <li>Has lived in the house for a long time already</li> <li>Higher education and income. Civil servants, teachers</li> <li>Experienced homeowners</li> <li>Ask many questions on the path to gain confidence (and have the time to look into everything)</li> </ul>
<ul style="list-style-type: none"> <li>Renovation needs</li> </ul>	Yes	Yes
<ul style="list-style-type: none"> <li>Access to information</li> </ul>	Yes	Yes
<ul style="list-style-type: none"> <li>General knowledge level</li> </ul>	Low	Medium/High
<ul style="list-style-type: none"> <li>Technical knowledge level</li> </ul>	Low	Medium/High
<ul style="list-style-type: none"> <li>Male/female</li> </ul>	Female dominated project (building of the nest). However, it is a common decision.	Male dominated project (do-it-yourself project). However, the woman of the house has to approve and is a main driver of the project.
<b>Available POSSIBILITIES and INTENTIONS</b>		
<ul style="list-style-type: none"> <li>Financial possibilities</li> </ul>	Limited	Yes
<ul style="list-style-type: none"> <li>Owner status</li> </ul>	Owner	Owner
<ul style="list-style-type: none"> <li>Willingness to invest in energy efficiency</li> </ul>	Yes /Varies	Yes/Varies
<ul style="list-style-type: none"> <li>Intentions to renovate</li> </ul>	Yes	Yes
<ul style="list-style-type: none"> <li>Environmental values and attitudes</li> </ul>	Yes/Varies	Yes/Varies

Table 4 Summary of dwelling characteristics

Dwelling characteristics	SFH until 1964
<b>SIMILAR dwellings</b>	
<ul style="list-style-type: none"> <li>Neighbourhood type</li> </ul>	Not similar
<ul style="list-style-type: none"> <li>Dwelling type</li> <li>Construction era</li> </ul>	SFH, detached and semi-detached Up to 1964 <sup>3</sup>
<ul style="list-style-type: none"> <li>Construction type</li> </ul>	SFH, detached and semi-detached

<sup>3</sup> Within this group we would also name the sub section of terraced houses (with high energy bills) built up to 1980.

• Historical value	Sometimes
<b>STATE of the Dwelling</b>	
• Urgency for renovation	Yes
• Inconvenience linked with the renovation	Yes
• Inconveniences and defects	Yes
• Value of the house	Depends on location
<b>Energy Saving potential</b>	
• Energy performance	<p>Energy label F (Detached), G (semi-detached)</p> <p><b>Typical U values in un-renovated state:</b>            Wall: 1,61 W/ m<sup>2</sup>K            Roof: 1,54 W/ m<sup>2</sup>K            Ground floor: 1,72 W/ m<sup>2</sup>K            Windows single pane: 5,20 W/ m<sup>2</sup>K            Windows double pane: 2,90 W/m<sup>2</sup>K</p> <p><b>Heating:</b>            Almost 90% of these houses has central heating installed (retrofit). HR-combination furnace is most common (HR107 40% and HR100 28%). A limited part has a different furnace (CR 8%, VR 9%) or is still locally heated (11%)</p> <p><b>Ventilation:</b>            Natural ventilation</p>

## 5.1.2 Drivers

Table 5 High potential drivers for Young Family

NL Drivers: Young Family	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation:</b> Remodel to fit modern life style, renovate to increase comfort</li> <li>• Has to be easy, <b>no inconvenience</b></li> <li>• NZEB needs to be neatly integrated with the remodelling</li> <li>• Authentic details of the house need to stay intact</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• <b>Needs financial solutions</b></li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Comfort, health, security and environment are important elements</li> <li>• Wants the renovation to be done in one go, especially when moving in.</li> <li>• <b>Needs expertise, project management support and architectural visualization of the NZEB solutions</b></li> <li>• Motivated by recognition for choices, branding and 'brag' value</li> <li>• Children's needs are important.</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Support schemes</li> <li>• Sustainable city planning</li> <li>• Ambitious city/regional climate agenda</li> <li>• Attractive area / geographic location with security for investment</li> </ul>



Table 6 High potential drivers for Empty Nesters

Category	NL Drivers: Empty Nesters
<b>Technical</b>	<ul style="list-style-type: none"> <li>• There is no immediate urgency for renovation, but maintenance still has to be done and might increase as the house is getting older</li> <li>• <b>Step by step approach</b> with personal influence along the way preferred.</li> <li>• <b>Wants increased comfort and lowering of maintenance burden</b></li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Has money, but also wants a care-free and active life</li> <li>• Financial planning incorporating house / work/ life helps to make right decisions in a staged manner</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Has time available (also for volunteer work) and connection with neighbourhood because of long time living there</li> <li>• Network is important</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Sustainable city planning</li> <li>• Ambitious city/regional climate agenda</li> </ul>

### 5.1.3 Solutions

Table 7 Non-technological solutions relevant for NL Young Families and Empty Nesters:

	Young Family	Empty Nesters
<b>Innovative Financial models</b>	<ul style="list-style-type: none"> <li>• A concept in which you can use the money spent on your energy bill and invest in your house with for example a low or interest free loan . Key is that part of the money / renovation can also be done on things other than energy efficiency per se, in order to combine energy saving, comfort and 'liveability'. E.g. new kitchen or bathroom</li> </ul>	<ul style="list-style-type: none"> <li>• A step by step renovation plan incorporating energy efficiency, improved comfort to be able to stay in the house longer and lowered maintenance burden with a financial plan making use of own financial means and potential energy savings in the form of a loan</li> </ul>
<b>Online tools for management or decision making</b>	<ul style="list-style-type: none"> <li>• Online energy advice tool, with visualization (architecturally) of the solutions in your own house/3D modelling</li> <li>• Best practices, real-life cases for inspiration (movies, lots of pictures)</li> </ul>	<ul style="list-style-type: none"> <li>• Online energy advice tool with step by step plan, also indicating possibilities of things you can do yourself</li> <li>• Best practices, real cases for inspiration (movies, lots of pictures)</li> </ul>

		pictures)
<b>Quality assurance</b>	<ul style="list-style-type: none"> <li>Independent, free of charge quality control of the total plan beforehand and after installation</li> </ul>	<ul style="list-style-type: none"> <li>Independent, free of charge quality control of the total plan beforehand and after installation. Also making sure no lock in occurs</li> </ul>
<b>New approaches to organising the supply side</b>	<ul style="list-style-type: none"> <li>off-site industrial prefabrication with combined forces of different producers</li> <li>local partnerships who can provide a complete service</li> </ul>	<ul style="list-style-type: none"> <li>local partnerships who can fill in a staged approach</li> </ul>
<b>Renovation packages = One-stop-shop-solutions</b>	<ul style="list-style-type: none"> <li><b>One-stop-shop: Renovation in one go, strong customer journey</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Step by step approach</b> without lock-in</li> </ul>

## 5.2 BELGIUM

Two market segments in Flanders (Belgium) are identified with a high potential for REFURB's NZEB-renovation packages.

The first segment are the "Young families": adults between 25-44 years with children (or a children's wish) and a house with a calculated energy performance lower than 400 kWh/m<sup>2</sup> per year. The second segment are the so-called "Empty nesters": adults between 45-65 years old and a house with building age between 1971 and 2005. In the case of the Empty nesters, the grown-up children have left the house and a new life phase for the homeowners has started.

These segments are similar to the ones identified in the Danish and Dutch case, in the sense that it concerns the same "dweller" types. The "dwelling" typologies however, are different. Regarding these dwelling typologies, it should be remarked that at this time, no distinction is made yet between the building typology (terraced, (semi-) detached) or location (urban, rural). It is possible that this could lead to a differentiation later on, when composing the renovation packages.

For each of these segments, the main drivers and (non-) technological solutions for NZEB-renovations are described with input from REFURB's WP2 "mapping the demand-side" and WP3 "mapping the supply-side". Keywords for the Young families in Belgium are: Financial incentives, step-by-step approach, guidance and coaching. Keywords for the Empty nesters are: Secure investments, comfort, unburdening, single-point-of-contact. This provides the first basis of the renovation packages that will be developed further in WP4.

A number of items should be taken into account when elaborating these market segments during the development of the renovation packages.

First, there is a clear differentiation noticeable in *non-technological* solutions as a result of the distinct characteristics of the two segments. However, the set *technological* solutions are still rather generic at this point in time. This should require more attention in the next steps.

Furthermore, it can be expected that other relevant solutions can be relevant too, not only the ones listed in this deliverable. In particular, it is valuable to look at the non-technological solutions of the other REFURB countries, as these were only briefly considered when defining the solutions for the Belgian segments.

Finally, while the selection of these segments is evidence-based, it needs to be taken into account that the descriptions of the characteristics, main drivers and solutions of these segments are partly based on assumptions and the local experience of partners involved. Therefore, it is crucial to test these assumptions in real life as early as possible when developing the renovation packages.

### 5.2.1 Segments

Table 8 Summary of dweller characteristics

Dweller characteristics	Young families	Empty nesters
<b>The right MOMENT</b>		
<ul style="list-style-type: none"> <li>Stage of life</li> </ul>	The main characteristic of this segment: young families	They need to remodel the house to their new future needs as active seniors and are planning for their retirement
<ul style="list-style-type: none"> <li>Time to manage</li> </ul>	Little time available	Time available

renovation project		
<ul style="list-style-type: none"> <li>Expected period to own the house</li> </ul>	They expect to own the house for a very long period	10 – 30 years
<ul style="list-style-type: none"> <li>Age of dweller</li> </ul>	Typically between 25-45 years old	45 – 64 years old
<ul style="list-style-type: none"> <li>Energy use patterns</li> </ul>	Morning and evening peaks. Peaks will start earlier in the day as children return from school.	Morning and evening peaks. Energy consumption will be slightly lower than young families, as the children have left the house.
<ul style="list-style-type: none"> <li>Home occupation pattern</li> </ul>	The house is empty during the day. Higher occupation on Wednesday afternoon and during the weekends.	Increasing home occupation during the week as they are likely to have more holidays available and a coming retirement
<b>Different PERSONALITIES</b>		
<ul style="list-style-type: none"> <li>Type of decision maker</li> </ul>	Various	Various
<ul style="list-style-type: none"> <li>Renovation needs</li> </ul>	Very important, as they need to adapt the house according to family needs	Comfort is the main driver as the house already possesses a certain degree of quality
<ul style="list-style-type: none"> <li>Access to information</li> </ul>	High, as this segment in general has high access to internet	Generally high access to information, although they might be less familiar with online resources than for instance the young families. Time to seek for information
<ul style="list-style-type: none"> <li>General knowledge level</li> </ul>	Various, rather high	Various, rather high
<ul style="list-style-type: none"> <li>Technical knowledge level</li> </ul>	Various	Various
<ul style="list-style-type: none"> <li>Male/female</li> </ul>	Various, as this is difficult to generalize	Various, as this is difficult to generalize
<b>Available POSSIBILITIES and INTENTIONS</b>		
<ul style="list-style-type: none"> <li>Financial possibilities</li> </ul>	Mostly limited. This might be a main reason to choose for staged renovations.	Sufficient financial possibilities
<ul style="list-style-type: none"> <li>Owner status</li> </ul>	Owners	Owners
<ul style="list-style-type: none"> <li>Willingness to invest in energy efficiency</li> </ul>	Young families mostly are more willing	Willingness to invest if return on investment is sufficiently proven
<ul style="list-style-type: none"> <li>Intentions to renovate</li> </ul>	High intentions. Mostly they buy a dwelling with the goal to go for a renovation (very often a deep renovation). Most young families start renovating within 3 years after buying the dwelling	Intentions to raise the comfort of their house
<ul style="list-style-type: none"> <li>Environmental values and attitudes</li> </ul>	Various	Various

Table 9 Summary of dwelling characteristics

Dwelling characteristics	Single family house with low energy performance	Single family house (1970 – 2005)
<b>SIMILAR dwellings</b>		
<ul style="list-style-type: none"> <li>Neighbourhood type</li> </ul>	Various, although a higher concentration is expected in urban centres	Various
<ul style="list-style-type: none"> <li>Dwelling type</li> </ul>	Slightly higher share consists of terraced housing, but it also includes (semi-) detached houses	Slightly higher share is detached, but it also includes semi-detached or terraced houses
<ul style="list-style-type: none"> <li>Construction era</li> </ul>	Mostly pre 1970	1970 – 2005
<ul style="list-style-type: none"> <li>Construction type</li> </ul>	Brick, no cavity wall, pitched roof	Brick, cavity wall, pitched or flat roof
<ul style="list-style-type: none"> <li>Historical value</li> </ul>	Not in particular	Not in particular
<b>STATE of the Dwelling</b>		
<ul style="list-style-type: none"> <li>Urgency for renovation</li> </ul>	High	Medium
<ul style="list-style-type: none"> <li>Inconvenience linked with the renovation</li> </ul>	High, but depending on the type of renovation (staged or all-at-once)	Medium to high
<ul style="list-style-type: none"> <li>Inconveniences and defects</li> </ul>	Low energy performance, re-organisation of the dwelling might be necessary, quality issues (for instance, mould and moisture, airtightness) linked to comfort	Already a certain level of building quality
<ul style="list-style-type: none"> <li>Value of the house</li> </ul>	Difficult to generalize, as there are a lot of factors that have an influence aside from the state of the dwelling (e.g. location).	Medium to high
<b>Energy Saving potential</b>		
<ul style="list-style-type: none"> <li>Energy performance</li> </ul>	Most important characteristic of this segment: low energy performance.  Detached houses < 539 kWh/m <sup>2</sup> .y Terraced houses < 439 kWh/m <sup>2</sup> .y.	Already a certain level of energy performance; risk for lock-in situations

## 5.2.2 Drivers

Table 10 High potential drivers for segment Young families

Young families – dwellings with low energy performance	
<b>Technical</b>	<ul style="list-style-type: none"> <li>Urgency for renovation: there is a high urgency to renovate as the house has a low energy performance</li> <li>Viability of tailor-made approach: a staged approach is certainly a possibility for young families and might even be recommended due to financial reasons (it</li> </ul>

	allows them to spread the investments over time)
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Feel secure about investment &amp; savings: increasing the market value of the house can be a driver but also a barrier for young families, in the sense that it could set a limit to the amount that can be invested in the renovation.</li> <li>• Subsidies, financial incentives: as the available budget is limited, additional financial support can be an important driver</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• They have renovation needs: they want to adapt the dwelling to family needs and have architectural ambitions</li> <li>• Accurate, reliable and tailor-made information: young families have easy access to information, which increases the need for accurate, reliable and tailor-made information</li> <li>• Group action, e.g. neighbourhood action, group buying</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Legislation and policy</li> <li>• Building sector readiness</li> </ul>

Table 11 High potential drivers for segment Empty nesters

Empty nesters – Dwellings 1971 - 2005	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• risk for lock-in</li> <li>• Inconvenience linked to the renovation: temporarily moving out of the house is less of an option for the empty nesters. Renovations within a short timeframe are an important driver.</li> <li>• Inconveniences and defects: reparations or maintenance might be necessary</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Availability of financial possibilities to invest: driver</li> <li>• Return on investment: a barrier to consider (due to the age of the inhabitants)</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• renovation needs and intentions because their house needs an update and they want to adapt their house to their changing family situation, with an emphasis on increased comfort.</li> <li>• advice, unburdening and guidance: they have enough financial possibilities to appoint an advisor to support them for their renovation</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Legislation and policy</li> <li>• Building sector readiness</li> </ul>

### 5.2.3 Solutions

Table 12 Non-technological solutions relevant for the BE segments:

		Young families	Empty nesters
<b>Innovative models</b>	<b>Financial</b>	<ul style="list-style-type: none"> <li>• Renovation grants</li> <li>• Renovation loans</li> <li>• Group purchasing</li> <li>• Cost estimation (embedded in Renovation masterplan)</li> <li>• Third-party upfront financing</li> </ul>	<ul style="list-style-type: none"> <li>• Investment plan</li> <li>• Renovation package (“one package, one price”)</li> <li>• NZEB-renovation as a financial product</li> </ul>
<b>Online management or decision making</b>	<b>tools for or</b>	<ul style="list-style-type: none"> <li>• “Warmer Wonen” NZEB-renovation advice tool</li> <li>• Online documentation of best-practice demonstration</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration buildings</li> </ul>

	projects <ul style="list-style-type: none"> <li>• Online community</li> </ul>	
<b>Quality assurance</b>	<ul style="list-style-type: none"> <li>• Renovation coach as (non-) technical support</li> <li>• Offering the option of do-it-yourself (DIY) of a part of the renovations</li> <li>• Guidelines and tutorials (e.g. youtube-movies)</li> </ul>	<ul style="list-style-type: none"> <li>• Renovation coach as single-point-of-contact</li> <li>• NZEB label, Quality assurance by a third party</li> </ul>
<b>New approaches to organising the supply side</b>	<ul style="list-style-type: none"> <li>• Renovation coach</li> <li>• Database of qualified contractors and partnerships</li> <li>• Group purchases, collective renovations</li> </ul>	<ul style="list-style-type: none"> <li>• Construction teams ('bouwteam' in Dutch) with one single-point-of-contact Turnkey renovations</li> </ul>
<b>Renovation packages = One-stop-shop-solutions</b>	<ul style="list-style-type: none"> <li>• Renovation masterplan</li> </ul>	<ul style="list-style-type: none"> <li>• One-stop-shop</li> <li>• Ease of the renovation (short renovation period, temporary housing)</li> </ul>

## 5.3 GERMANY

### 5.3.1 Segments Single Family Houses

Of all the dwellings in Germany a share of 47% is located in the single-or double-family house segment.

Every year, 7 to 8 percent of all German homeowners renovate their buildings with a specific focus on building envelope and heating system. For the decision whether to renovate or not, sociodemographic factors play an important role. The highest level of renovators is to be found among the age group of 50 to 70 years (more than 40 percent renovated their house in the last four years).

With regard to stage of life and income situation, homeowners who carried out a comprehensive energetic renovation hardly differ from homeowners who decided to undertake a standard renovation. Structural conditions such as year of construction and type of building has only little impact on the kind of renovation being made.

Detached single-family houses are being renovated more often than semidetached houses and terraced houses. The acquisition of an existing residential property provides a window of opportunity particularly for implementing a *comprehensive* energetic renovation.

Personal values and attitudes, orientations, and expectations have the most significant impact on choosing what kind of renovation to be done. Many barriers for an energetic renovation are not only to be seen in financial and economic aspects and therefore can't be removed solely by increasing funding programmes. Due to worries and biases homeowners are often confused and only implement stepwise renovation measures, if any at all. This complex situation shows the relevance of the REFURB approach to develop and support tailored offers and renovation packages (demand driven) based on existing sources of information and counselling as well as technical implementation (supply driven). To test this the open-minded sceptics were chosen as a segment to target.

*Table 13 Summary of dweller characteristics*

Dweller characteristics	Open-minded sceptics
<b>The right MOMENT</b>	
<ul style="list-style-type: none"> <li>Stage of life</li> </ul>	Precaution for old age living, house has a high emotional value
<ul style="list-style-type: none"> <li>Time to manage renovation project</li> </ul>	Yes time
<ul style="list-style-type: none"> <li>Expected period to own the house</li> </ul>	Period property have been owned is 11 to 30 years
<ul style="list-style-type: none"> <li>Age of dweller</li> </ul>	50 years and older
<ul style="list-style-type: none"> <li>Energy use patters</li> </ul>	Morning and evening peaks
<ul style="list-style-type: none"> <li>Home occupation pattern</li> </ul>	Depends (still employed, full-time/part-time or early retirement)
<b>Different PERSONALITIES</b>	
<ul style="list-style-type: none"> <li>Type of decision maker</li> </ul>	-risk-tolerant, open -elementary formal education (non-academic)
<ul style="list-style-type: none"> <li>Renovation needs</li> </ul>	Yes, necessary maintenance work
<ul style="list-style-type: none"> <li>Access to information</li> </ul>	Yes, mainly social network, but also heating installers, architects, TV, internet, technical



	journals, energy consulting
• General knowledge level	Depends / elementary education (non-academic)
• Technical knowledge level	mid-level
• Male/female	Common decision
<b>Available POSSIBILITIES and INTENTIONS</b>	
• Financial possibilities	Yes
• Owner status	Owner
• Willingness to invest in energy efficiency	Yes
• Intentions to renovate	Yes
• Environmental values and attitudes	Yes

Table 14 Summary of dwelling characteristics

Dwelling characteristics	SFH
<b>SIMILAR dwellings</b>	
• Neighbourhood type	similar
• Dwelling type	SFH
• Construction era	1969-1988
• Construction type	SFH
• Historical value	No
<b>STATE of the Dwelling</b>	
• Urgency for renovation	Yes
• Inconvenience linked with the renovation	Yes
• Inconveniences and defects	Yes
• Value of the house	Depends on location (high emotional value for dweller / owner)

### 5.3.2 Segments Multi Family Houses

Almost 52% of the dwellings in Germany are in multi-family houses. In urban areas, there are even more, 17% of the dwellings located in single- or double-family houses and 82% located in multi-family houses.

Both condominium owner associations (COA) and housing enterprises represent together nearly 40% of the German dwelling stock. COA will become more important in the future because of the trend of turning tenant buildings into condominium apartments. Furthermore, this trend is continuing because new-built multi-family houses are mostly 'condos'. In the context of the REFURB project, convincing housing enterprises of energetic refurbishments can be also promising. Depending on their building stock they can make a big contribution to energy saving and CO<sub>2</sub>-reduction by renovating energy-efficiently.

Especially for housing companies it will be difficult to implement refurbishment renovations with regard to the interests of the tenants. There will be a trade-off between the economic interests of housing companies to stay in competition and the interest of tenants to have an affordable rent which will increase with every renovation measure.

In the following analysis the housing cooperatives are examined in more detail. The reasons for this is as follows:

- 1) Housing cooperatives are democratic because the members elect their representatives. The representatives elect the supervisory board of housing cooperative. The members of the supervisory board nominate the executive board members. The executive board members decide about all projects and is responsible for the housing cooperative.
- 2) Bauverein Halle & Leuna is a housing cooperative and part of the REFURB project. Although REFURB primarily addresses owners of single-family houses, it can be also adapted on multi-family houses which are owned by housing companies. The housing cooperative's intention of refurbishment renovations is different compared to the interests of single-family house owners.

On the one hand, there are housing companies which act economically and often are owner of multi-family houses. They have the intention to stay competitive in the housing market sector and want to reduce their residential vacancy rate. Therefore, periodic renovations are indispensable so that there is a very high residential modernization rate in Germany.

On the other hand, there are the tenants who are members of housing cooperatives at the same time. The interests of tenants can be summarized as follows: affordable homes, benefit from good infrastructure in larger cities, transfer responsibility to housing specialists and so on

*Table 15 Summary of dweller/stakeholder characteristics*

Dweller characteristics	Housing cooperatives	Tenants
<b>The right MOMENT</b>		
• Stage of life	Experiences in other projects	All stages
• Time to manage renovation project	<b>Everyday business</b>	<b>No time and no ambition</b>
• Expected period to own the house	Depends on investment sums and interest rates	Only tenant
• Age of dweller	Age of tenants: all age groups	All age groups
• Energy use patters	Morning and evening peaks	Morning and evening peaks
• Home occupation pattern	There is always someone at home.	There is always somebody in the house.
<b>Different PERSONALITIES</b>		
• Type of decision maker	- Housing renovation as a big project - <b>economically driven</b>	<b>No decision makers</b>
• Renovation needs	- depends on renovation rate	Depends on individual expectations of each tenant
• Access to information	- Yes, but housing cooperatives must also disclose information to tenants	Notices in staircases
• General knowledge level	- high, because they have typically a broad range of renovation experience	No

• Technical knowledge level	- High, because they have <b>skilled workers</b> (architects, engineers,...)	No
• Male/female	unimportant	unimportant
<b>Available POSSIBILITIES and INTENTIONS</b>		
• Financial possibilities	- <b>Yes, subsidies and grants</b>	Not necessary
• Owner status	- <b>Owner</b>	Only tenants
• Willingness to invest in energy efficiency	- Yes	<b>Yes, reduction of energy bill</b>
• Intentions to renovate	- Yes, because they want to <b>stay in competition (competitiveness)</b>	Depends on increase of rent
• Environmental values and attitudes	- Yes	Yes

Table 16 Summary of dwelling characteristics

Dwelling characteristics	Dwelling multi-family house
<b>SIMILAR dwellings</b>	
• Neighbourhood type	- different, because of diversity of tenants
• Dwelling type	- several dwellings with approx. 65 m <sup>2</sup>
• Construction era	1919 - 1948
• Construction type	- multi-family house
• Historical value	Yes
<b>STATE of the Dwelling</b>	
• Urgency for renovation	- Depends on renovation rate
• Inconvenience linked with the renovation	- yes, but primarily just for tenants
• Inconveniences and defects	- yes
• Value of the house	- Depends on location, age and condition
<b>Energy Saving potential</b>	
• Energy performance	- Gas boilers - Different insulation standards

### 5.3.3 Drivers Single Family houses

Table 17 High potential drivers

<b>Technical</b>	• Urgency for renovation / maintenance (e.g. windows, heating, façade, ventilation system)
<b>Financial</b>	• The renovation budget is available without any loans (e.g. building loan contracts, life insurance, life insurance, saving the amount)
<b>Social</b>	• Comfort, open for modern technology, preserving and increasing the value of the house, provision for one's old age

<b>Context</b>	<ul style="list-style-type: none"> <li>• Sustainability matters</li> </ul>
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### 5.3.4 Drivers Multi Family Houses

#### Housing cooperatives

Table 18 High potential drivers for Housing cooperatives

Housing cooperatives	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• Urgency for renovation: <b>Renovation to keep competitiveness</b></li> <li>• It has to be fast to reduce inconvenience for tenants</li> <li>• <b>High energy saving potential</b> because of large-scale investment projects</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• <b>Profiting from subsidies/grants</b></li> <li>• Enhance the sales value or the rents</li> <li>• High cost-benefit-ratio for a fast return on invest</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Environmental protection</li> <li>• Increasing living quality</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Complying with regulations</li> <li>• climate-conscious urban development</li> <li>• <b>sustainable and future-orientation in their public relations strategy</b></li> </ul>

#### Tenants

Table 19 High potential drivers for Tenants

Tenants	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• <b>has to be easy and fast to reduce inconveniences</b></li> <li>• no decision makers</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• <b>reducing energy bill</b></li> <li>• the German tenancy law: restricts the scope of rent increases</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• <b>comfort and health living</b></li> <li>• increase security and environmental awareness</li> <li>• part of a community</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• <b>high flow of information</b></li> <li>• active in planning process</li> </ul>

### 5.3.5 Solutions Single Family Houses

Table 20 Non-technological solutions relevant for German segments:

Open-minded sceptics	
<b>Innovative Financial models</b>	No loans
<b>Online tools for management or decision making</b>	Energy consulting: online database ( <a href="http://www.energie-effizienz-experten.de">www.energie-effizienz-experten.de</a> ); online tool "Sanierungsrechner effizienzhaus-online"
<b>Quality assurance</b>	Expert advice at the owner's expense; - Energy Performance Certificate for

	Buildings (“Energieausweis”)
<b>New approaches to organising the supply side</b>	
<b>Renovation packages = One-stop-shop-solutions</b>	"ecohome" one-stop-shop ( <a href="http://ecohome.de/">http://ecohome.de/</a> ), "Renewa" one-stop shop ( <a href="https://www.renewa.de">https://www.renewa.de</a> )

### 5.3.6 Solutions Multi Family Houses

Table 21 Non-technological solutions relevant for German segments:

		Housing cooperatives	Tenants
<b>Innovative models</b>	<b>Financial</b>	- KfW-Bank provides loans at reduced interest rates or <b>grants/subsidies</b> for energy efficient renovation (deep or staged), loans for converting the heating system towards renewable energies and grants/subsidies for having your energy efficient renovation supervised by a professional.	- the <b>German tenant law</b> prevented an over-proportional increase of rents which often come along with refurbishment renovations
<b>Quality assurance</b>		- <b>KfW-program 432 “energetic urban renewal”</b> : give subsidies up to 65% for the development of energetic renewal concepts including measures in living quarters to planning and engineer associations; supports the renewal management process up to 5 years and aims to the implementation of the energy saving measures - efficient <b>complaint management</b> for tenants	- Energy Performance Certificate for Buildings (“Energieausweis”)
<b>Online tools</b>		- thermal photos, model representation - information event for tenants - <b>public attention</b> - Energy Consulting	- understandable visualisation of the project - <b>transparent information</b> about renovation project - <b>involving in planning process</b>
<b>Innovative Communication</b>		- Energy Performance Certificate for Buildings (“Energieausweis”) - Certification for meeting the standards of “KfW-Effizienzhaus” - communication of a better <b>user behaviour</b> : long-term stabilisation of energy bill	- more communication between housing cooperative and housing community (tenants) in complex situations - <b>consultation hours</b> for tenants, if they have questions

## 5.4 SLOVENIA

In Slovenia most of the single family houses are in private ownership. Mostly their renovations are connected to the necessity to improve the living conditions for young families. Mostly they are interested in shallow renovations, since the lack of funds and appropriate financial mechanisms prevent them to invest in deep renovation. Deep renovation happens mainly in the case of richer families (which are rather rare in Slovenia). Additionally, there is a lack of appropriate public counselling.

The second biggest share in buildings is blocks of flats (19 %). Most of their renovations are connected to the necessity to improve the living condition, but mostly the decisions are driven by the building managers (private companies) who are contracted by the owner associations. Mostly they are interested in shallow renovations, since the lack of funds and appropriate financial mechanisms prevent them to invest in deep renovations. They have limited options given the low income of owners/tenants. In some cases, also deep renovation happens mainly in the case of “richer” blocks of flats or if the manager is resourceful enough to find good solutions – financial-wise for owners/tenants (meaning long years of repayment of additional costs needed for a renovation). The decision for renovation of a block of flats are based on a plan presented by the manager and with final decision/approval of the owners/tenants and council of the owner association.

Inspiration from other countries in the REFURB project can give additional inputs and findings about the necessity to develop the specific support mechanisms in Slovenia that can contribute in greater extent to the development of a step by step approach to deep renovation.

Deep renovation is a challenge in Slovenia. Due to the lack of appropriate support mechanisms in Slovenia and in the region the development is rather slow, but it can be helped with a good support mechanism that will empower the residents about cost efficiency of new measures implemented. Additionally, a step by step approach “from shallow to deep renovation” need to be put into the heart of support mechanisms. Lack of additional subsidies and funds from owners makes it difficult to work in line with a deep renovation, even if the Housing companies (managers) are keen on renovations and can be viewed as frontrunners. Energy efficiency measures are sold on the low cost promise which is the main driver for managers to be able to implement renovation (either shallow or step by step (towards deep renovation)).

### 5.4.1 Segments

Table 22 Summary of dweller/stakeholder characteristics

Dweller characteristics	Young family (staying in the dwelling (private houses) of the parents)	Private Owners of flats in Housing blocks	Private Managers of Blocks
<b>The right MOMENT</b>			
<ul style="list-style-type: none"> <li>Stage of life</li> </ul>	They are looking for comfortable and functional flats for the family (parents)	They are looking for comfortable and functional flats for the family (parents)	experiences in other renovation projects (professionals in the field)

	and children)	and children or if older – comfortable place to live in)	
<ul style="list-style-type: none"> <li>Time to manage renovation project</li> </ul>	<b>No or very little time</b>	<b>based on plan of the manager</b>	<b>private business (their core business)</b>
<ul style="list-style-type: none"> <li>Expected period to own the house</li> </ul>	life time	life time	they are not owners, they manage it
<ul style="list-style-type: none"> <li>Age of dweller</li> </ul>	25-45 years	all ages	all ages
<ul style="list-style-type: none"> <li>Energy use patters</li> </ul>	morning, evening, additional usage during weekends	(average)morning, evening, additional usage during weekends	(average)morning, evening, additional usage during weekends
<ul style="list-style-type: none"> <li>Home occupation pattern</li> </ul>	The house is occupied in the morning and evening (partly during the weekend (especially during colder months)	The flat is occupied in the morning and evening (partly during the weekend (especially during colder months), some all days	The flat is occupied in the morning and evening (partly during the weekend (especially during colder months), some all days
<b>Different PERSONALITIES</b>			
<ul style="list-style-type: none"> <li>Type of decision maker</li> </ul>	<ul style="list-style-type: none"> <li>Decision is based on the necessity to have their own home</li> <li>They mostly have at least secondary schools, although with younger generations faculty degree prevail</li> <li>The decision is based also on the financial issues (in lots of cases parents need to loan/support the young</li> </ul>	<ul style="list-style-type: none"> <li>Decision is based on the decision of all owners or tenants in the block of flats.</li> <li>They mostly have at least secondary schools, although with younger generations faculty degree prevail</li> <li>The decision is based also on the financial issues (in lots of cases parents or relatives support for example</li> </ul>	<ul style="list-style-type: none"> <li>Decision is based on the plan of the manager and decision of the council of the homeowner association (not part of the regular maintenance costs)</li> </ul>

	family)	the young family	
• Renovation needs	Yes	Yes	depends on the value for money
• Access to information	Yes	Yes	yes – professional business but they have to share it with owners/tenants (house council)
• General knowledge level	Low (but they upgrade before/during the process of renovation) (they try to do some things by themselves – to reduce the costs).	Low (all work is done by contractor/manager)	high – their everyday business
• Technical knowledge level	Low (but they upgrade before/during the process of renovation) they try to do some things by themselves – to reduce the costs).	Low	high – their everyday business
• Male/female	It is a common decision. Couple split the job according to individual competences and knowledge.	It is a common decision (mostly based on the financial situation of the family (decision before the house council has a meeting).	decision within manager team and then consulted with owners/tenants (house council)
<b>Available POSSIBILITIES and INTENTIONS</b>			
• Financial possibilities	<b>No</b>	No	yes – subsidies (Eco fund)
• Owner status	Owner (or living in the house of parents)	Owner (or tenant)	not owner only manager- they sometimes manage also the surroundings of the block (if agreed with other public service providers)
• Willingness to invest in energy efficiency	Yes	Yes	yes –based on the value for money
• Intentions to renovate	Yes	Yes	yes – based on the value for money (to assure the market



			share)
<ul style="list-style-type: none"> <li>Environmental values and attitudes</li> </ul>	Yes	Yes	yes – based on the value for money (to assure the market share)

Table 23 Summary of dwelling characteristics

Dwelling characteristics	Family houses 1950 onwards	Block of flats
<b>SIMILAR dwellings</b>		
<ul style="list-style-type: none"> <li>Neighbourhood type</li> </ul>	Similar	similar
<ul style="list-style-type: none"> <li>Dwelling type</li> </ul>	single family houses	dwellings (up to 100m <sup>2</sup> ), depends on the year of construction
<ul style="list-style-type: none"> <li>Construction era</li> </ul>	1950 onwards	1950 onwards
<ul style="list-style-type: none"> <li>Construction type</li> </ul>	single family houses	block of flats – multifamily home
<ul style="list-style-type: none"> <li>Historical value</li> </ul>	No	Mostly no (some protected due to renown architects)
<b>STATE of the Dwelling</b>		
<ul style="list-style-type: none"> <li>Urgency for renovation</li> </ul>	Yes	yes (based on value for money)
<ul style="list-style-type: none"> <li>Inconvenience linked with the renovation</li> </ul>	Yes	yes (for owners/tenants)
<ul style="list-style-type: none"> <li>Inconveniences and defects</li> </ul>	Yes	yes
<ul style="list-style-type: none"> <li>Value of the house</li> </ul>	Depends on location	depends on location
<b>Energy Saving potential</b>		
<ul style="list-style-type: none"> <li>Energy performance</li> </ul>	– class F: from 150 to 210 kWh/m <sup>2</sup> a, – class G: from 210 to 300 and more kWh/m <sup>2</sup> a.  <b>Heating:</b> Central heating system. Individual heating mostly wood) <b>Ventilation:</b> No mechanic ventilation	– class F: from 150 to 210 kWh/m <sup>2</sup> a, – class G: from 210 to 300 and more kWh/m <sup>2</sup> a.  <b>Heating:</b> long distance heating (gas, wood) <b>Ventilation:</b> No mechanic ventilation

## 5.4.2 Drivers

Table 24 High potential drivers for segment young families in single houses

	Young Family private house	Manger of Flat	Owner/ Tenants of Flat
<b>Technical</b>	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation:</b> Remodel to fit modern life style and to fit the needs of families and children</li> <li>• <b>Need to fit the financial means of the families</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation: to keep the competitive position of the manager (private company)</b></li> <li>• Deep renovation: Desired – cannot be reached- therefore more common shallow renovation</li> </ul>	<ul style="list-style-type: none"> <li>• Need to have functional modern space</li> <li>• open to new low cost technologies (if advised)</li> <li>• <b>Comfort Living</b></li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Need financial solutions (no specific support measures for young families exist)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Get support from subsidies (Eco fund)</b></li> <li>• <b>secure their position on the market</b></li> <li>• Energy Saving potential</li> </ul>	<ul style="list-style-type: none"> <li>• <b>It has to reduce costs for tenants</b></li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Want support from experts regarding the renovation, new technics, technology</li> <li>• They value the honest reply and honest advice</li> <li>• The needs of their family is the highest value.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase of the quality of living</li> <li>• Joint decision of owners/tenants to “have more beautiful” and cost effective living (including energy efficiency measures)</li> </ul>	<ul style="list-style-type: none"> <li>• Joint decision of manager/owners/tenants (house council)</li> <li>• <b>As little inconvenience as possible</b></li> <li>• <b>Honest flow of information</b></li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Support schemes (need to be upgraded)</li> <li>• Green local community planning in connection with development of sustainable energy efficiency plan (in correlation with</li> </ul>	<ul style="list-style-type: none"> <li>• Complying with regulations and “advertisement” for “we are energy efficiency frontrunners</li> <li>• <b>Complying with the market situation (possible reward for energy efficiency</b></li> </ul>	

	Covenant of Mayors)	of	frontrunners)	
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### 5.4.3 Solutions

Table 25 Non-technological solutions relevant for Slovenia segments:

Open to sustainable solutions	
Renovation packages = One-stop-shop-solutions	not existing (only partly with managers)
Innovative financial support (banks,...)	so far only smaller subsidies from national Eco fund are available (no other specific favourable loans) <a href="http://www.ekosklad.si">www.ekosklad.si</a>
Support measures (need to be upgraded) (counselling, support from national mechanisms)	so far only general public advice possible (Eco fund network of counsellors); <a href="http://www.ekosklad.si">www.ekosklad.si</a> ; no specific advice with overview of needs of the owners (on spot checks are done by companies)
New ways of organising renovation (e.g. housing cooperatives –so far not developed)	not existing (not implemented yet in practice)

## 5.5 DENMARK

The most interesting dwelling segment in Denmark to renovate to NZEB standard is “the single family houses” (SFH) built from 1960 to 1977. Both by number (the market potential) and by energy performance (the high energy use) this category stands out as a high potential segment and is therefore chosen as the main building typology segment for the further Danish development. From analysis carried out by Kirsten Gram<sup>4</sup>, summarized in the Danish market report (D.2.1 Annex 2 Denmark), the main high potential dwellers are:

1. “Young Family” (YF) living in the suburbs, close to larger cities
2. “Empty Nester” (EN) living in an old house anywhere in DK.

Both segments are in stages of their lives where **the “right moment” for a renovation is likely to happen**. The Young family is buying a house to renovate and the Empty Nester living the good life, might be planning retirement and wants to get the house fixed with special attention given to low operational and maintenance cost for the future.

There are 248.000 Single family homes (SFH) from 1960-1977 in Denmark<sup>5</sup> and these houses therefore account for approximately 20% of the total single family housing market of approximately 1,2 mill. housing units. The total housing stock in DK including multifamily houses are 2,5 mill.

The greatest market for the segment “Young Family” is in the urban areas around the larger Danish Cities as this is where a renovation will increase the resell value of the house making it possible to get the

<sup>4</sup> Kirsten Gram-Hansson

<sup>5</sup> <http://sparenergi.dk/forbrugerværktøjer/bygningsguiden/parcelhus-1960-76>

investment financed.<sup>6</sup> For the Empty Nesters the location for the house is not a key factor as this group has the money and is not dependent on increasing the resell value of the house.

Based on the segment and driver analysis, the most promising solutions for the Young Family segment seems to consist of a convenient One-Stop-Shop Solution with special focus on the financial product. For the Empty Nester segment, a promising solution seems to consist of a Step by Step approach with good inspiration from cases and testimonials. However, the true nature of real compelling offer can only be verified by completing a real market test.

### 5.5.1 Segments

Table 26 Summary of dweller characteristics

Dweller characteristics	Young family	Empty Nester
<b>The right MOMENT</b>		
<ul style="list-style-type: none"> <li>• Stage of life</li> </ul>	Are on the look for a new home which has the <b>space and modern functionalities</b> , perhaps their first house.	They need to remodel the house to their new future needs as <b>active seniors and are planning for their retirement</b>
<ul style="list-style-type: none"> <li>• Time to manage renovation project</li> </ul>	<b>No time</b>	<b>Yes Time</b>
<ul style="list-style-type: none"> <li>• Expected period to own the house</li> </ul>	10-30 years	10 – 30 years
<ul style="list-style-type: none"> <li>• Age of dweller</li> </ul>	30-40 years old	50 – 65 years old
<ul style="list-style-type: none"> <li>• Energy use patters</li> </ul>	Morning, evening peaks is dominating.	Morning and evening peaks, however soon all day as the retirement is close.
<ul style="list-style-type: none"> <li>• Home occupation pattern</li> </ul>	The house is empty during the day. And occupied in the evenings and in weekends.	The house is empty during the day. And occupied in the evenings and in weekends.
<b>Different PERSONALITIES</b>		
<ul style="list-style-type: none"> <li>• Type of decision maker</li> </ul>	<ul style="list-style-type: none"> <li>• First mover</li> <li>• <b>The home as arena for activities</b></li> <li>• Typical education background: Academic with well paid jobs</li> <li>• Needs to feel secure, however quickly trust consultants if they have good recommendations.</li> </ul>	<ul style="list-style-type: none"> <li>• First mover</li> <li>• <b>The home as a project</b></li> <li>• Typical education background: Teacher, Engineer or Economist</li> <li>• Ask many questions on the path to gain confidence</li> </ul>
<ul style="list-style-type: none"> <li>• Renovation needs</li> </ul>	Yes	Yes
<ul style="list-style-type: none"> <li>• Access to information</li> </ul>	Yes	Yes
<ul style="list-style-type: none"> <li>• General knowledge level</li> </ul>	<b>Low</b>	<b>High</b>
<ul style="list-style-type: none"> <li>• Technical knowledge level</li> </ul>	<b>Low</b>	<b>High</b>
<ul style="list-style-type: none"> <li>• Male/female</li> </ul>	<b>Female dominated project</b>	<b>Male dominated project (do-it-</b>

<sup>6</sup> / Kirsten Gram DK D2.1 Annex 2.

	(building of the nest). However, it is a common decision.	your-self project). However, the woman of the house has to approve and is a main driver of the project.
<b>Available POSSIBILITIES and INTENTIONS</b>		
• Financial possibilities	No	Yes
• Owner status	Owner	Owner
• Willingness to invest in energy efficiency	Yes	Yes
• Intentions to renovate	Yes	Yes
• Environmental values and attitudes	Yes	Yes

Table 27 Summary of dwelling characteristics

Dwelling characteristics	SFH 1960 to 1977
<b>SIMILAR dwellings</b>	
• Neighbourhood type	Similar
• Dwelling type	SFH
• Construction era	1960-1976
• Construction type	SFH
• Historical value	No
<b>STATE of the Dwelling</b>	
• Urgency for renovation	Yes
• Inconvenience linked with the renovation	Yes
• Inconveniences and defects	Yes
• Value of the house	Depends on location
<b>Energy Saving potential</b>	
• Energy performance	Energy label < D  <b>Typical U values:</b> Walls: 0,65 W/m <sup>2</sup> K Roofs: 0,26 W/m <sup>2</sup> K Floors: 0,3 W/m <sup>2</sup> K Windows: 2,52 W/m <sup>2</sup> K  <b>Heating:</b> Central heating system. Typically district heating, but individual heating with oil and gas boilers are also common.

**Ventilation:**  
No mechanic ventilation

## 5.5.2 Drivers

### Young families

Table 28 DK Drivers: Young Family

DK Drivers: Young Family	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation:</b> Remodel to fit modern life style</li> <li>• Has to be easy, <b>no inconvenience</b></li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• <b>Need financial solutions</b></li> <li>• The resell value and to secure the investment</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Comfort, health, security and environment are important elements</li> <li>• Are moving in and wants everything to be fixed and ready the day they move in.</li> <li>• <b>Want guidance and architectural visualization of the NZEB solutions</b></li> <li>• Motivated by recognition for choices, branding and brag value</li> <li>• Children's values are important.</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Support schemes</li> <li>• Sustainable city planning</li> <li>• Ambitious city/regional climate agenda</li> <li>• Attractive area / geographic location with security for investment</li> </ul>

### Empty nesters

Table 29 DK Drivers: Empty Nesters

Category	DK Drivers: Empty Nesters
<b>Technical</b>	<ul style="list-style-type: none"> <li>• No Urgency for renovation: Need to do renovation of different building components within a few years.</li> <li>• <b>Step by step approach</b> with personal influence along the way preferred.</li> <li>• <b>Wants increased comfort and lowering of running cost</b></li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Advices and economy plan for investments to secure money for an active senior life and a good retirement</li> <li>• Restructuring loan can spark a momentum</li> <li>• Deploy tax reduction scheme</li> <li>• Needs to feel they a making a good economic deal</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>• Attracted by evening classes due to the social element of joining a physical activity (education/knowledge)</li> <li>• <b>Motivated by recognition</b> and will act as active ambassadors</li> <li>• Network is important</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>• Sustainable city planning</li> <li>• Ambitious city/regional climate agenda</li> </ul>

### 5.5.3 Solutions

Table 30 High potential non-technological solutions vs. DK key segments

	DK Drivers: Young Family	DK Drivers: Empty Nesters
<b>Innovative Financial models</b>	<ul style="list-style-type: none"> <li>• <b>A cheap 30 year “mini” ESCO loan</b>, where the energy savings are used to pay off the investment included in the house loan.<sup>7</sup></li> <li>• New leasing concepts of renewable energy installations</li> </ul>	<ul style="list-style-type: none"> <li>• <b>A 20 year holistic Economic plan</b> for an active senior life and retirement including renovation and energy optimizations</li> <li>• Holistic house plans when restructuring loans</li> </ul>
<b>Online tools for management or decision making</b>	<ul style="list-style-type: none"> <li>• Good cases for inspiration</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Do-it-your-self Guideline</b></li> <li>• Good cases for inspiration</li> </ul>
<b>Quality assurance</b>	<ul style="list-style-type: none"> <li>• Free guidance from independent party</li> </ul>	<ul style="list-style-type: none"> <li>• Free guidance from independent party</li> </ul>
<b>New approaches to organising the supply side</b>	<ul style="list-style-type: none"> <li>• Facilitation of local partnerships</li> <li>• <b>Design proposal for renovation by real-estate, bank or energy company</b></li> </ul>	<ul style="list-style-type: none"> <li>• Facilitation of local partnerships</li> <li>• Sell heating and service instead of technical products.</li> </ul>
<b>Renovation packages = One-stop-shop-solutions</b>	<ul style="list-style-type: none"> <li>• <b>One-stop-shop</b></li> <li>• <b>Visualization of the renovation/new design/functionality</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Step by step approach</b></li> </ul>

<sup>7</sup> This solution is not commercially on the market and needs to be developed and tested.

## 5.6 ESTONIA

The main dwelling type in Estonia is a multifamily house. About 75% of the population in Estonia lives in Multifamily Houses, two thirds of which were built between 1960 and 1990. The composition of the residents in the Multi-Family-Houses is most heterogenic.

The apartments were not owned by dwellers but in most cases rented from state owned management companies. Some dwellings were later on privatised in the beginning of 90s, and are the buildings in focus for this analysis. The composition of dwellers has remained heterogeneous for this group of houses.

In the case of Tartu there are two groups of homeowners that stand out:

- Empty Nesters / Retirees
- Absentee Owners. This group sublet their apartment to others, mostly students and other low-income individuals. This creates two dweller types for the same apartment building, the private owners who make the decisions and can be viewed as managers of the dwelling and the dwellers who actually live in the apartment.

A common defining feature is that every house constitutes a legal body which is responsible for all the maintenance and possible renovations: the homeowner association. All decisions involving financial matters are subject to general assemblies of the apartment owners in the house. The key drivers for NZEB renovations in Estonia is the availability of a financing scheme.

Currently a complex set of specific eligibility requirements are to be met for the current KredEx subsidy scheme in Estonia towards renovation to be used and the process requires the presence of a technical consultant.

### 5.6.1 Segments

Table 31 Summary of dweller characteristics

Dweller characteristics	Empty Nester /Retirees	Absentee Owners/Managers
<b>The right MOMENT</b>		
<ul style="list-style-type: none"> <li>• Stage of life</li> </ul>	Retired or preparing to retire.	Usually in their prime. People have either left for work abroad or built their homes in the suburbs but kept their flat.
<ul style="list-style-type: none"> <li>• Time to manage renovation project</li> </ul>	Plenty of time. In many cases members of this group are most active in pursuing renovation projects.	No time and no interest.
<ul style="list-style-type: none"> <li>• Expected period to own the house/apartment.</li> </ul>	Retirees plan to live in the house for the rest of their life.	Unknown. Often the flat is kept 'just in case' - to hope for the price to rise or in case offspring should need their own place.
<ul style="list-style-type: none"> <li>• Age of dweller</li> </ul>	50+	30-45 (owner)
<ul style="list-style-type: none"> <li>• Energy use patters</li> </ul>	Energy use is best described as conservative. People are well aware of costs on energy and a few supposed ways to reduce consumption.	Not applicable to owners. The flats are mostly sublet to students whose energy use patterns may be described as



		erratic.
<ul style="list-style-type: none"> <li>Home occupation pattern</li> </ul>	Mostly staying home.	Not applicable to owners. Subtenants occupation pattern is similar to a standard working segment energy use patterns.
<b>Different PERSONALITIES</b>		
<ul style="list-style-type: none"> <li>Type of decision maker</li> </ul>	Decision making is thorough and calculated. The main concern is not to overshoot their income with spending. There is a reluctance towards taking loans.	Owners are not concerned about renovation. The interest lies in not having the value of apartment reduced by neglecting maintenance of property.
<ul style="list-style-type: none"> <li>Renovation needs</li> </ul>	Need for renovation can be justified by linking NZEB renovation to regular maintenance i.e. changing of 40-year-old plumbing or replacing roof material.	No direct need. If relation between raised property value and renovation can be shown, then the decision is usually positive. Unfortunately, there is no real rise in value in real life yet.
<ul style="list-style-type: none"> <li>Access to information</li> </ul>	Information is acquired mostly from printed press which tends to be distorted towards sensations and mishaps. Also word of mouth is valued highly.	Source of information is 'supply side' if not to say sales people. Official and relevant information is available on the internet, although in a less attractive format.
<ul style="list-style-type: none"> <li>General knowledge level</li> </ul>	Mostly poor and distorted unless conscious effort is made to obtain truthful information	General knowledge level is rather good.
<ul style="list-style-type: none"> <li>Technical knowledge level</li> </ul>	Technical knowledge level about NZEB renovation is low due to the complexity of the task.	Technical knowledge level about NZEB renovation is low due to the complexity of the task.
<ul style="list-style-type: none"> <li>Male/female</li> </ul>	Both	Both
<b>Available POSSIBILITIES and INTENTIONS</b>		
<ul style="list-style-type: none"> <li>Financial possibilities</li> </ul>	Very poor possibilities. Every precaution is taken when using loans. Renovation is only possible with significant subsidies.	Possibilities exist. Eagerness is the problem.
<ul style="list-style-type: none"> <li>Owner status</li> </ul>	Owner	Owner (with subtenant)
<ul style="list-style-type: none"> <li>Willingness to invest in energy efficiency</li> </ul>	Only if shown that living costs do not rise.	If energy efficiency comes with a rise of property value, then the willingness is there.
<ul style="list-style-type: none"> <li>Intentions to renovate</li> </ul>	The key motive for renovation is careless retirement with guaranteed low cost of heating and maintenance.	Renovation is justified if property value raises or if it is absolutely necessary to maintain integrity of the house.
<ul style="list-style-type: none"> <li>Environmental values and attitudes</li> </ul>	Environmental values are just about neglected.	For some owners who are aware of the matters it may

		mean a lot. For tenants (students) these values are important but they have very little possibilities to pursue them.
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Table 32 Summary of dwelling characteristics

Dwelling characteristics	Dwelling
<b>SIMILAR dwellings</b>	
<ul style="list-style-type: none"> <li>• Neighbourhood type</li> </ul>	Rather compact areas of multi apartment houses either on the outskirts of cities of 60s and 70s or areas rebuilt after destruction of world war 2.
<ul style="list-style-type: none"> <li>• Dwelling type</li> </ul>	Average area 60 square meters, 1 to 2 bedrooms, small kitchen and bathroom.
<ul style="list-style-type: none"> <li>• Construction era</li> </ul>	1960 to 1990
<ul style="list-style-type: none"> <li>• Construction type</li> </ul>	Mostly built of concrete blocks, some light concrete or sand-lime bricks, a few red brick houses.
<ul style="list-style-type: none"> <li>• Historical value</li> </ul>	None
<b>STATE of the Dwelling</b>	
<ul style="list-style-type: none"> <li>• <b>Urgency for renovation</b></li> </ul>	Most houses are close or over 50 years of age and need a thorough renovation including change of windows, heating system, sewage and water pipes etc.
<ul style="list-style-type: none"> <li>• Inconvenience linked with the renovation</li> </ul>	There is some necessary inconvenience involved in every repair work. However, this is being kept to as little as possible.
<ul style="list-style-type: none"> <li>• Inconveniences and defects</li> </ul>	
<ul style="list-style-type: none"> <li>• Value of the house</li> </ul>	<b>In theory the value of the property should rise as a result of renovation especially to NZEB. But for some reason it has not yet happened in practice. At least not in Tartu.</b>
<b>Energy Saving potential</b>	
<ul style="list-style-type: none"> <li>• Energy performance</li> </ul>	<b>Energy saving potential is high.</b> Presently the EPC values are around 250-300 kWh/m <sup>2</sup> y. This figure can be brought down to as low as 90 kWh/m <sup>2</sup> y of primary energy. Bringing EPC values down to values this low involves training of dwellers on how to use their NZEB apartments the right way.

## 5.6.2 Drivers

### Segment Empty Nester

Table 33 High potential drivers for the segment Empty Nester/Retirees

Segment Empty Nester / Retirees	
<b>Technical</b>	<ul style="list-style-type: none"> <li>• Need to renovate</li> <li>• Possibility of more comfortable living conditions</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• <b>Availability of financing schemes (KredEx subsidies)</b></li> </ul>

	<ul style="list-style-type: none"> <li>● <b>Potential of lowering heating costs</b></li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>● Giving up old-fashioned gas water heaters which have had a few fatal accidents lately.</li> <li>● Microgeneration of electricity by PV-panels is "good for nature" and "modern".</li> <li>● Environmental drivers are generally weak.</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>● District heating in Tartu is using 95% renewables already.</li> </ul>

### Segment Absentee

Table 34 High potential drivers for segment Absentee / Manager

Segment Absentee / Manager	
<b>Technical</b>	<ul style="list-style-type: none"> <li>● Installation of 'smart' features in apartments makes them easier to manage.</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>● <b>Renovated flat can be sublet for higher price.</b></li> <li>● Insulating perimeter secures value of the house in the foreseeable future.</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>● Environmental drivers are weak.</li> </ul>

### 5.6.3 Solutions

Table 35 Non-technological solutions relevant for Estonia:

All segments Multi family houses	
<b>Innovative Financial models</b>	Subsidies for renovation up to 40% + local bonuses
<b>Online tools for management or decision making</b>	Currently there are none
<b>Quality assurance</b>	<ul style="list-style-type: none"> <li>● A technical consultant (TC) is introduced in a process of renovation. The TC is hired by the housing association (legal body representing dwellers of one house) and is following their interest in relation to design, contractor, bank and municipality.</li> <li>● Contractor only gets final payment after the whole house is inspected and approved.</li> <li>● Hiring a building inspector is compulsory</li> </ul>
<b>New approaches to organising the supply side</b>	Requirements to apply for a subsidy are specific and rather complex. They almost <u>have to be</u> solved with a single approach. The TC also contributes heavily in this regard.
<b>Renovation packages = One-stop-shop-solutions</b>	The Technical Consultant seems to play the role of one-stop-shop.

# 6 Country Cluster Overview

## 6.1 NETHERLANDS

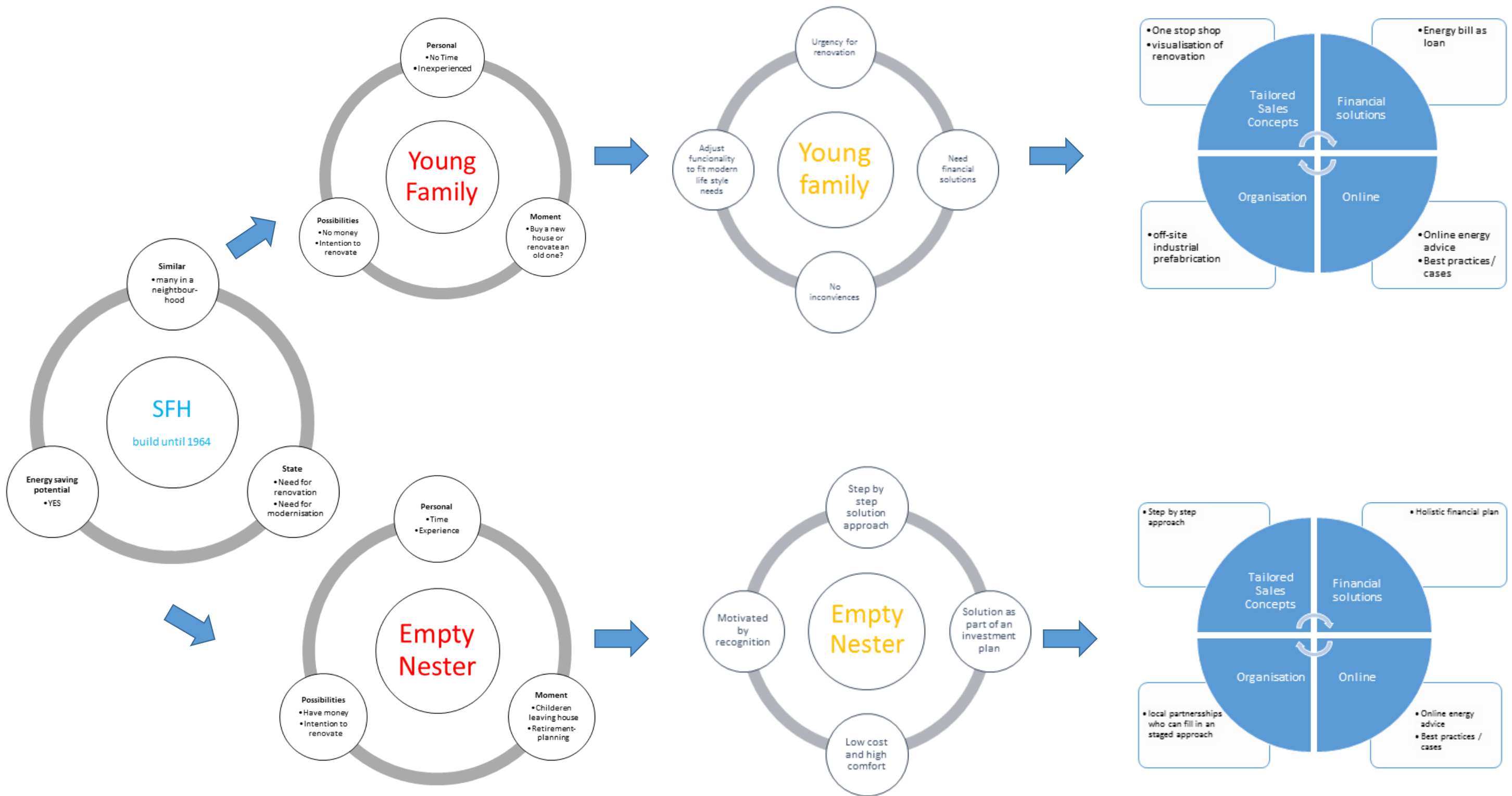


Figure 2 Graphic overview of segments, drivers and solutions relevant for the Netherlands

## 6.2 BELGIUM

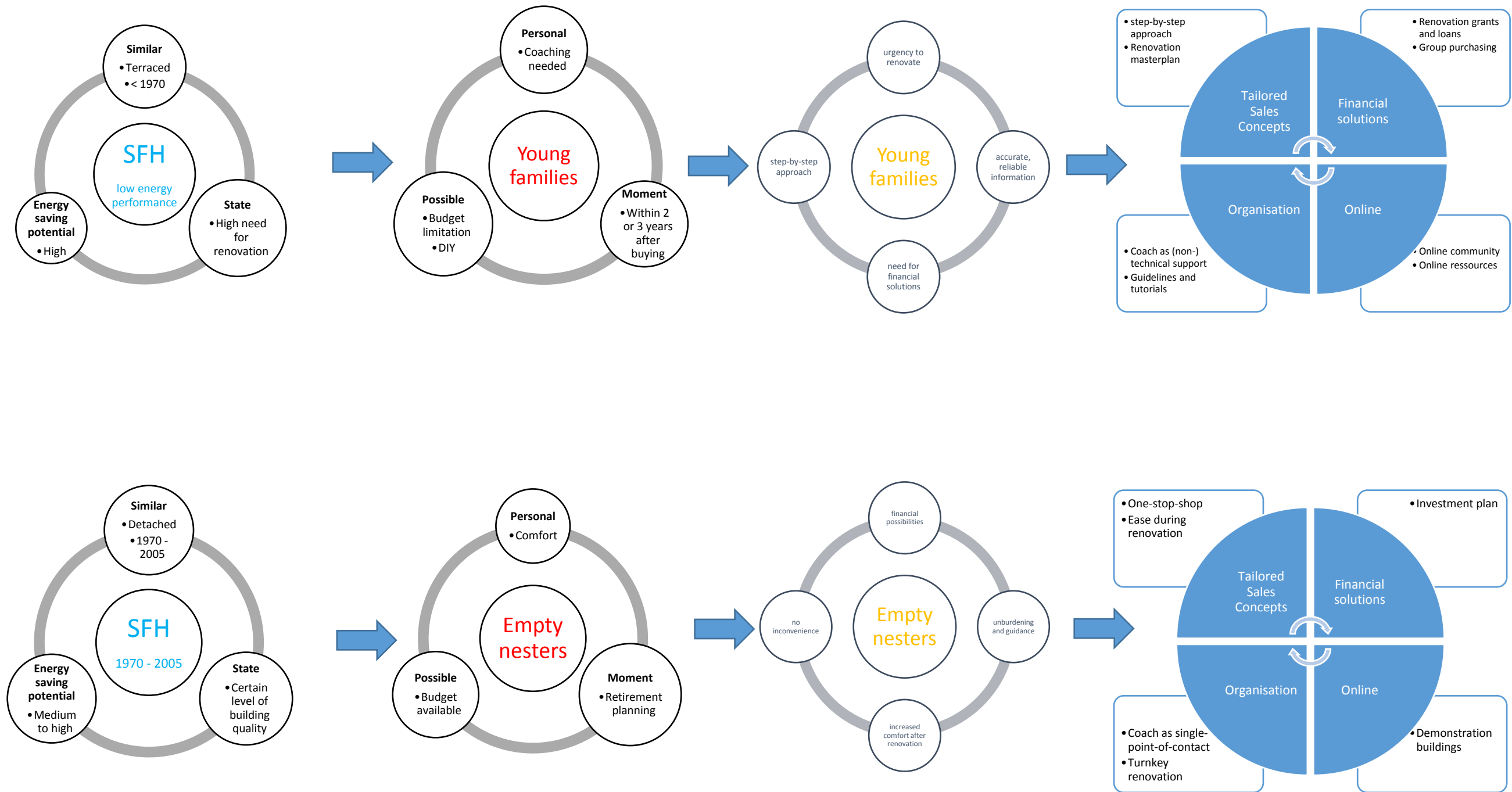


Figure 3 Graphic overview of segments, drivers and solutions relevant for

## 6.3 GERMANY

### Single family Housing

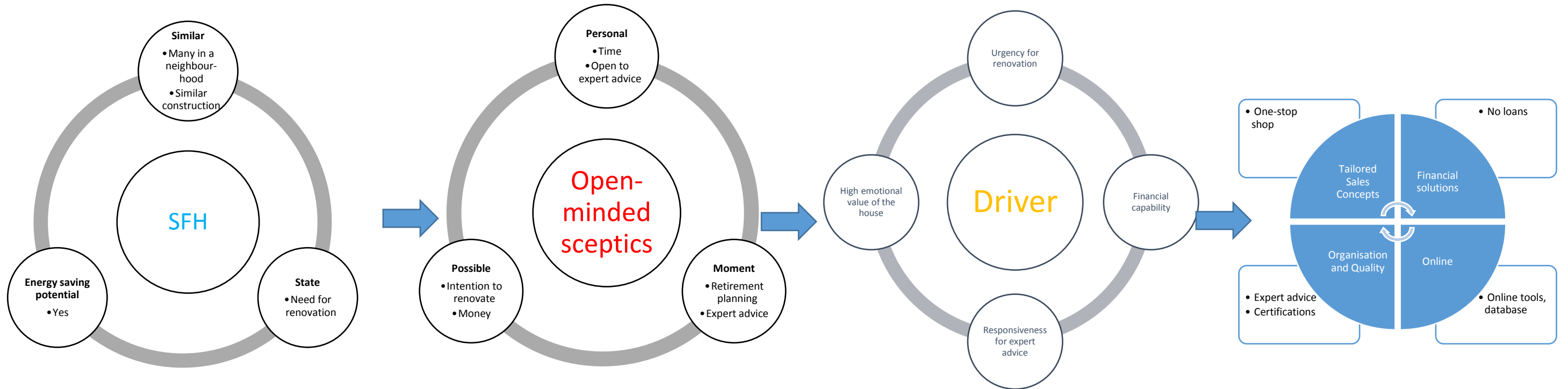


Figure 4 Graphic overview of segments, drivers and solutions relevant for The single family House segment in Germany

**Multi Family Housing**

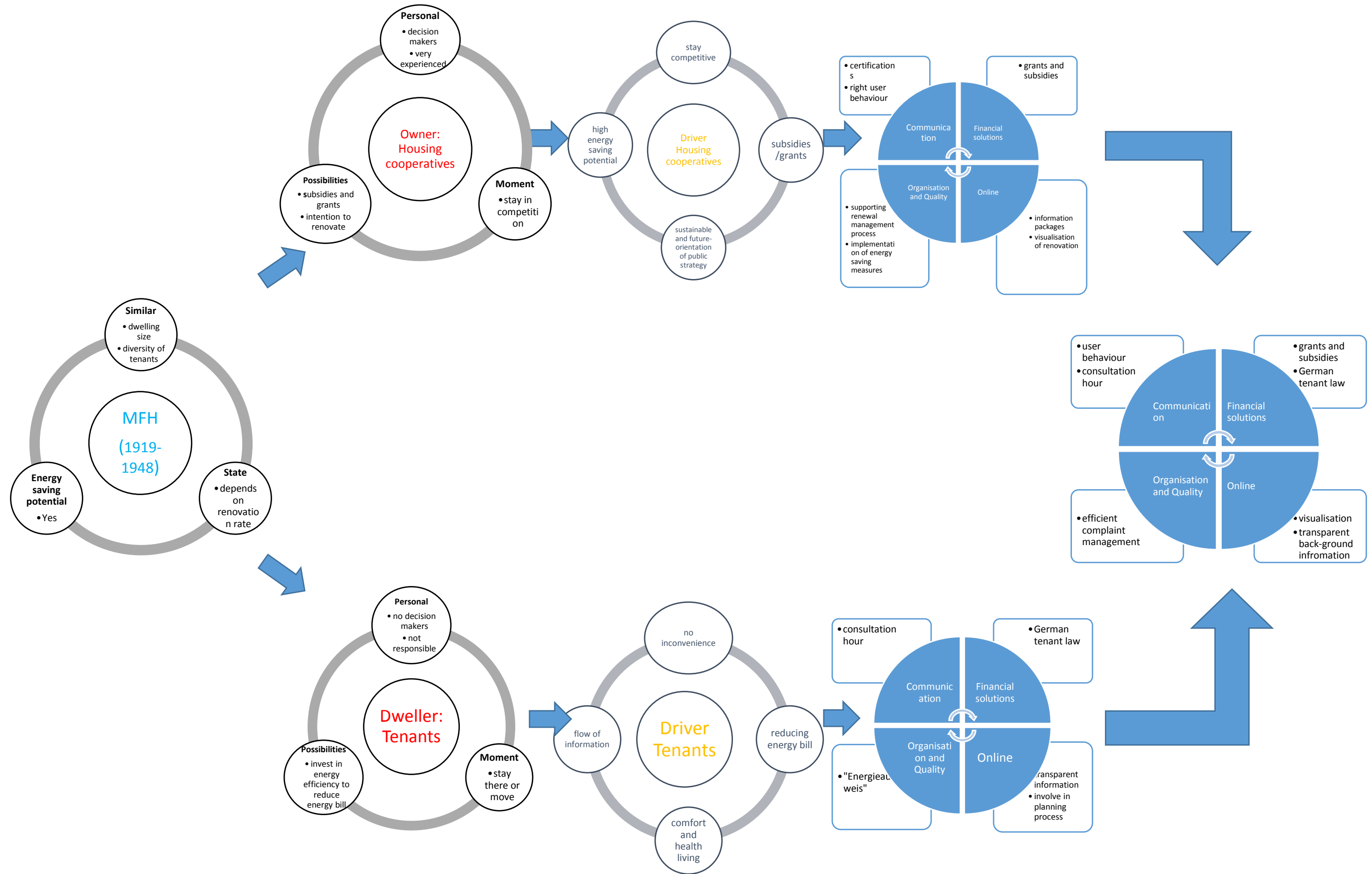


Figure 5 Graphic overview of segments, drivers and solutions relevant for the Multi Family House segment in Germany



## 6.4 SLOVENIA

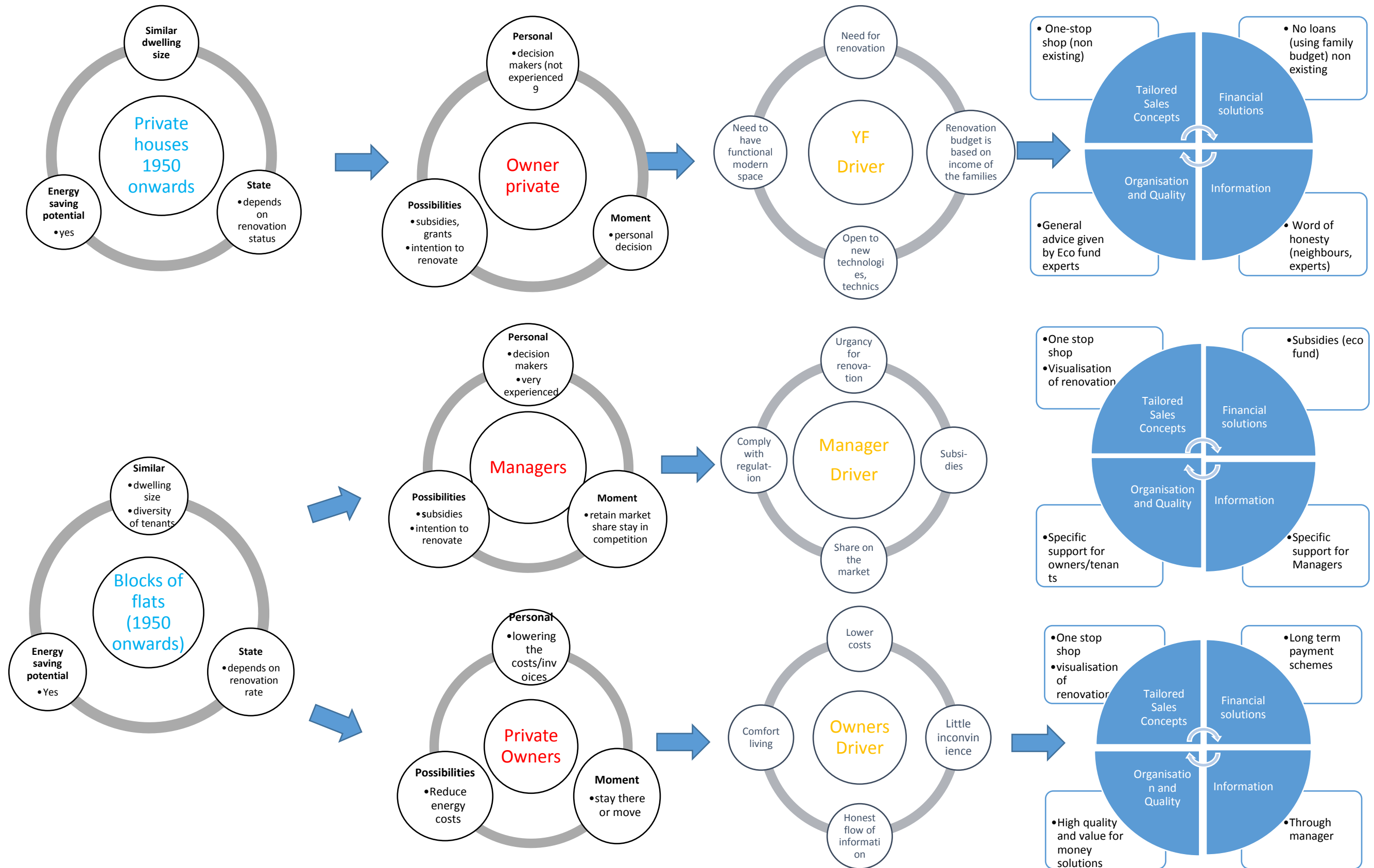


Figure 6 Graphic overview of segments, drivers and solutions relevant for Slovenia



## 6.5 DENMARK

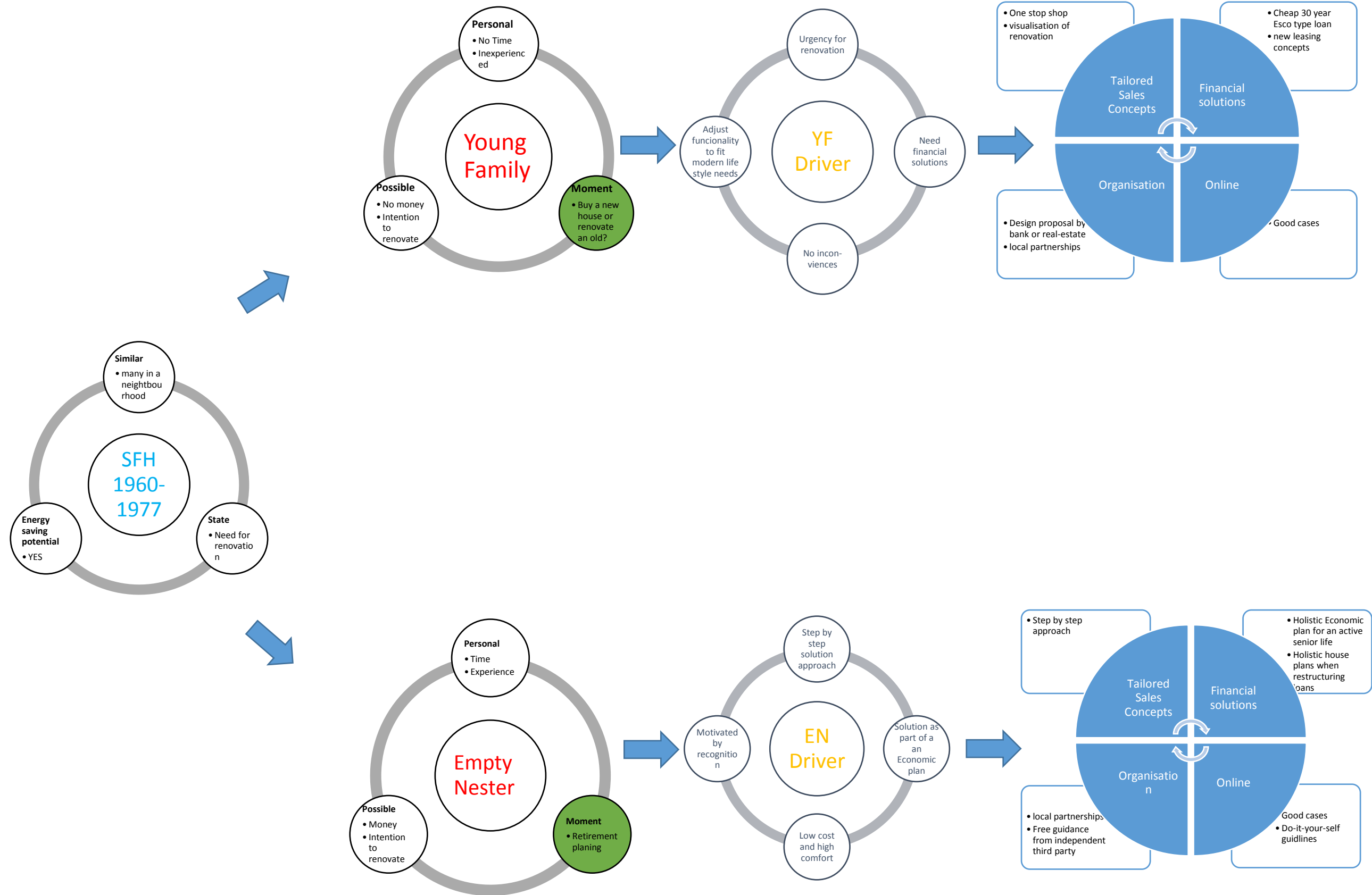


Figure 7 Graphic overview of DK segments, drivers and solutions

## 6.6 ESTONIA

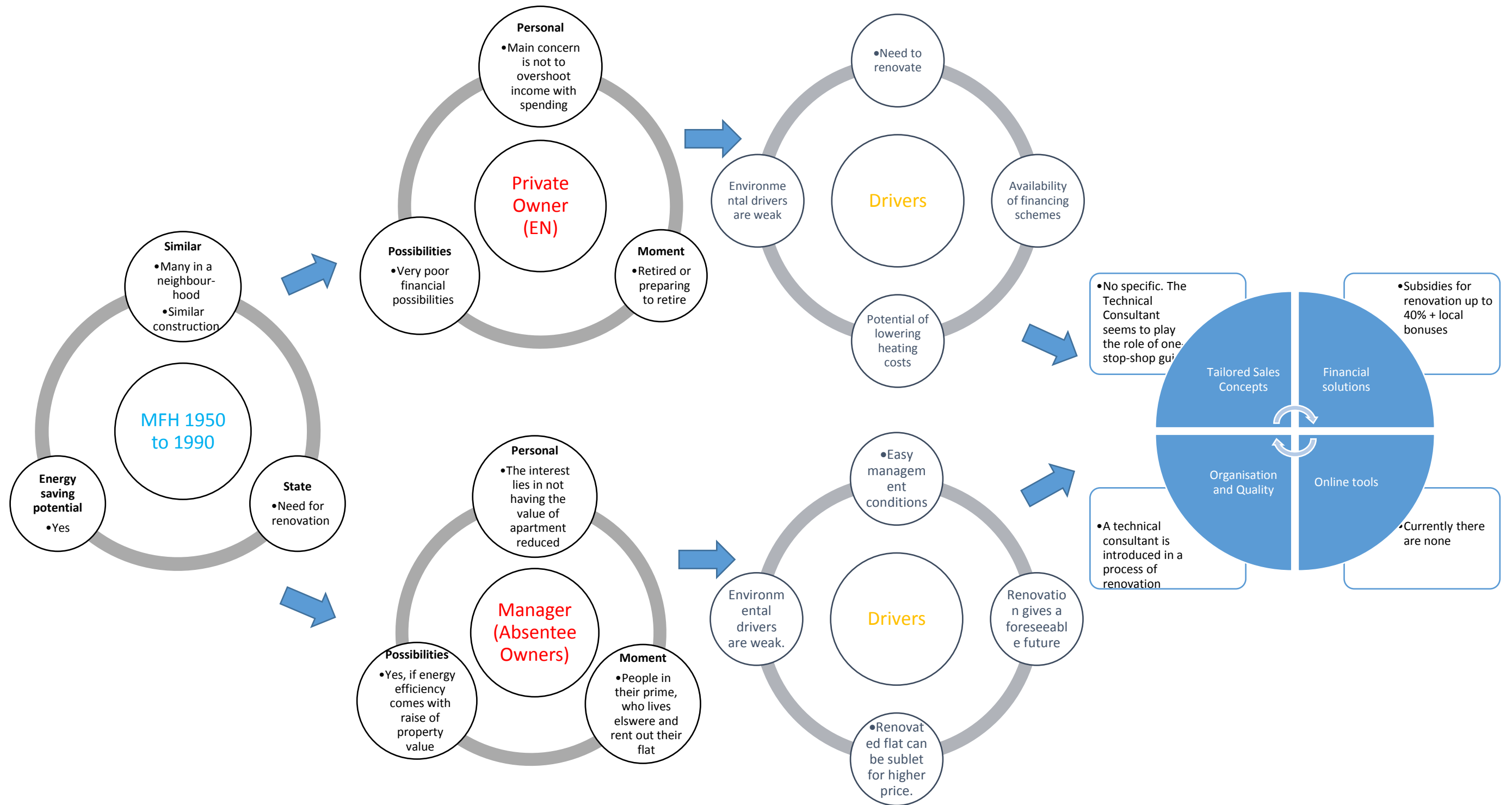


Figure 8 Graphic overview of segments, drivers and solutions relevant for country Estonia

# 7 Main tendencies across the countries

From the country analyses it is clear that there are many similarities but also differences in the chosen key segments and their drivers and solutions. This section gives an overview of the tendencies, similarities and differences between the countries.

## 7.1 SEGMENTS

Two main segments have been identified across the countries as overall categories with a high potential for a NZEB-renovation package, these are:

- Single Family Houses (SFH) with Young Families (YF) and Empty Nesters (EN) as dwellers.
- Multi Family Houses (MFH) with Owners and Tenants as decision maker and dwellers in an apartment.

Belgium, The Netherlands and Denmark have all identified the main potential segments as the Single Family Houses with either a Young Family or an Empty Nester as the most relevant dweller segment living in and owning their house.

Germany and Slovenia have also identified the Single Family Houses as a main dwelling segment. However, Germany, with a focus on the more specific dweller group under the Empty Nester category, identified as the Open Minded Sceptics and Slovenia with the Young Family as their main focus for a dweller segment in this category.

Germany have also identified the Multi Family Houses owned by a Housing Cooperation as a main segment.

Estonia and Slovenia have identified the Multi Family Houses with privately owned apartments a high potential segment, for Estonia this is the only high potential segment they are targeting.

The dweller analysis of the Multi Family Houses is divided into an Owner (building Manager) and in the case of the Housing Cooperatives a Tenant segment, living in the apartment as the dweller. Decisions for renovation in this segment are based on a democratic process guided by regulation specific to each country. Estonia have identified a sub segment of dwellers who own their apartment, but do not live there, they rent it out to a third party, typically students. This segment is named “Absentee Owners” and are similar to the building Managers.

A schematic overview of the identified key high potential country segments is illustrated in the table below.

*Table 36 Summery of Main Country Segments relevant for NZEB renovations*

Country	Dwelling	Dweller
Germany	SFH 1969-1988	EN
	MFH 1919-1948	Owner: Housing cooperatives in larger cities
	MFH 1919-1948	Dweller: Tenants
Belgium	SFH	YF
	SFH 1970 - 2005	EN

<b>Holland</b>	SFH built up until 1964	YF, city
	SFH built up until 1964	EN, all over
<b>Denmark</b>	SFH built 1960-1980	YF, city
	SFH built 1960-1980	EN, all over
<b>Estonia</b>	MFH build 1960-1990	EN
	MFH build 1960-1990	Absentee Owners
<b>Slovenia</b>	SFM from 1950	YF, city
	MFH from 1950	Dweller Management: Private management company
	MFH from 1950	Dweller: Private Owners (all types)

The key characteristics of the segments are very similar in their basic descriptions between the countries and the common key characteristics are visualized in the two figures below.

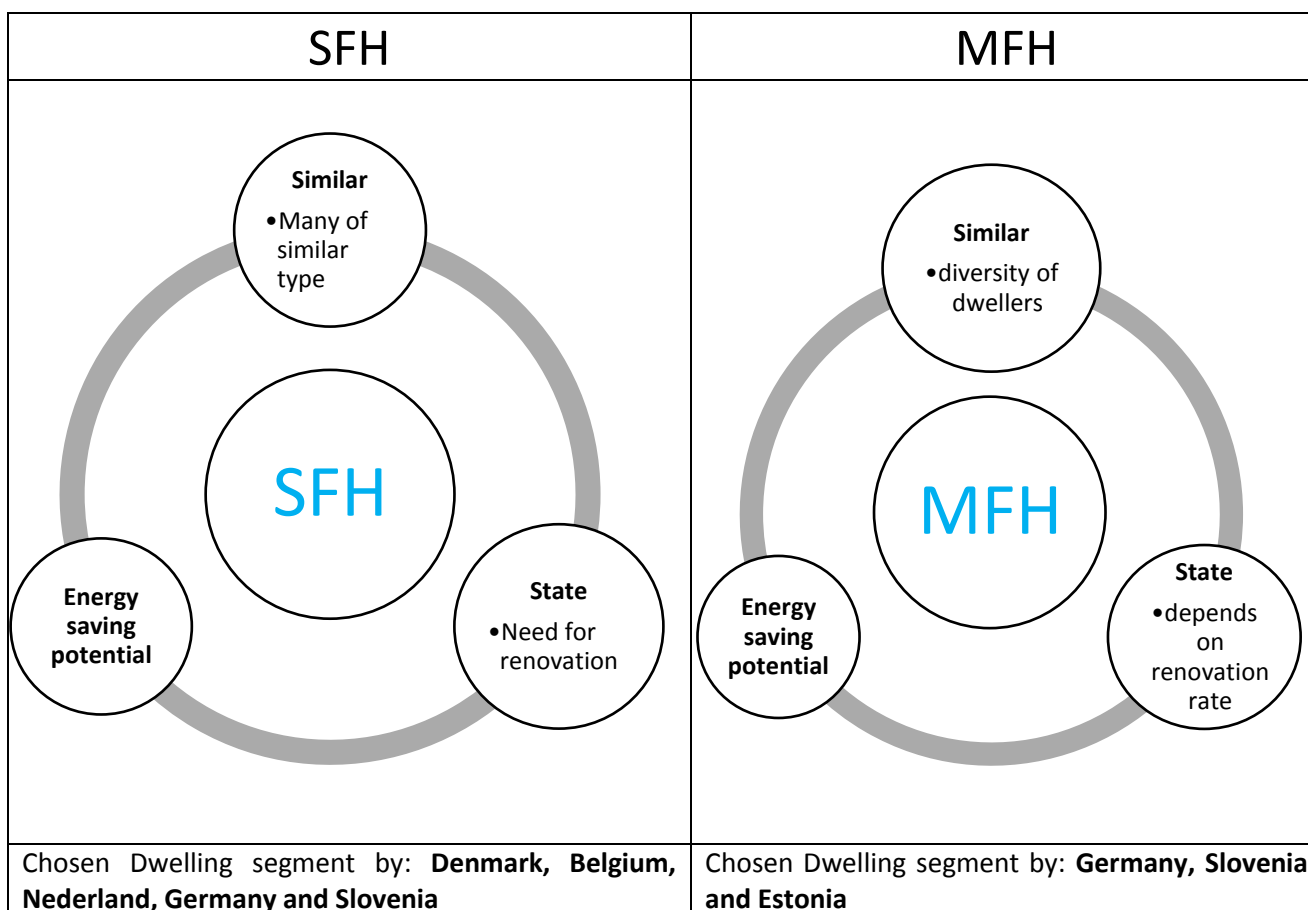


Figure 9 Dwelling segment characteristics identified by the counties as key.

An important element to be aware of is that the building typologies in similar dwelling segments e.g the Single family houses built in 1960, are not necessarily constructed in a similar manner between the countries and therefore require different technical solutions to reach the NZEB standard.

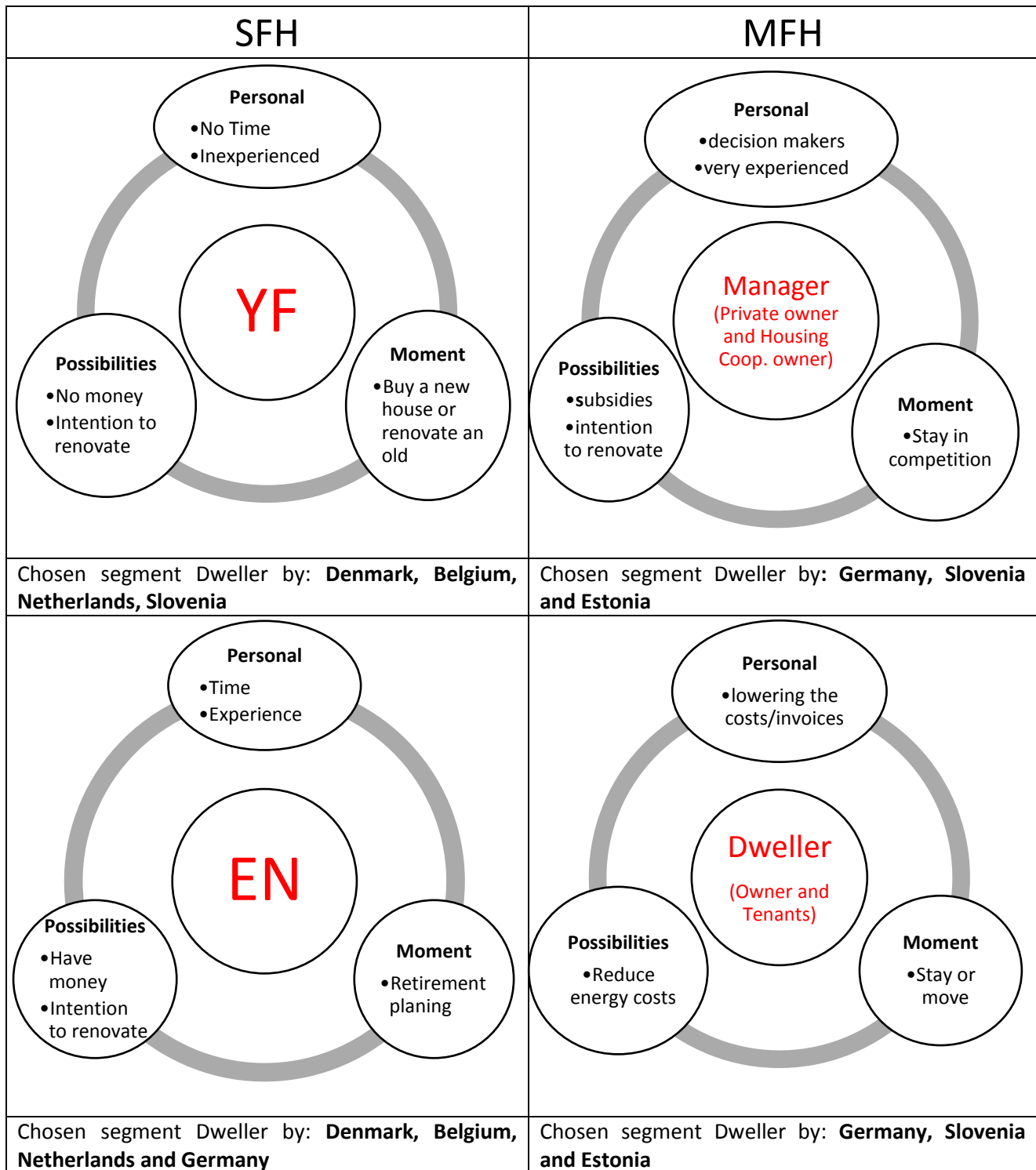


Figure 10 Dweller segment characteristics identified by the counties as key.

## 7.2 DRIVERS

The choices of specific key drivers for the segments are quite fragmented between the countries.

This is well demonstrated by the example that Belgium have identified a key driver for the Young family segment to be a step by step approach, whereas the Netherlands and Denmark, who have identified the same segments, have identified that the key solution for the young Family is a one-stop-shop approach.

However, some similarities have been identified and have been listed below, for inspiration:

- Single Family Houses
  - Young Families:
    - **Urgency for renovation (identified as KEY by three countries or more)**
    - **Need financial Solution (identified as KEY by three countries or more)**
    - **Adjust functionality to fit modern life style needs (identified as KEY by three countries or more)**
    - No inconveniences (identified as KEY by two countries)
  - Empty Nesters:
    - Step by step (identified as KEY by two countries)
    - Solution as part of an investment (identified as KEY by two countries)
    - Low cost high comfort (identified as KEY by two countries)
    - Motivated by recognition (identified as KEY by two countries)
    - Financial possibilities (identified as KEY by two countries)
    - Expert advice (identified as KEY by two countries)
- Multi Family Houses
  - Housing Coop. Owner/Manager:
    - N/A as only one country has this category
  - Housing Coop. /Tenant:
    - N/A as only one country has this category
  - Private Owner / Manager (private company and absentee owner)
    - Subsidies from the state (identified as KEY by two countries)
  - Private Owner / Dweller living in Flat
    - Lowering cost (identified as KEY by two countries)

The total overview of the tendencies between the counties is visualized in figures in the following sections and is illustrated by using a colour scheme to identify whether more countries have listed the same key driver as key to address in the further work.

Legend code for the figures in this section is:

- Dark Green means that the driver has been identified as key by **three** counties or more
- Light Green means that the driver has been identified as key by **two** counties
- White means the driver has been identified only one time by a country.

### 7.2.1 Single Family Houses

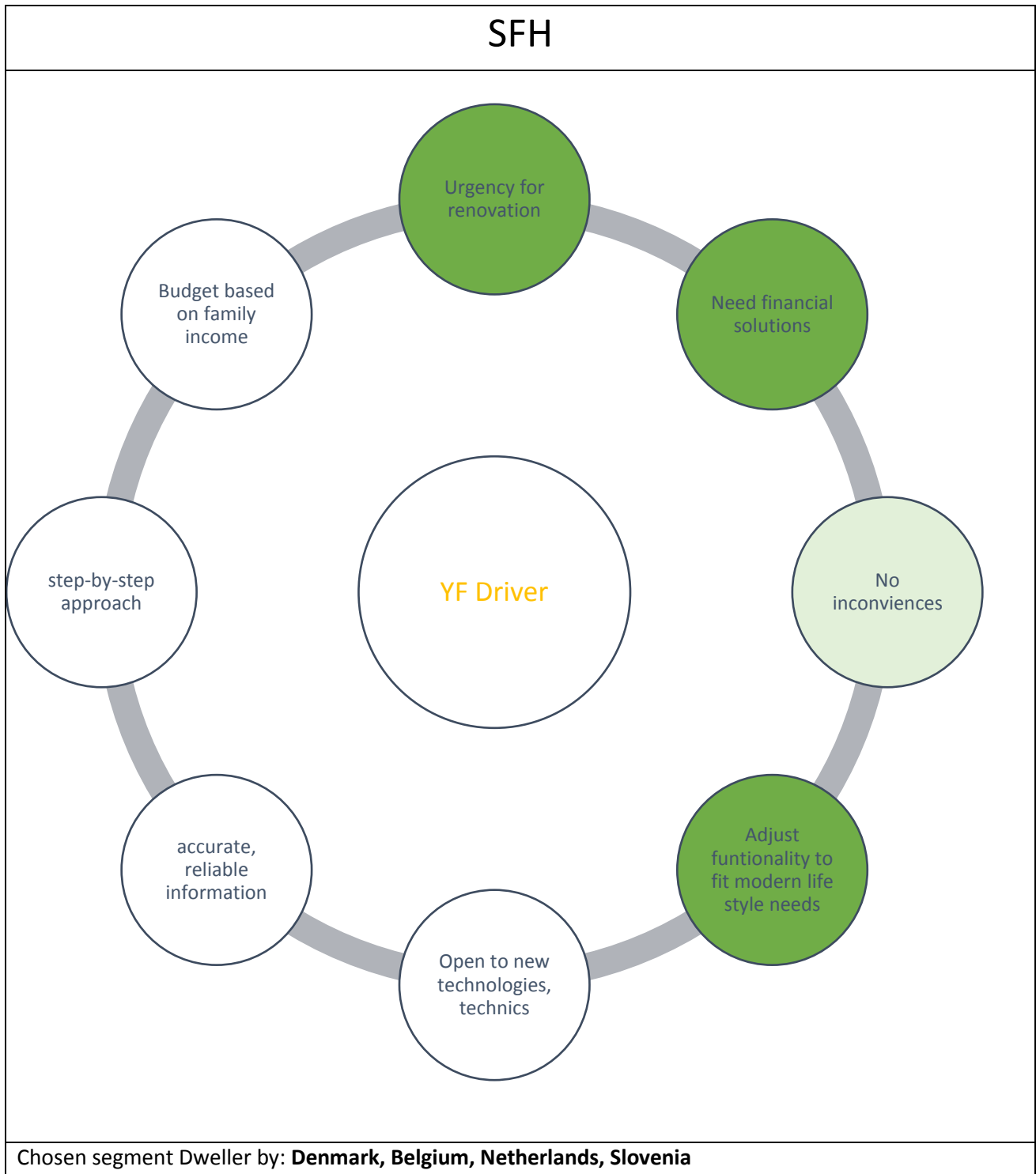


Figure 11 Key identified drives across the counties for the segment SFH, YF

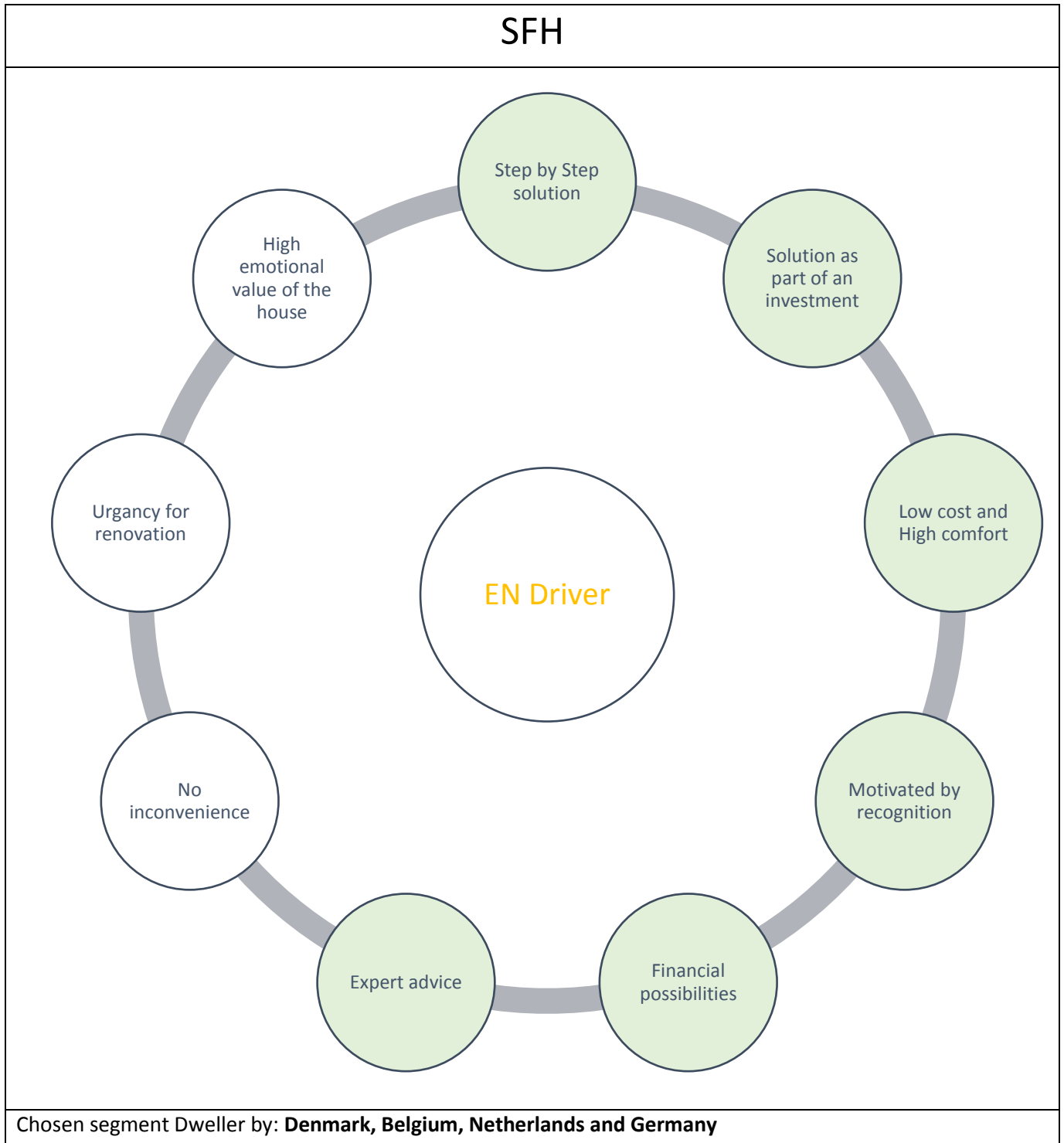


Figure 12 Key identified drives across the counties for the segment SFH, EN



## 7.2.2 Multifamily Houses

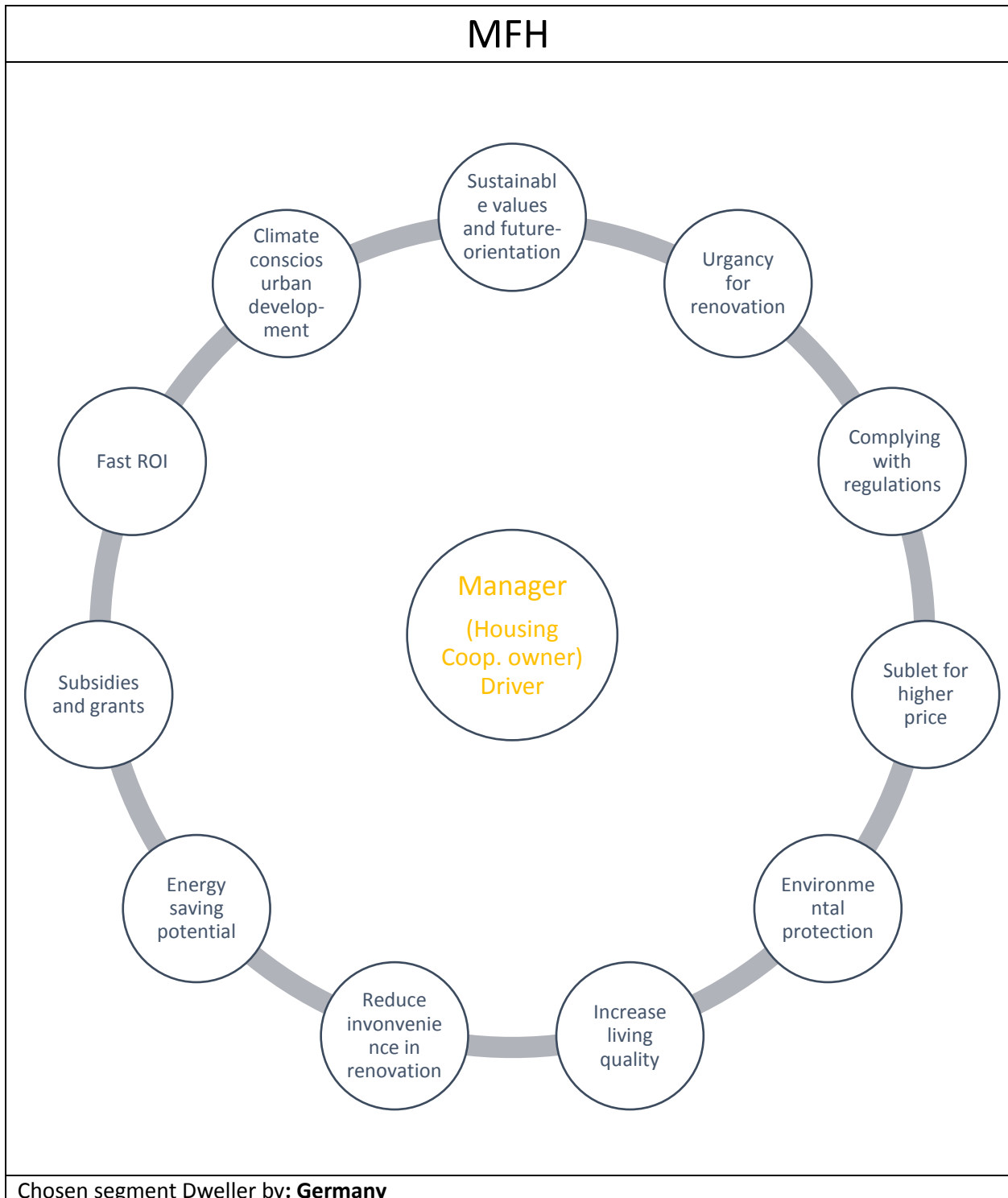


Figure 13 Key identified drives across the counties for the segment MFH, Manager of Housing Coops.

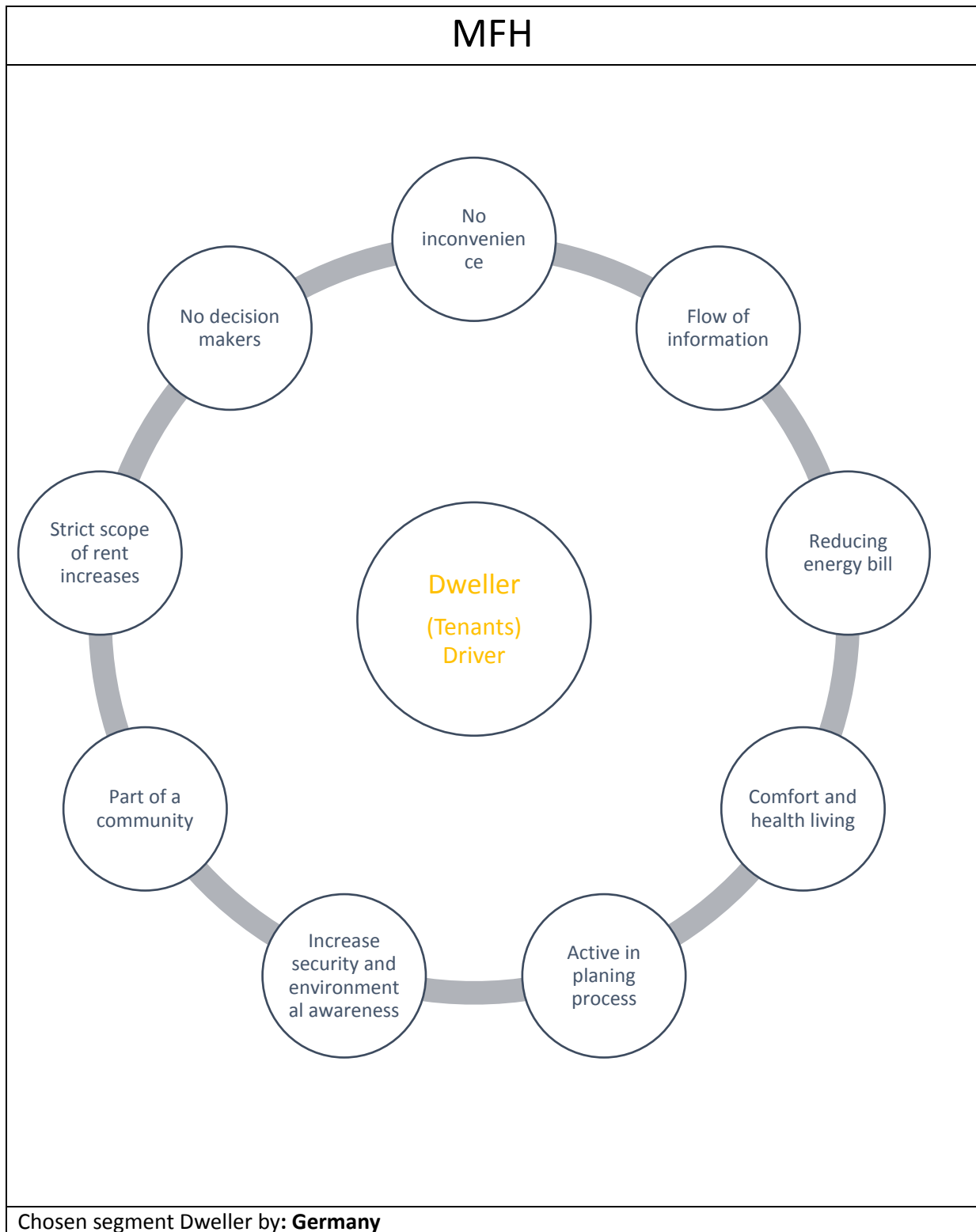


Figure 14 Key identified drives across the counties for the segment MFH, Tenant

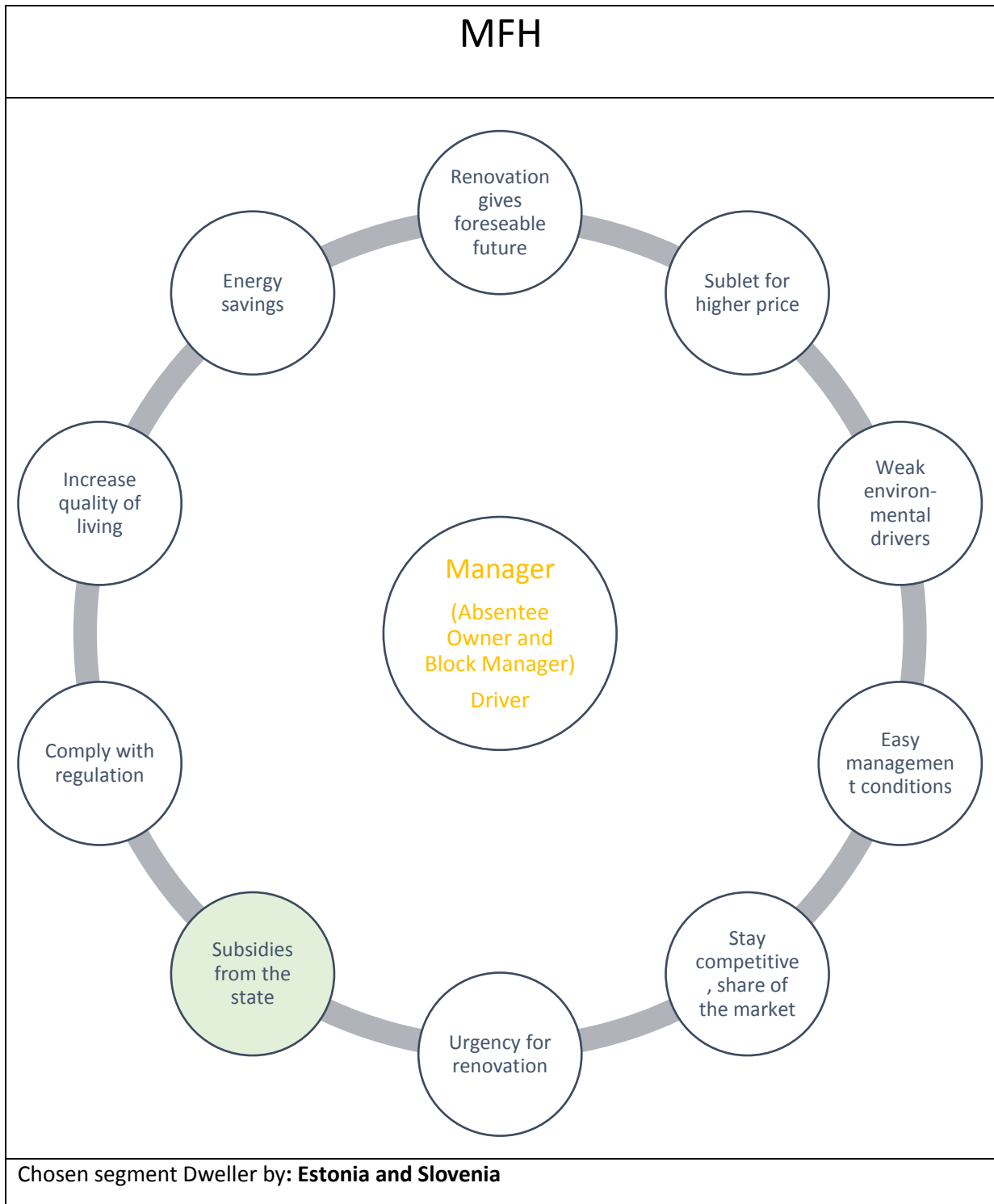


Figure 15 Key identified drives across the counties for the segment MFH, Private Owner/Manager

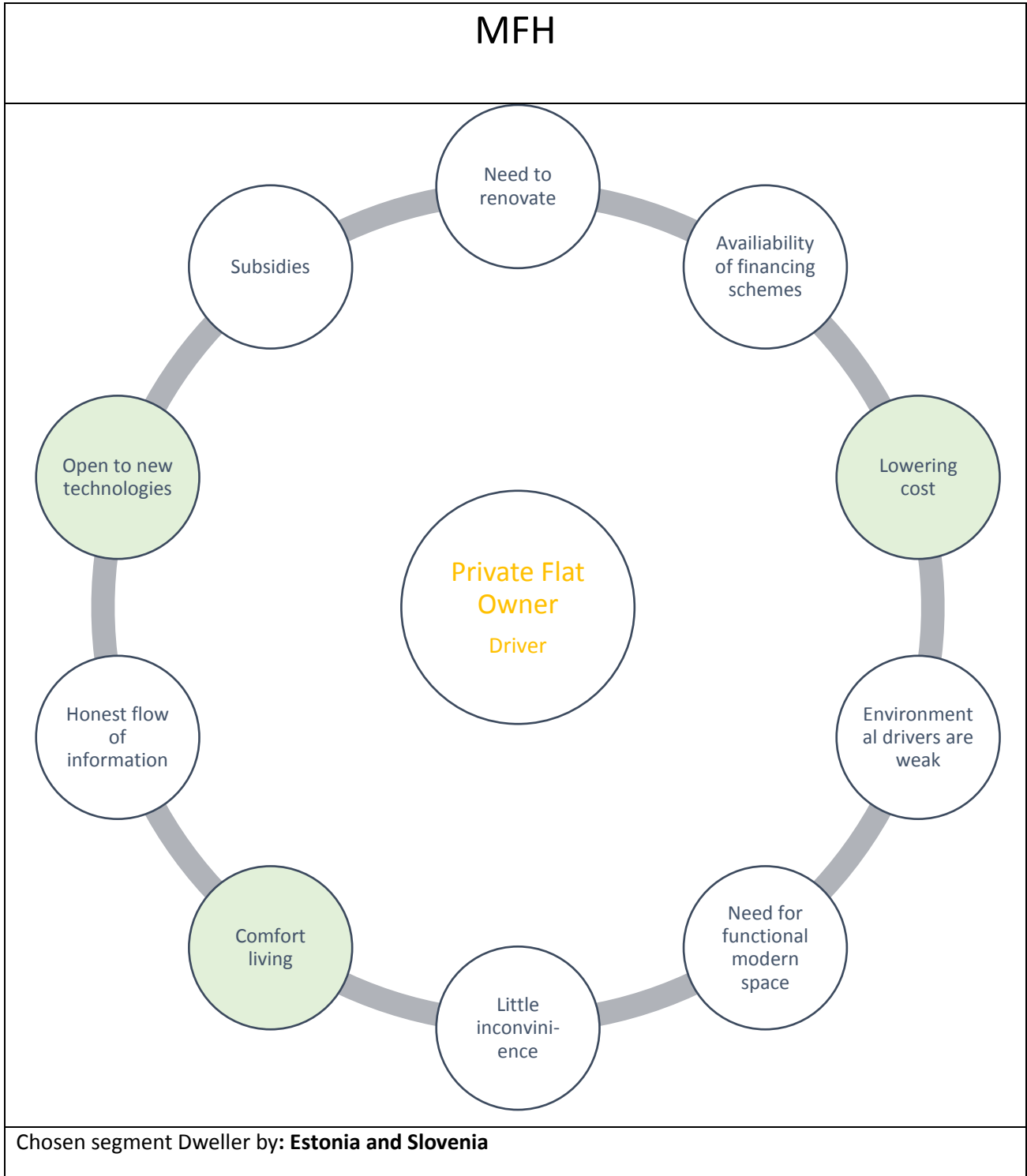


Figure 16 Key identified drives across the counties for the segment MFH, Private Absentee Owner

## 7.3 SOLUTIONS

The focus of the analysis in this report has been to match the identified segment and their drivers with the need for specific non-technological solutions. The non-technological solutions in this report have, in many cases, not been developed in the countries or are only available at small scale or in pilot schemes and therefore represent a need for development to overcome the barriers for NZEB renovations.

The identified, key non-technological solutions addressing the key drivers for the chosen segments are quite fragmented between the countries. However, some similarities have been identified and are listed in the following:

- Single Family Houses
  - Young Families:
    - **One-stop-shop**
    - **Visualization of Renovation**
    - **Renovation grants and loans**
    - **Best practice/ Cases**
  - Empty Nesters:
    - **Step by Step**
    - **Holistic financial plan**
    - **Investment plan**
    - **Local partnerships who can fill in a staged approach**
    - **Expert advice (free and independent)**
    - **Best practice/ Cases**
- Multi Family Houses
  - Housing Coop. Owner/Manager:
    - N/A as only one country has this category
  - Housing Coop. Tenant:
    - N/A as only one country has this category
  - Private Owner:
    - **Subsidies**
  - Private Manager / Absentee Owner:
    - **Subsidies**

The total overview of the tendencies between the countries is visualized as tables in the following sections. The key solutions identified by more than one country are highlighted in **bold**.

### 7.3.1 Single Family Houses

#### SFH: Young Family

Denmark, Belgium, Netherlands, Slovenia

Table 37 Non-technological Solutions for the segment SFH, YF

Tailored sales concepts	Financial Solutions	Organization and Quality	Online tools
<input type="checkbox"/> Step by step <input type="checkbox"/> Renovation masterplan <input type="checkbox"/> <b>One stop shop</b> <input type="checkbox"/> <b>Visualization of Renovation</b>	<input type="checkbox"/> Energy bill as loan <input type="checkbox"/> <b>Renovation grants and loans</b> <input type="checkbox"/> Group purchasing <input type="checkbox"/> New 30 year Escro type loan <input type="checkbox"/> New leasing concepts	<input type="checkbox"/> Off site industrial prefabrication <input type="checkbox"/> Coach as (non-) technical support <input type="checkbox"/> Guidelines and tutorials <input type="checkbox"/> General advice given experts <input type="checkbox"/> Design proposal by bank or real-estate <input type="checkbox"/> Local partnerships	<input type="checkbox"/> Online energy advice <input type="checkbox"/> <b>Best practice/ Cases</b> <input type="checkbox"/> Online Communities <input type="checkbox"/> Online ressources <input type="checkbox"/> Word of honesty (neighbours, experts)

#### SFH: Empty Nester

Denmark, Belgium, Netherlands and Germany

Table 38 Non-technological Solutions for the segment SFH, EM

Tailored sales concepts	Financial Solutions	Organization and Quality	Online tools
<input type="checkbox"/> <b>Step by step</b> <input type="checkbox"/> One stop shop <input type="checkbox"/> Ease during renovation	<input type="checkbox"/> <b>Holistic financial plan</b> <input type="checkbox"/> <b>Investment plan</b>	<input type="checkbox"/> <b>Local partnerships who can fill in an staged approach</b> <input type="checkbox"/> <b>Coach as single-point-of-contact</b> <input type="checkbox"/> Turnkey renovation <input type="checkbox"/> <b>Expert advice (free and independent)</b> <input type="checkbox"/> Certification	<input type="checkbox"/> Online energy advice <input type="checkbox"/> <b>Best practice/ Cases</b> <input type="checkbox"/> Online tools, database <input type="checkbox"/> Do-it-yourself guidelines

## 7.3.2 Multi Family Houses

### MFH: Housing Coop. / Manager

#### Germany

Table 39 Non-technological Solutions for the segment MFH, Housing Coop.

Tailored sales concepts	Financial Solutions	Organization and Quality	Online tools
<ul style="list-style-type: none"> <li>•Certifications</li> <li>•Right user behaviour</li> <li>•consultation hour</li> </ul>	<ul style="list-style-type: none"> <li>•Subsidies and grants</li> <li>•Solutions which fit to the local tenant law</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/>Efficient complaint management</li> <li>•Supporting management process</li> <li><input type="checkbox"/>Implementation of energy saving measures</li> </ul>	<ul style="list-style-type: none"> <li>•Transparent back ground information</li> <li>•Information packages</li> <li>•Visualisation</li> </ul>

### MFH: Tenant in a Housing Coop.

#### Germany

Table 40 Non-technological Solutions for the segment MFH, Tenants

Tailored sales concepts	Financial Solutions	Organization and Quality	Online tools
<ul style="list-style-type: none"> <li>•Good tenant communication incl. a Consultation hour</li> </ul>	<ul style="list-style-type: none"> <li>•Subsidies and grants</li> <li>•Solutions which fit to the local tenant law</li> </ul>	<ul style="list-style-type: none"> <li>•Efficient complaint management</li> <li>•"Energieausweis"</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/>transparent information</li> <li><input type="checkbox"/>Involve tenant in planing process</li> <li><input type="checkbox"/>Visualisation</li> </ul>

### MFH: Private Management and Private Owner (dweller)

#### Slovenia and Estonia

Table 41 Non-technological Solutions for the segment MFH, Private Owner and tenants

Tailored sales concepts	Financial Solutions	Organization and Quality	Online tools
<ul style="list-style-type: none"> <li>•The Technical Consultant seems to play the role of one-stop-shop guide.</li> <li>•One stop shop</li> <li>•visualisation of renovation</li> </ul>	<ul style="list-style-type: none"> <li>•<b>Subsidies for renovation</b></li> <li>•Long term payment schemes</li> </ul>	<ul style="list-style-type: none"> <li>•A technical consultant is introduced in a process of renovation</li> <li>•Specific support for owners (dwellers)</li> <li>•High quality and value for money for solutions</li> </ul>	<ul style="list-style-type: none"> <li>•Specific support for managers</li> <li>•Information needs to go through the mangers</li> </ul>

## 8 Conclusion

The 6 country partners in the REFURB project have carried out detailed analysis of their individual markets and have created a solid overview of the high potential key segments, drivers and solutions relevant for NZEB renovations tailored to the individual countries.

Two main groups of segments have been identified across the countries:

- Single Family Houses (SFH) with Young Families (YF) and Empty Nesters (EN) as dwellers.
- Multi Family Houses (MFH) with Owners and Tenants as decision maker and dwellers.

### Single Family Houses:

**Belgium, Netherland and Denmark** have all identified the Single Family Houses with either a Young Family or an Empty Nester as the most relevant dweller segment for their country.

**Germany and Slovenia** have also identified the Single Family Houses as a main dwelling segment. However, Germany with focus on the more specific dweller group, under the Empty Nester category, identified as the Open Minded Sceptics and Slovenia with the Young Family as their main focus for a dweller segment in this category.

### Multi Family Houses:

**Germany** have identified the Multi Family Houses owned by a Housing Cooperative as a main segment and **Slovenia** and **Estonia** have identified the Multi Family Houses with privately owned apartments as their high potential segment. The dweller analysis of the Multi Family Houses is divided into an Owner (building Manager) and in the case of the Housing Cooperatives, a Tenant segment, living in the apartment as the dweller. Decisions for renovation in this segment is based on a democratic process guided by regulation specific for each country.

**Estonia** has identified a sub segment of dwellers who own their apartment, but do not live there, they rent it out to a third party, typically students. This segment is named “Absentee Owners” and have similar drivers when compared to the building Managers.

### Drivers:

For each segment the relevant local drivers have been identified and the similarities between countries are illustrated in the tables below, where the drivers highlighted in bold show that the driver has been identified as key by more than three counties.

*Table 42 Key similar drivers across the partner counties*

Dwelling Segment	Dweller Segment	Drivers
Single Family Houses	Young Family	<ul style="list-style-type: none"> <li>• <b>Urgency for renovation (identified as KEY by three countries or more)</b></li> <li>• <b>Need financial Solution (identified as KEY by three countries or more)</b></li> <li>• <b>Adjust functionality to fit modern life style needs (identified as KEY by three countries or more)</b></li> </ul>



		<ul style="list-style-type: none"> <li>No inconveniences (identified as KEY by two countries)</li> </ul>
	Empty Nester	<ul style="list-style-type: none"> <li>Step by step (identified as KEY by two countries)</li> <li>Solution as part of an investment (identified as KEY by two countries)</li> <li>Low cost high comfort (identified as KEY by two countries)</li> <li>Motivated by recognition (identified as KEY by two countries)</li> <li>Financial possibilities (identified as KEY by two countries)</li> <li>Expert advice (identified as KEY by two countries)</li> </ul>
<b>Multi Family Houses</b>	Housing Coop. Owner/Manager	<ul style="list-style-type: none"> <li>N/A as only one country has this category</li> </ul>
	Housing Coop. Tenant	<ul style="list-style-type: none"> <li>N/A as only one country has this category</li> </ul>
	Private Owner	<ul style="list-style-type: none"> <li>Lowering cost</li> <li>Open to new technologies</li> <li>Comfort Living</li> </ul>
	Private Manager and Absentee Owner	<ul style="list-style-type: none"> <li>Subsidies</li> </ul>

The drivers identified for the segments are mostly rational drivers. That is, drivers which speak directly to a given “pain” or “gain” for the dweller or building owner. It is important that these rational drivers are addressed to create a compelling renovation package design. However, in the design of the compelling offer, it is also important to address the non-rational drivers in the decision process. A common element for addressing the non-rational drives is that the design must be easy, accessible and affordable to attract a majority of the market in each country. Values which are being addressed in the organization of supply and customer journey.

### Solutions

The tendencies across the countries for the identified solutions matching the drivers are illustrated in the table below. The solutions highlighted in bold means that the solution has been identified as key by more than two counties:

*Table 43Key similar solutions across the partner counties*

Dwelling Segment	Dweller Segment	Non technological solution
Single Family Houses	Young Family	<ul style="list-style-type: none"> <li><b>One-stop-shop</b></li> <li><b>Visualization of Renovation</b></li> <li><b>Renovation grants and loans</b></li> <li><b>Best practice/ Cases</b></li> </ul>
	Empty Nester	<ul style="list-style-type: none"> <li><b>Step by Step</b></li> </ul>

		<ul style="list-style-type: none"> <li>• <b>Holistic financial plan</b></li> <li>• <b>Investment plan</b></li> <li>• <b>Local partnerships who can fill in a staged approach</b></li> <li>• <b>Expert advice (free and independent)</b></li> <li>• <b>Best practice/ Cases</b></li> </ul>
<b>Multi Family Houses</b>	Housing Coop. Owner/Manager	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Housing Coop. Tenant	<ul style="list-style-type: none"> <li>• N/A as only one country has this category</li> </ul>
	Private Owner	<ul style="list-style-type: none"> <li>• Subsidies</li> </ul>
	Private Manager and Absentee Owner	<ul style="list-style-type: none"> <li>• Subsidies</li> </ul>

From Table 43, it can be seen that there are certain similarities between the countries in identifying key non-technological solutions, especially for the Single Family Houses. However, mostly, the analysis can be used as inspiration between the countries in addressing barriers and designing new solutions.

The selection of the country segments is evidence- and market-based, but the identification of the characteristics, main drivers and solutions of these segments are primarily based on assumptions and experiences by the partners involved in the project and it is therefore crucial to test these assumptions in real life with feedback from the market.

This report serves as a tool for development of NZEB solutions and compelling offers across Europe and the similarities between the solutions identified across the countries can serve as inspiration in the design phase for each country developing compelling local renovation offers.