EXPERIENCES OF HOMEOWNERS REGARDING NEARLY ZERO-ENERGY RENOVATIONS AND CONSEQUENCES FOR BUSINESS MODELS

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Fig 1: Needed input for the business model generation canvas (based on Osterwalder & Pigneur, 2010)

DRIVING THE BUSINESS MODEL DEVELOPMENT OF INTEGRATED HOME RENOVATION BY PROVIDING INPUT FROM EXPERIENCED HOMEOWNERS

Research summary
Pathways should be explored so that supply-side actors can present integrated renovations to homeowners in such a way that customers are confident with “nearly zero-energy” renovation. Understanding the real wishes of homeowners regarding integrated renovation can help to develop appropriate business. In the framework of the Intelligent Energy Europe project COHERENO (www.cohereno.eu), research was done for the market development of such renovation of single-family homes in five European countries. A coherent study was performed that encompasses an overview of, and experiences from, homeowners involved in realized projects in order to determine business model input for increasing integrated renovations.

The research showed that frontrunner-homeowners who decided for nearly zero-energy renovations were either younger or more mature families, mainly motivated by energy targets and indoor and environmental concerns. They actively searched experienced actors and attached high value to the energy interest of professionals. They expected professionals to have reference projects they can visit, to deliver a feasible planning and to assure project timing.

Detected customer value propositions and quality assurance procedures are now introduced in collaborative business model development cases to find pathways to increase customer confidence and the market uptake of integrated home renovations.

Keywords: integrated renovation, business models, single-family houses, user experiences, actor collaboration
1. Introduction

For moving to a competitive low carbon economy in 2050 the European Union identified the need of reducing carbon emissions in residential sectors by 88-91% by 2050 compared to 1990 levels (EU, 2011). Europe’s new buildings and major renovations will be required to reach the level of “nearly zero-energy” (EPBD Recast, 2010). Moreover, the Energy Efficiency Directive (EED, 2012) requires EU Member States to establish a long-term strategy to mobilize investment in the renovation of national building stocks. However, the development for highly energy-efficient housing is still paved with many barriers related to the adoption of such innovation, see for example: Mlecnik (2013). For developing the market of home renovation various focus areas need further attention, see for example Figure 2.

![Fig 2: Schematic overview of action topics for developing quality-oriented renovation processes for housing (based on Van Holm et al., 2012).](image)

More specifically, various researchers (Haavik et al., 2012; Mlecnik et al., 2012) found that supply side collaborations should aim for integrated renovation and streamlined project management where responsibilities of actors are clearly defined, and actors collaborate to reduce fragmentation. To increase volume uptake of nearly-zero energy building (nZEB) renovation, it is generally assumed that innovative business models should be defined that lead to lower costs, lower burden for the client, limiting renovation time, and so on (One Stop Shop, 2012; SuccessFamilies, 2012).

2. Research objectives

Amongst other, the development of an effective offer for integrated energy-saving home renovation is challenged by generating an increasing interest of customers for energy and environmental issues, and by the capacity of companies to adapt to the real needs and requirements of client segments. Pathways should be explored so that supply-side actors, such as architects, contractors and consultants can present their offer to homeowners in such a way that customers trust them to deliver such renovation and are confident with an integrated offer. Understanding the real wishes of homeowners regarding integrated renovation can help to develop business strategies and structural collaborations. However it is poorly understood what the real wishes are of households who want to engage in nZEB single-family home (SFH) renovations and how this can be translated in input for business models. In other words: What are their motives to choose for a nZEB-renovation of their house – and consequently, useful value propositions for supply side actors? How can customer segments be reached? What type of relationship do they value? Figure 1 illustrates the positioning of these issues within general business model development, as proposed by Osterwalder and Pigneur (2010).
3. Research approach

3.1 The COHERENO project as a source

In the framework of the Intelligent Energy Europe project COHERENO (www.cohereno.eu), research was done for the market development of “nearly zero-energy” renovation of SFH in five European countries (Austria, Belgium, Germany, The Netherlands, Norway). One goal of this project was to identify experiences from realized home renovations. A coherent study was performed that encompasses an overview of, and experiences from, all actors – homeowners, architects, contractors, and so on - involved in realized projects in order to determine and eliminate market barriers for increasing development of integrated renovations.

Frontrunner renovation projects were defined in the partner countries using a national nZEB ‘radar’ (see Figure 3) resulting from various sources, such as developing legislation, national databases, architecture contests, homeowner platforms and voluntary certificate schemes. The identified projects were used as a source to find ‘experienced’ homeowners and actors.

3.2 Business model generation ontology

The customer-related building blocks of the business model generation canvas developed by Osterwalder and Pigneur (2010) - see Figure 1 - were defined as key topics for research. The model defines customer segments as different groups of people or organizations an enterprise aims to reach and serve. Value propositions are the bundle of products and services that create value for a specific customer segment. Channels are the means how a company communicates with and reaches its customer segments to deliver a value proposition and customer relationships are types of relationships a company establishes with specific customer segments.

3.3 Collecting homeowners’ experiences

A homeowner questionnaire with both open and closed questions was developed (available at COHERENO website). It was designed to provide insights for business modelling, especially regarding the definition of the customer segment willing to take up nZEB renovations, their value propositions, communication channels they used and customer relationships they appreciated. In the development of this questionnaire particular attention went to finding arguments to increase customer confidence by quality assurance. Further information can be found in the full COHERENO report (Straub et al., 2014).

Homeowners in five partner countries were addressed with the demand-side questionnaire. At least three homeowner interviews per country (covering different customer segments) and national literature studies provided additional insights for business model input for nZEB SFH renovation. Simultaneously supply-side experiences were also collected via workshops with experienced actors (not addressed in this paper).
4. Results and analysis

Fig 5: Example of obtained results. Building conditions that households found important in order to decide to renovate (multiple answers possible, n=60). Source: Straub et al., 2014.

Fig 6: Example of obtained results. Communication channels that influenced households to decide for very high energy efficiency (multiple answers possible, n=60). Source: Straub et al., 2014.

Fig 7: Example of obtained results. Issues homeowners particularly appreciated about an involved general contractor, indicated by themselves as ‘excellent’ (multiple answers possible, n=27). Source: Straub et al., 2014.
Overall 66 frontrunner households from five countries responded to the homeowner questionnaire. Regarding the limited response per country, an in-depth quantitative analysis per country was not meaningful. Figure 8 shows some indicative results per country, in this case for Belgium. Indicators summed for the five countries are explained further.

Fig 8: Characteristics of households renovating their SFH to nZEB. Example results for Belgium. Source: Passiefhuis-Platform vzw.

4.1 General characteristics of single-family homes being renovated to nZEB
The majority of houses being renovated to nZEB consist of old detached houses. 60% of the households renovated a detached house, 23% a terraced house and 10% a semi-detached house. 47.5% of the renovated houses was originally built before 1945, of which 10% was built before 1900. 77% of all renovated houses were built before 1970. Almost one third of the households that already lived in the house, did not live in the house during the renovation. Meaning the renovation works probably didn’t make that possible.

4.2 General characteristics of frontrunner households (customer segment)
Most frontrunner households are relatively old and with good income. Overall, the households exist for one third of 1-2 person households and exist for two thirds of more than two persons. The majority is between 40 and 60 years old (64%). Of the households 23% is younger than 40 and 13% is 60 years or older. Almost half of the households think their household has a total annual income above average. Almost 64% invested more than 100,000 Euro in their home renovation and almost 50% invested even more than 200,000 Euro in their major renovation. Most of the households financed the renovation largely with own savings.

4.3 Value propositions that convinced homeowners to renovate towards nZEB
In order to decide to renovate more than 70% of the households was led by energy saving and improving comfort and health conditions (see Figure 5). They had clear energy saving targets in mind before renovating their house. However, contractual guarantees on energy savings were just offered in one case. For other households, the energy target came later on, for example after consulting professionals. For the majority of the households, reducing the energy consumption and improving indoor comfort or health conditions were a more important decision factor than the needed repairs or changes.

4.4 Customer channels that influenced homeowners
The communication channels that influenced the households to decide for very high energy efficiency are quite diverse (see Figure 6). Noticing similar projects and on-line information about energy efficiency, and noticing applicable subsidies, grants and green loans were important. Especially architects and energy auditors influenced households. Also, professional networks seemed to influence. In more than 30% of the cases households knew a contractor
from other projects. In general, the contractor was not the actor that informed the household the first time about e.g. subsidies and green loans, energy performance guarantees, and methods for quality assurance. Only in about 20% of the cases involved professionals offered energy (cost) saving calculations.

4.5 Customer relationships with professionals
75% of the households contracted a general contractor and 80% contracted a professional for building services (51 respondents). Architect and energy experts were only consulted in 57%, respectively 55%, of the cases. 73% (27 respondents) of the households had the opinion that the general contractor delivered an excellent job. What those households particularly appreciated about the involved professionals - see Figure 7 - are the creativeness of finding solutions, and keeping to agreed costs and delivery time. For contracted building service professionals the latter two factors were valued the most important. Also, the time spent with the household to discuss the project and the ease of which the professional could be contacted were important parameters.

4.6 Country and regional differences
It is important to notice that there are country and regional differences in the results. For example in Austria and Germany, the most important customer segments for nZEB renovation were younger to middle aged persons with a high level of education and income. In Norway the main target segment consists of owners of single family houses built in the period from 1960 until end 1980'ies. In some regions, for example the Brussels Capital Region and Germany, a subsidy was found to be the main motivator to go towards nZEB. In Austria, differences occurred in the Federal States, each pursuing own subsidy targets and objectives. In regions with limited subsidies such as Flanders environmental concerns played a important role to motivate homeowners. In the Netherlands a policy supported programme targets the refurbishment of owner-occupied single-family dwellings according to “Energy bill = 0”.

The main responsible actors for renovation can also differ per country. For example, in Austria and Belgium, an architect in the coordinating role was usually key. In other countries, also a project manager or turnkey supplier was found to be a main responsible actor. In Norway, certified energy advisors bring owners attention to an integrated energy-efficient renovation. In the Netherlands, consortia of builders, architects, product suppliers and other professional actors are challenged to make renovation proposals for “Energy bill = 0” houses.

5. Conclusion: consequences for business models

The empirical research sheds light on elements that are important for better business model development for nZEB SFH renovations. The limited number of available nZEB SFH renovations – despite using various sources to track nZEB renovations - highlights the need for such development.

One most promising market segment for nZEB renovation consists of more mature families with presumably higher than average salaries. Their main motivation is living in an energy-efficient/healthy/comfortable house and this motivation is more important than the need for renovation itself. Another promising segment consists of young families with an average to above-average income who buy a house with the intention to renovate it to their expectations.
Although this research focused on nZEB renovation, various findings relate to general opportunities to improve client relations in the renovation sector.

Clients find professionals mainly on-line and through active searches and references (projects as well as personal contacts). They tend to conduct a check on contractors by taking the time to meet them and sometimes by asking prior clients for feedback. They sometimes tend to live somewhere else while the renovations are on-going.

In almost half of the projects architects and energy experts are not involved in the building process. Main contracted actors are building service professionals and general contractors. An excellent professional is seen by households as someone who respects dates, sticks to estimated costs, discusses the project with the household and the rest of the contractors involved in the renovation. Next to that, the interest professionals show is important for clients: they especially value professionals who are enthusiastic about the renovation.

In any case the timing aspect holds the biggest potential for professional’s improvement as many homeowners suffered from their renovation being delayed. In order to avoid frustrated end users, an advice to the sector could be to set more carefully determined, realistic deadlines. Professionals should pay specific attention to good time-keeping, quality assurance and unburdening of the project management of homeowners.

What is remarkable for nZEB renovations is that clients visit reference projects and that they chose professionals with references who are committed to pursuing environmental and low energy goals. In the perception of the client this has higher weight than for example energy saving guarantees and ‘hard’ quality assurance procedures. For information about energy saving homeowners also rely on “independent” informing or subsidy granting actors such as the government, municipalities or non-profit organisations. Nowadays only in some countries informing actors can point to experienced professionals. However, the energy (cost) savings are rarely calculated for specific renovations.

It is thus important to provide homeowners with information about example projects, to make the supply side actor’s experience visible and to link recommended supplying actors with informing actors. Especially architects, energy experts, project managers and banks are currently poorly embedded in building processes for nZEB SFH renovation and are recommended to step up and develop appropriate business models.

6. Outlook

Only about 1.2 per cent of Europe’s buildings are renovated each year (BPIE, 2011) and it is still unlikely that this share is renovated to anything like nZEB. However, the market potential for SFH nZEB renovation in Europe is very big. In most countries the market for energy renovations of SFH is clearly growing and businesses have to be prepared to step into this market.

Within COHERENO, being listed as an experienced professional on specialized demand-oriented websites is seen as a way forward to nZEB SFH renovation marketing. While certain customer segments are already highly motivated, the future adoption of integrated home renovations is challenged by developing appropriate answers for various customer segments and by developing regional actor collaboration targeting specific customer segments. Therefore, in future COHERENO work, the research results are introduced in collaborative business model development.
cases. This should lead to novel integrated solutions and supply chain collaborations that increase customer confidence and quality.

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8. References


