

The resident-centered
energy transition:
**Bridging the gap
between the customer
and business journey for
installation companies**

The resident-centered energy transition

Bridging the gap between the customer and business journey for installation companies

Master Thesis

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“[The installer of the future] can unburden the business client and consumer: from advice and execution of the work to management and maintenance. You already see installation companies taking over the entire energy chain from customers. They provide advice, install the systems, take care of maintenance and purchase energy. In short: The installation sector will really make a difference in the coming years in the transition to CO2-neutral buildings and homes.”

D. Terpstra, chairman of Techniek Nederland
Interviewed by M. Westerlaken (2023)

Preface

This thesis symbolizes a significant milestone in my academic journey, a path that, as those close to me know, has not always been straightforward. However, it stands out as one of the journeys during which I truly discovered a lot about myself.

I express my sincere gratitude to my mentors, Stella Boess and Matthijs Buijs. Working with both of you has been a wonderful experience. When the road seemed daunting, you consistently guided me, demonstrating that the challenges were not as insurmountable as I thought them to be. As a designer with a broad spectrum of interests, spanning design thinking, business, and societal issues, I am grateful for your support in keeping me focused on my research at the intersection of these domains.

I extend the same heartfelt thanks to my extensive network of friends and family, whose unwavering support has been indispensable. While the list is too long to enumerate everyone, I will try. My parents, for their enduring patience; Denis, my partner, for his motivational encouragement and ensuring I didn't forget to eat; and my dear friends – Jamie, Iris, Luca, Roxanne, Lisa, Senna, Pauline, Guido, Cameron, Alex, Niels, and Priyanka – for keeping me grounded throughout this journey. Special appreciation also goes to the wonderful people at JigsEye for their reminders that they were ready for me to be finished with university and generous help.

This thesis would not have been possible without the collective encouragement, guidance, and support of each individual mentioned, and probably many more. I am grateful, and excited to keep exploring all the topics I've explored in this project and many more interesting areas I will come across.

- Pip van Esch

Executive summary

The Netherlands is confronted with a formidable challenge in the transition away from natural gas in the built environment. In this challenging landscape installation companies have an opportunity since they are often perceived as natural points of contact by residents to further aid the acceleration of the energy transition. However, installation companies currently often don't manage to deliver positive experiences for residents.

Exploring the potential of Customer Journeys as a valuable tool to improve resident experiences, this thesis uses the customer journey as a framework to explore how installation companies can deliver improved experiences to residents. To this end, a research gap is identified in the lack of sources offering guidance on the optimal implementation of the customer journey into a company's processes.

To start addressing this gap and provide guidance for companies, the thesis details a typical customer journey, shedding light on pain points experienced by residents during sustainable renovations with insights gained from industry literature. This overview shows that despite overall resident satisfaction, avoidable unfortunate experiences persist in the resident journey. The thesis proposes that installation companies could benefit from expanding their focus from the initial phases of the customer journey, such as orientation and choosing a solution, to later phases, such as living in a renovated home, to reduce failure costs and adopt a more holistic approach.

Examples from practice, potential solutions and insights into the challenges installation companies face emerge from analyzing semi-structured interviews with industry experts.

In conclusion the thesis presents a design concept encouraging installation companies to integrate more resident feedback into their design phase, fostering a more iterative approach. This proposal aims to start bridging the existing gap, empowering installation companies to navigate the complexities of sustainable renovations with enhanced customer-centric practices.

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01 Introduction & context

This chapter introduces the context of the project. This entails:

- The natural gas-free energy transition and the challenges it represents for sustainability of the existing built environment
- The opportunity for installation companies to play a key role in this transition
- The customer journey as a tool for installation companies to enhance outcomes for residents
- Defining the project boundaries

Key takeaways

- The Netherlands faces a significant challenge in navigating the energy transition, with diverse ownership structures contributing to varying challenges and incentives for residents, even within the same building.
- Installation companies, positioned as natural points of contact for residents, have a unique opportunity to play a pivotal role in expediting the energy transition and enhancing resident experiences.
- However, these companies grapple with challenges in delivering a satisfactory customer experience, placing them among the lowest-ranked sectors in terms of customer centricity.
- Customer Journeys are an effective tool that could help installation companies deliver better resident experiences. However, there is a research gap with guidance on how to best implement the customer journey into a company's process.

01.01 The energy transition

The energy transition poses a formidable challenge for companies, governments, and municipalities in the Netherlands. In 2019 the Dutch government committed itself to the discontinuation of natural gas by 2050, of which household gas use is a large part. In the Netherlands, this means that 7 million household gas connections (klimaatakkoord.nl, 2022) will have to be replaced by a renewable alternative, at considerable pace to meet climate goals.

The complexity of this transition is exacerbated by the diverse array of available solutions. They can be sorted roughly into area heating for residences that are in suitable neighbourhoods, full-electric heat pumps, and hybrid heat pumps. However, transitioning a residence can be done in steps. Such as, insulation, electrification of the household combined with sustainable electricity sources.

Within the context of ownership structures of the total 8.05 million residences in the Netherlands (see figure 1), various challenges emerge.

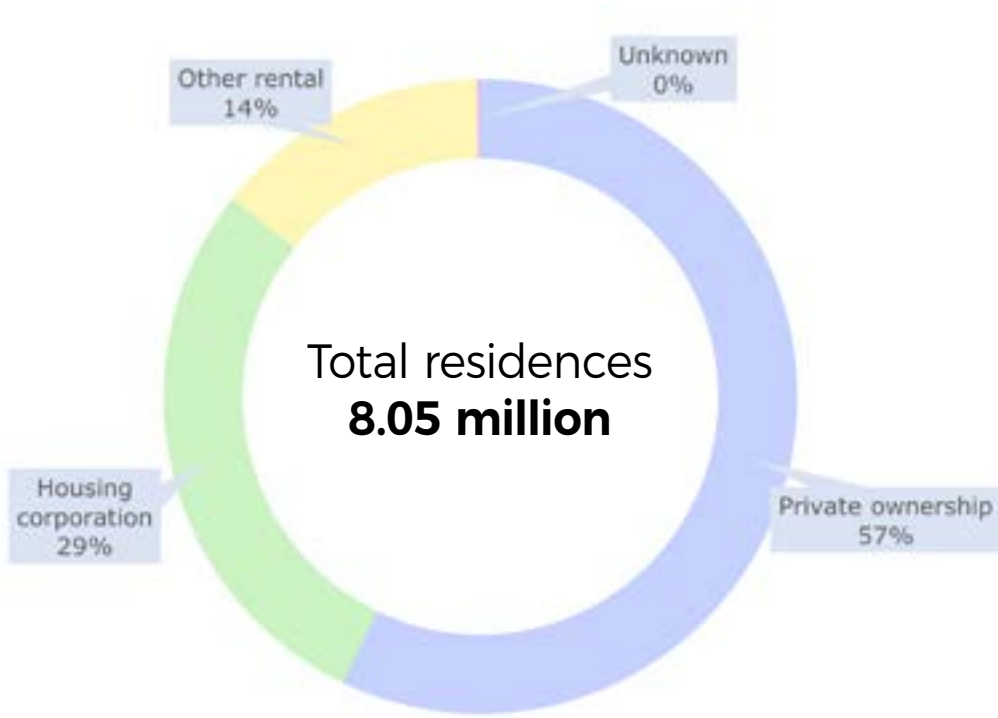


Figure 1: Housing stock in the Netherlands. Source: Graph based on data from the Central Statistical Office of the Netherlands (CBS, 2023)

Private owners

Private owners often find themselves navigating the transition independently, grappling with the complexities of understanding subsidies, exploring different renovation types, and determining the most suitable solutions for their home. This group may face financial constraints and overwhelm of information. Online resources can play an important role in providing guidance and initiating the process for these owners (Milieu Centraal, 2023).

Residences within a homeowners association

For the 1.2 million residences within homeowners associations (CBS, 2016), a separate challenge arises due to the coexistence of individual owners and rental structures within the same building. To achieve a successful sustainable renovation, reaching consensus within the building is essential. Overdue maintenance, low engagement and attendance at meetings, and a lack of knowledge on initiating the process contribute to the difficulties faced by this group.

Within a homeowners association, voting for a sustainable renovation needs an increased quorum and an increased majority (NederlandVvE, 2023).

Renters

Renters within housing corporations and the private sector encounter their own set of obstacles. Many feel a lack of influence and agency in the renovation process, and incentive structures are not always in favour of the renter. This can cause them to disengage. Renters often don't get a say in the type of sustainable solution their building gets, but a 70% approval rate of the renovation proposal is usually required for the housing corporation to start the renovation, since this is the legal limit where renters can be required to cooperate with the execution of the renovation work (Aedes, 2023).

Additional challenges

Across all ownership categories, individuals with low literacy and lower socioeconomic status face extra challenges that make the likeliness of disengagement higher, such as financial constraints and a lack of time or mental bandwidth to engage with the complex material.

Furthermore, factors like the age and construction of different housing types, as well as their potential monumental status, introduce layers of complexity. Navigating these multifaceted challenges requires tailored approaches that address the specific needs and circumstances of each resident.

01.02 The opportunity for installation companies

Installation companies constitute a fundamental link in the sustainable renovation chain, tasked with implementing the envisioned solutions through the installation of various systems. However, their role can extend beyond mere execution; often serving as a natural point of contact for homeowners, installation companies can assist in navigating the challenges outlined in chapter X.

The industry acknowledges this expanded role, recognizing that rising customer expectations necessitate installers to operate with increased flexibility and communicate empathetically (Samenwerkingsorganisatie Beroepsonderwijs Bedrijfsleven, 2020). Or, as D. Terpstra, chairman of Techniek Nederland, explains in an interview (Westerlaken, 2023):

“[The installer of the future] can unburden the business client and consumer: from advice and execution of the work to management and maintenance. You already see installation companies taking over the entire energy chain from customers. They provide advice, install the systems, take care of maintenance and purchase energy. In short: The installation sector will really make a difference in the coming years in the transition to CO2-neutral buildings and homes.”

It is not easy for companies to meet this changing demand, and the building and installation sector is a particularly challenging sector. Costs are high, and errors have a substantial impact on residents’ living environment.

Despite a recent three-year improvement trend in customer satisfaction, the building and installation sector still receives the lowest scores among all sectors in the Netherlands, according to a recent report (Integron, 2023). Consumers specifically mention unburdening and customer-centricity as areas of improvement (Integron, 2022).

Performing well in this area can therefore set a company apart from its competitors. An analysis of the approaches adopted by four companies in Zero Energy renovations (Boess, 2022) reveals that, despite outward similarities in approach—such as using a model residence for resident feedback—the divergent execution and integration of feedback resulted in substantial variations in the user-friendliness of the final dwelling and its seamless integration into residents’ daily lives.

01.03 Customer Journey research

To enhance customer centricity, companies and designers turn to the customer journey as a valuable tool. While creating a comprehensive customer journey map is an impactful first step, logically a crucial second part for achieving better outcomes lies in integrating the insights derived from these maps into the company’s operational practices. Otherwise, accomplishing meaningful change will be difficult.

Despite a solid research basis offering guidance on creating effective customer journey maps—detailing what to include, the associated benefits, and the significance of various components—there exists a research gap concerning the incorporation of these findings into daily work processes.

Notably, the customer journey tends to be heavily associated with the sales process, a focus that can be limiting for design solutions. This is illustrated in images 2 and 3, showing that ‘sales’ is the most commonly co-occurring term in a Scopus search (228 occurrences), over even ‘customer experience’ (185 occurrences). Figure 3 on the right shows the average publication date of clusters.

Categorising customer journey mapping primarily as a sales tool seems limiting from a design perspective. As a tool it has the potential to generate insights which ideally permeate the entire business process.

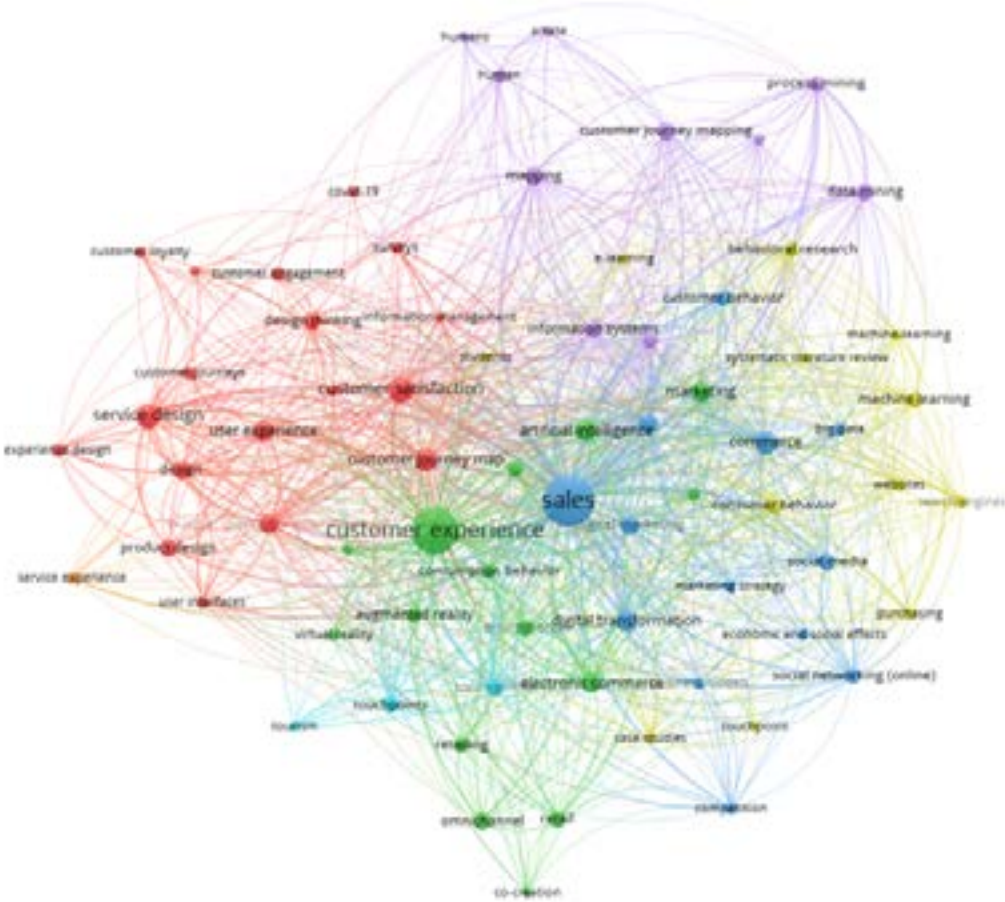


Figure 2 - A VOSviewer visualisation of bibliometric network, keywords most frequently co-occurring with the term ‘customer journey’ in a Scopus search.

For companies aiming to truly embed 'design thinking' practices or a design-oriented approach into their way of working, guidance may be found in Wrigley, Nusem, and Straker's research (2020).

A transformative approach may involve the strategic hiring of a designer who can assume the role of a changemaker within the organization, provided that the required conditions are present. This 'catalyst' can facilitate the integration of design principles across various facets of the business, fostering a more comprehensive and impactful incorporation of customer journey insights.

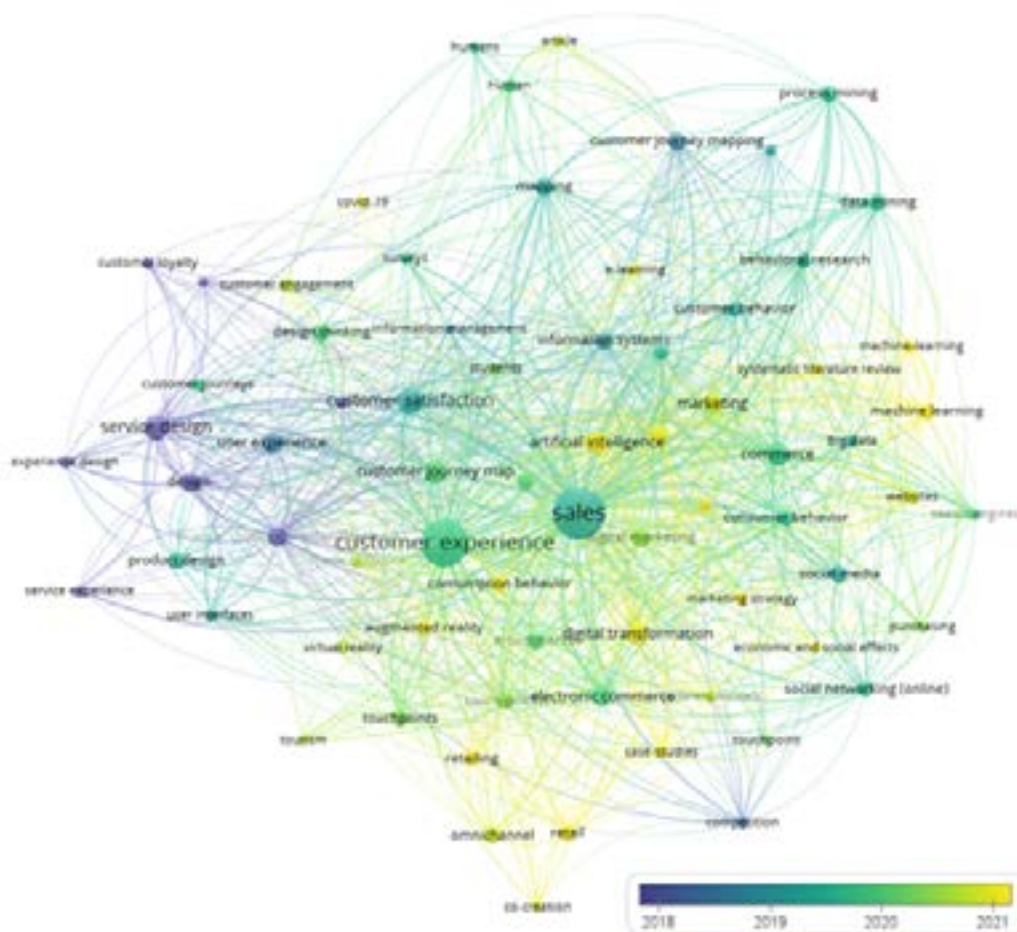


Figure 3 - VOSviewer visualisation of bibliometric network, keywords most frequently co-occurring with 'customer journey' in a Scopus search. Colour shows average year of publication.

01.04 Project aim

To provide focus and bring together the topics of installation companies within the energy transition and the use of the customer journey as a tool to improve resident experiences throughout, a research question was defined:

‘How can the Customer Journey generate value for a sustainable renovation installation company, and what are the challenges in integrating this into the business process?’

To explore this question, first, a foundational customer journey was established, dissecting the pain points experienced by residents throughout this journey filtered through a lens of relevance to the installation industry.

This provided a framework through which to determine where maximally useful insights could be gained from expert interviews.

Subsequently, interviews were conducted with a diverse group of industry professionals. These aimed to shed light on the challenges faced by companies in enhancing outcomes for residents, uncover strategies employed by these professionals to address such challenges, and determine opportunities for innovation within the field. Thematic analysis was conducted to structure the interview insights and determine a relevant design goal, which was defined as such:

‘To design something that invites installation companies to incorporate resident feedback in their design phase, creating a more iterative approach.’

The later chapters of this thesis present a proposed design aimed at realizing this goal.

02 Resident pain points through the customer journey

This chapter establishes a foundational customer journey that residents go through with a sustainable renovation. It expands on the painpoints residents encounter in each phase, as well as highlighting the main challenges faced by installation companies.

Key takeaways

- Although residents generally express satisfaction with the outcome of sustainable renovations, there are still numerous avoidable missteps in the resident journey.
- As to be reasonably expected, in the installation sector the association between sales and the customer journey is strong. In the professional literature, when searching for terms related to the customer journey, there is a focus on the early phases (orientation and choosing a solution). However, delving into failure costs reveals that installation companies could gain advantages by examining other phases of the customer journey more closely as well.

02.01 Establishing the residents' customer journey

To gain an understanding of where common failures occur throughout the customer journey, I established a generalized customer journey framework, based on the "Customer Journey to a Natural Gas-Free Home" developed by de Koning, Kooger, Hermans & Tigchelaar (2020)(figure 4). The journey was modified to ensure optimal relevance to installation companies. Subsequently, exploratory research was conducted to identify pain points experienced by residents throughout their journey.

The data was gathered from various sources within the installation industry, including trade journal websites, monitoring organizations, government reports, and exploratory discussions with industry professionals. These sources were then color-coded and mapped onto the relevant phases of the customer journey.

The defined phases are illustrated in Figure 5 and encompass the following:

1. Orientation
2. Choosing a solution
3. Preparation of installation activities
4. Execution of installation activities
5. Delivery
6. Living within warranty
7. Living outside of warranty

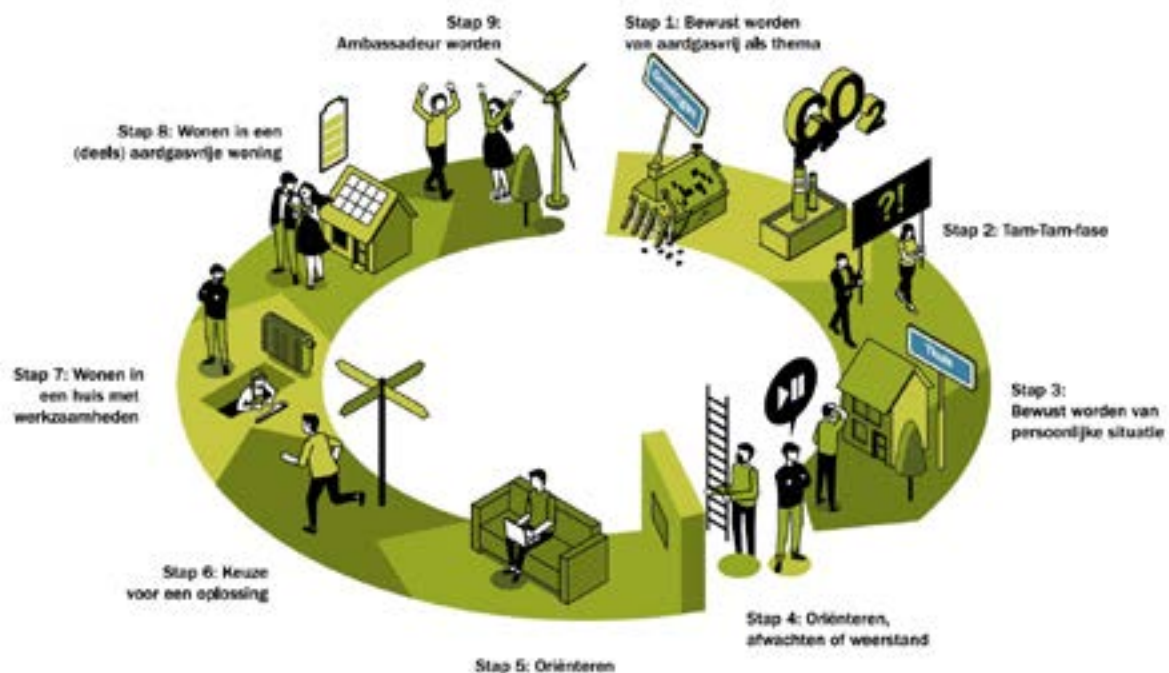


Figure 4: Customer Journey to a Natural Gas-Free Home (Kooger et al. 2020)

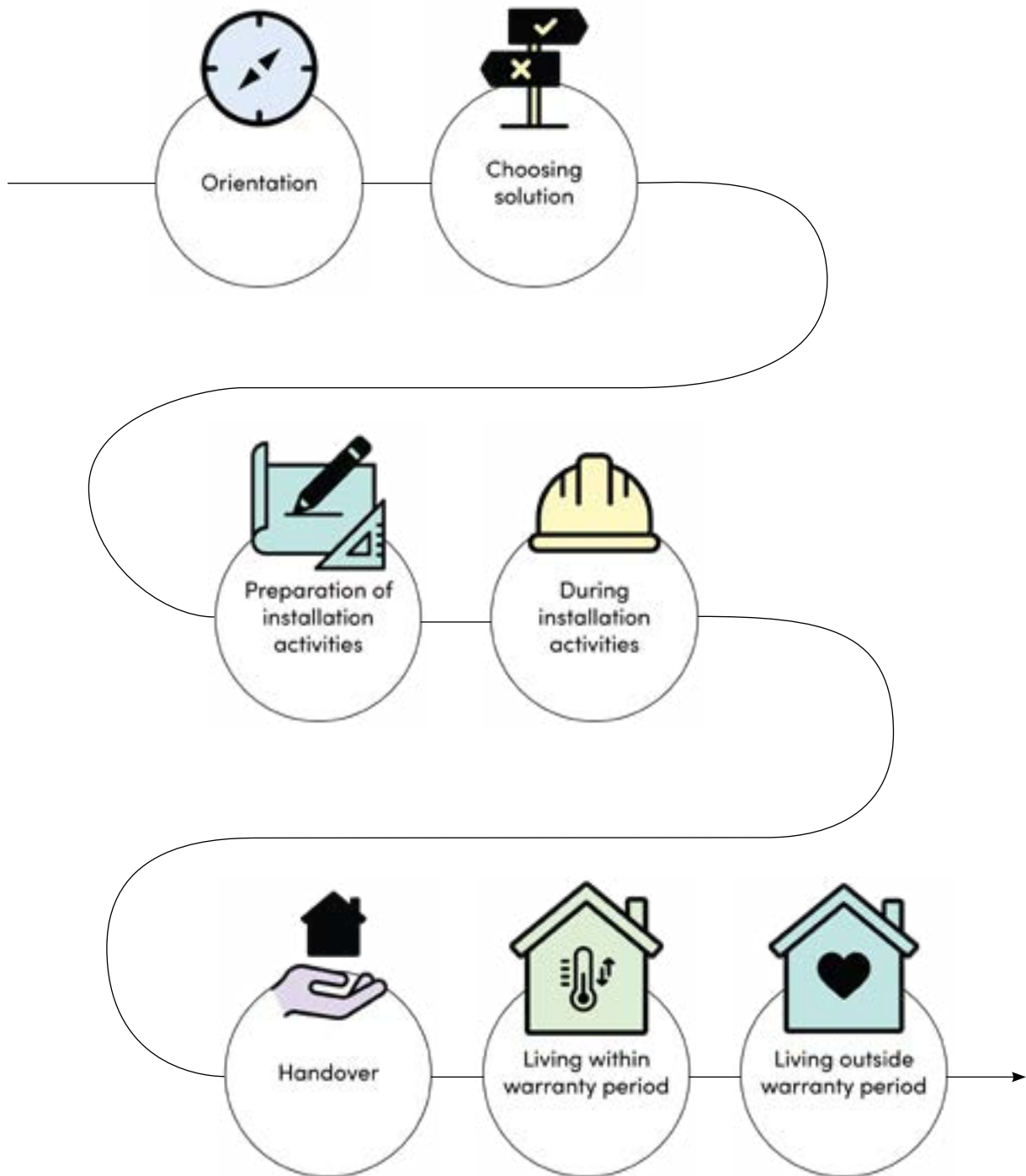
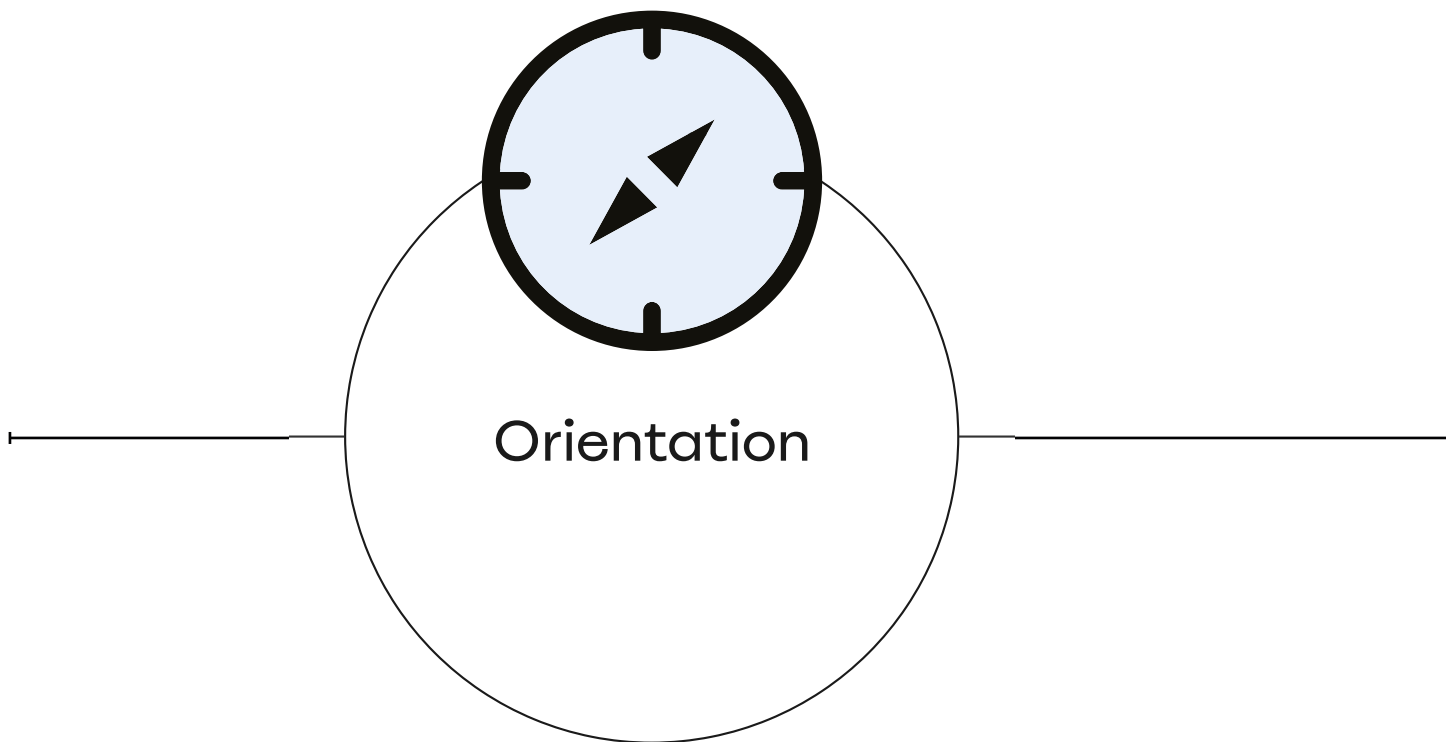


Figure 5: Customer Journey phases for a sustainable renovation

02.02 Orientation

In the orientation phase, residents have already become aware of the move towards natural gas-free homes and begin to grasp its personal implications. They naturally fall into three categories: those actively seeking solutions, those adopting a wait-and-see approach, and those actively resisting the transition (Kooger, de Koning, Hermans, & Tigchelaar, 2020).

Installation companies dealing with private homeowners mainly engage with the first category, but those working with housing corporations or homeowners' associations will also encounter residents from the other categories, posing additional challenges.



Getting to the next phase

Residents tend to obtain information through channels that are logical for them. They will move on to the next phase if they feel that they are sufficiently informed or that there is a suitable decision aid to base their choice on (Kooger et al., 2020).



During this phase, residents' lack of technical knowledge is a significant challenge. Understanding the choices can be overwhelming, compounded by conflicting information from various sources, making it challenging for residents to determine the best course of action.

The level of trust, the manner of communication, and the opportunity for residents to be involved in the process all influence how residents perceive the entire journey towards natural gas-free living. These three factors can also impact each other. The way communication occurs and the extent to which residents can be involved in the process can affect residents' trust, and vice versa. (Kooger, et al., 2023)

Main challenge: Build trust

- Providing complex information in an understandable way
- Providing transparent information
- Being present at the right moment
- Give the resident realistic expectations



From the installer's side, this phase presents a big challenge. Every household has different circumstances, renovation options, budget, and underlying needs. This makes it so that installers have to invest a lot of time into this first phase, without any assurances of a sale.

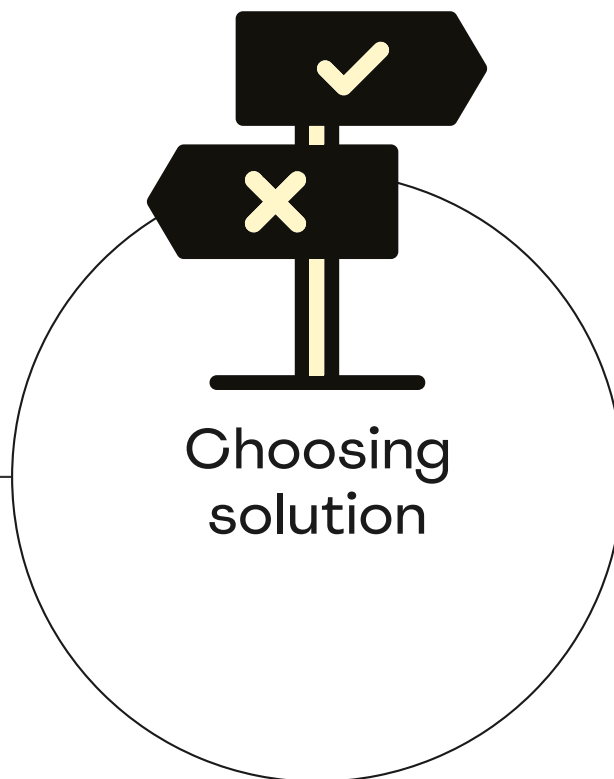
"If you don't have the customer journey in order, you can easily get stuck with a low conversion rate of 10 percent. You then invest a lot of energy in projects that ultimately yield nothing." (Otten, 2021)

However, guiding the resident well in this phase is also an opportunity to stand out.

02.03 Choosing a solution

When all choices have been considered and quotations have been received, homeowners have to choose a desired renovation approach. To enter this phase, people need to feel that they are either sufficiently informed or that they have found a good heuristic (what is the neighbour doing? how will the municipality advise me?)(Kooger et al., 2020).

For private homeowners this is an individual choice, one they can either make or postpone making. For renters living in a housing complex, the choice is usually whether they accept the renovation, which can be implemented for the whole complex if 70% of residents vote in favour (Aedes, 2023). In the case of a homeowners association (VvE), a 'qualified majority' of votes is required (NederlandVvE.nl, 2023).



Getting to the next phase

Sharing positive experiences from early adopters can help persuade residents who are still unsure about transitioning away from natural gas. It's essential to show owner-occupiers who are still undecided the benefits, based on others' experiences. Be transparent about the challenges and emphasize the benefits which follow the initial difficulties. (Kooger, et al., 2023)



Residents can struggle in coordinating the different renovation activities. They have to search, contact, and select service providers on their own. This complexity can lead residents to disengage or become discouraged, even if they initially support the idea of a natural gas-free home. (Kooger, et al., 2023)

Additionally, a report by Authority Consumer & Market (ACM) highlights the necessity for residents to have the feeling that they can have a say in the process, and that freedom of choice is offered where possible. (Autoriteit Consument & Markt, 2021b).

Main challenge: Guiding residents through a difficult choice

- Communicate choices in a clear & concise way
- Share others' positive experiences with residents
- Be transparent about challenges
- Emphasize the benefits
- Make use of model residence to gather input from residents and revise installation concept

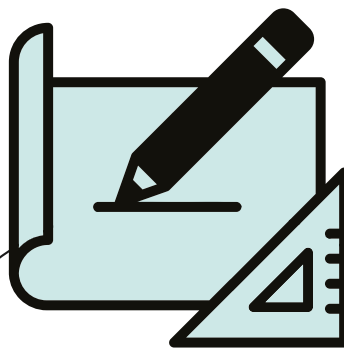


If installation manage to facilitate residents in the decisionmaking process, it can significantly enhance the overall process.

This was underscored by the experience resident of a homeowners association (VvE) who attended the Energy Lab Zuidoost Seminar of April 2023. She shared her experience, mentioning that the quotation provided by an installation company exceeded the VvE budget. She struggled to discern her options regarding the quotation, particularly whether they could prioritize certain impactful renovation components or make alterations to the proposed quotation. However, she indicated that the company did not accommodate her in this.

02.04 Preparation

The preparation phase involves the planning of the renovation activities after a decision has been made on which sustainable renovation will be performed on the resident's home.



Preparation of
installation
activities

Getting to the next phase

This phase concludes naturally when installation activities begin.



A report on resident satisfaction with zero-net-energy renovations (de Jong & Borger, 2018) highlights that during this phase, a primary source of frustration stems from project planning. This frustration doesn't solely arise from project delays but also from the significant gap between overly optimistic initial communications about project timelines and the insufficient or delayed follow-up regarding adjustments to those timelines.

Main challenge: Clear communication

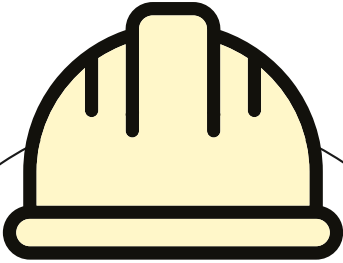
- Minimise delays
- Communicate clearly about delays when unavoidable
- Plan realistically



For installers, the key challenges lie in their ability to proactively mitigate delays whenever possible and communicating clearly with residents when such delays are inevitable.

02.05 Installation activities

In this phase, residents are living in a home where renovations are taking place. Alternatively, if the house is unliveable during this period, alternative accommodation should be provided. In either case, the renovations disrupt residents' immediate surroundings and daily routines.



During
installation
activities

Getting to the next phase

Seemingly minor issues often hold significant importance for residents. They appreciate parties that address these concerns, citing examples like construction workers assisting with bike obstructions and staff members who communicate warmly and provide explanations. Understanding what truly matters to residents can be a challenge. However, it is vital to focus on identifying and addressing these "side matters" that are pivotal to residents' well-being. Resident consultants can play a crucial role in seeking solutions to these issues that hold paramount importance for residents. (Kooger, et al., 2023)



A source of frustration in this phase is the failure to adhere to established agreements, and ambiguity regarding who should be held accountable when problems surface. This issue becomes especially challenging in projects where the entire process, including resident guidance, has been outsourced to the builder, often leading to heightened frustration among residents (de Jong & Borger, 2018).

Main challenge: Minimise disruption

- Adhere to established agreements
- Dedicate a set team of workers per residence



The challenge in this phase is to keep the experienced disruption to a minimum. Establishing trust with residents during the earlier phases of the process proves advantageous as it simplifies addressing minor resident requests, ultimately creating a more conducive and pleasant work environment for the installer. Lastly, having a dedicated team of workers can reduce the perceived disruption.

“It goes much more smoothly when residents are on board with the project from the beginning.” (Centrum voor Woononderzoek, 2023b)

02.06 Handover

After renovation activities are completed, there has to be a handover. Since the new installations often require behavioural change from the resident, a good handover can make sure residents know how to use their new installations. A key opportunity for improvement was identified here by de Jong & Borger (2018), who described that information regarding maintenance is often perceived as unclear. This can result in installations not being used optimally, and the potential for savings not being fully realized.



Getting to the next phase

Handover can be a good time to prevent unnecessary problems in the 'living within warranty' phase, by explaining to residents how to utilize their new installations, and prepare them for the required behavioural change.



For the resident, frustration can come from not knowing how their new system works. For example, it occurs that residents disable ventilation systems due to perceived noise disturbance.

However, other complaints are quality related. Systems can either be inadequately calibrated, or more frequently cited challenges such as issues related to a lack of airtightness, noise disturbances, and drafts, all of which are critical factors affecting the achievement of promised energy efficiency and comfort levels. (de Jong & Borger, 2018)

Main challenge: Clear communication

- Explaining residents how to use their new installations
- Doing quality checks before handover on build quality and calibration
- Installing more intuitive installations

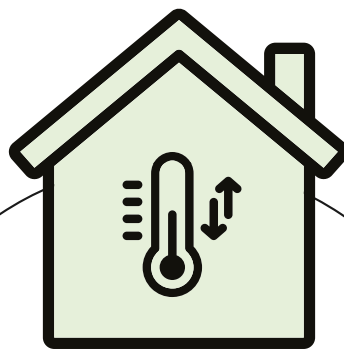


Installation companies have the opportunity to pre-empt certain issues in the following phase, which involves residents living with the new installations. They can achieve this by providing clear explanations on the functionality of their new installations, using language that is accessible and not overly technical for residents. Furthermore, conducting quality checks before returning the residence to the resident can further prevent potential problems.

02.07 Living within warranty

After the handover, residents now reside in a fully or partially natural gas-free home, and experience natural gas-free living. Overall, residents are usually quite satisfied with their energy efficient household (de Jong & Borger, 2018). However, the previously mentioned quality concerns (see chapter 02.06 - handover) can affect satisfaction, and additional points of frustration can be:

- Lack of clear point of contact: In instances where delivered quality was unsatisfactory, residents faced challenges in obtaining compensation or identifying the responsible party. (Autoriteit Consument & Markt, 2021a).
- Complaint processing: Residents want to feel that their concerns are taken seriously (Centrum voor Woononderzoek, 2023a). To process and address complaints, clear agreements between the housing corporation, the installation company, or another party such as the heat supplier are required.



Living within
the warranty
period

Getting to the next phase

This phase concludes organically with the expiration of the installer's warranty period, signifying that residents ideally should not require further assistance. A positive or negative experience during this phase can influence residents' perceptions of the overall process, potentially impacting their likelihood to recommend a sustainable renovation to friends, family, or neighbours. As outlined in the report by de Kooger et al. (2010), their concluding stage is described as 'becoming an ambassador,' wherein residents share both highly positive and highly negative experiences with their social network.



Residents must adapt to a new way of interacting with their homes and heating systems during this phase. For instance, the use of a heat pump necessitates adjustments in habits related to heating system interaction, ventilation, and window usage to achieve the promised energy efficiency. For example, residents can experience frustration with the fact that low temperature heating systems are slower to warm the house than high temperature ones (de Jong & Borger, 2018). Research on post-occupancy adaptation finds that conflicts between resident and heating system may arise due to individual differences in understanding the system's role, perceptions of the indoor climate, and responses to system performance (Jin, 2023).

Main challenge for installer: Effectively processing complaints

- Residents want to have one clear point of contact for complaints
- Residents want complaints to be processed effectively and promptly



From the perspective of the installation company, this phase entails often-overlooked costs: failure costs. A consultant in the field notes that identifying the sources of these costs and preventing recurring mistakes can be a management blind spot. Installers, with their implementation experience, possess valuable insights into common failures during projects. The consultant recommends conducting project evaluations and proper kick-offs involving various stakeholders (salesperson, work planner, project manager, lead technician, and director) to mitigate repeated failures. (van Maasakkers, 2019)

02.08 Living outside warranty

In this phase there is no further touchpoints between the installation company and the resident. However, various factors still play a role in shaping the experience of residents with the installed system.

Ideally, a resident who has had good experiences through the installation journey can advise their social network, or neighbours in adjacent apartment complexes (Hauge et al., 2014) about their experience of the sustainable renovation. In essence, this phase represents not just the conclusion of the renovation process but also the potential for residents to evolve into advocates, sharing their experiences and contributing to the broader discourse.



Living outside
the warranty
period

Concluding the customer journey

Multiplying positive experiences can accelerate the energy transition within communities, and if community groups of residents like homeowners associations have a positive experience being guided by an installation company, they can recommend the company to homeowners associations in the neighbourhood.

Additionally, if only a partial sustainable renovation was decided upon, a good experience could facilitate future complementary renovation activities to the residence.



For residents, the following factors can still influence their experience:

The compatibility of the installation solution with the unique needs of residents. For instance, considerations can be made for elderly residents or those with a preference for radiant heat, for whom the incorporation of infrared panels atop a low-heat heating solution can prove beneficial (de Jong & Borger, 2018). This underscores the importance of tailoring the installed infrastructure to individual preferences and requirements in the 'choosing a solution' phase of the customer journey.

The intuitiveness of the resident's interaction with the installation system emerges as another consideration. Questions arise regarding the accessibility and user-friendliness of the interface. Is it conveniently located? Is it easy to navigate? Does the interface provide clear feedback on the heating process? Typically, one resident will assume the 'expert' role, but there are considerations as to how each resident comprehends the system and interacts with it. An intuitive interface that provides feedback on its status could be beneficial to make 'conflict' between these actors productive (Jin, 2023).

**Main challenge:
Intuitive user interaction of installation system**



For the installer, it can be advantageous to consider the maintenance needed to the system, which introduces additional dimensions to the resident's experience. To illustrate, if maintenance tasks such as replacing filters in the ventilation system are required, considerations must be given to accessibility, visibility of replacement necessity, and the overall intuitiveness of the process. It is crucial to evaluate whether residents can perform maintenance tasks without resorting to extensive manuals, emphasizing a user-friendly approach.

In cases where professional assistance is needed for maintenance, clarity on whom to contact becomes an additional aspect. Residents should be well-informed about the appropriate channels for seeking professional help, ensuring a seamless and efficient resolution of any issues that may arise.

03 Design methodology

This chapter describes the design research methodology followed throughout this project. This project gives some insight into the iterative steps that have been followed.

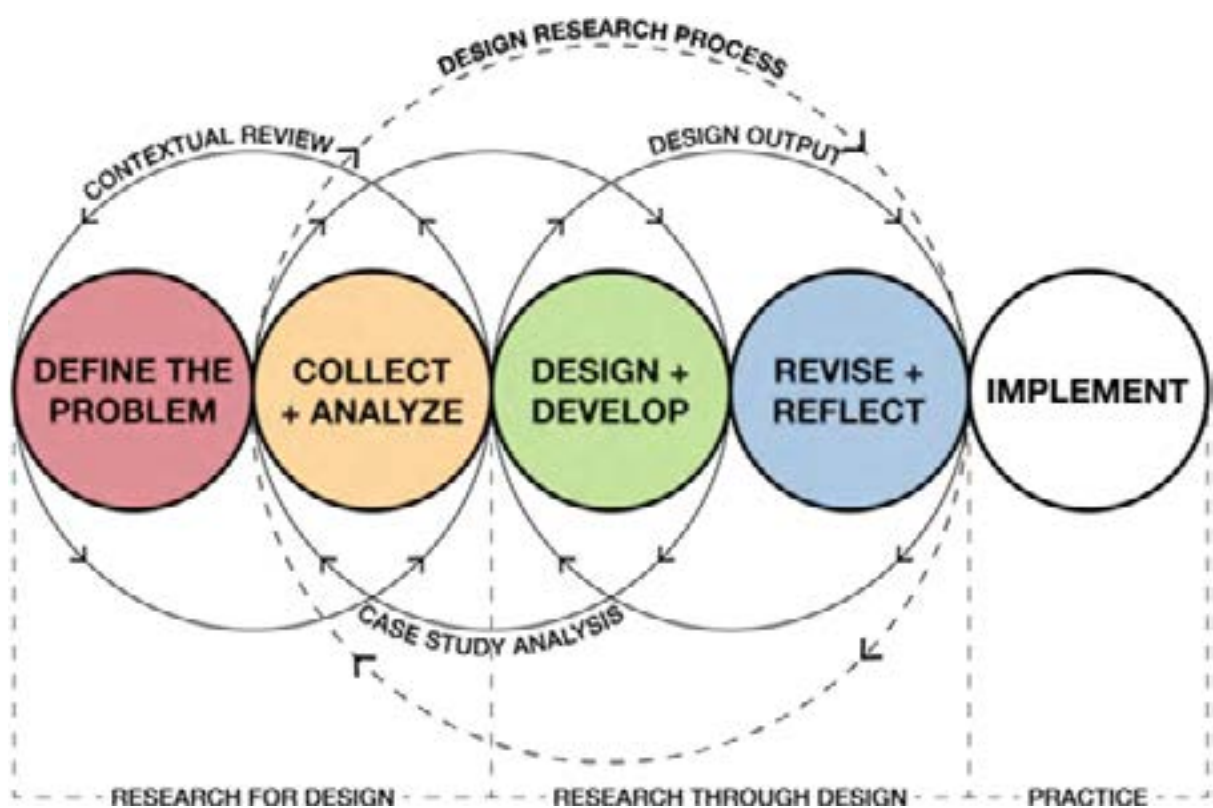


Figure 6 - A diagrammatic representation of the design research process described by McRobert (2018)

The methodology followed during this project was inspired by the design research methodology described by McRobert (2018) shown in figure 6, a continuous process of looping iterations and redefining the project. For clarity, they have been divided into the following steps and colourcoded:

- **1. Define the Problem: Initial Project Brief (appendix 1)**
Formulate a research question to identify the core problem within the context of sustainable renovation installation companies.

'To understand the different ways in which installation companies can integrate a Customer Journey Map (CJM) into their business process, and what value it generates for them. An additional point of interest is the benefits for the end consumer'
- **2. Collect and Analyze: Exploratory Literature Research into the Pain Points Residents Experience**
Conduct a literature review to explore the context and analyze the pain points experienced by residents throughout the customer journey in the realm of sustainable renovation. (Chapter 2)
- **3. Define the problem: Frame the focus of Expert Interviews**
Adjust and refine the research question based on insights gained from literature research, preparing it for exploration through expert interviews.

'How can the Customer Journey generate value for a sustainable renovation installation company, and what are the challenges in integrating this into the business process?'
- **4. Collect and analyze: Conduct continuously evolving interviews aimed to fill unanswered questions (Chapter 04.01 - Interview setup)**
Develop a flexible interview design that adapts to emerging questions, allowing for a dynamic exploration of challenges and opportunities in the integration of customer journey insights.
- **5. Analyze: Synthesize findings (Chapter 04.02 - Findings)**
Systematically organize and synthesize the gathered information from literature research and expert interviews, identifying key patterns, themes, and insights.
- **6. Define the problem: Reframe with Insights from Topic Experts from a Design Perspective Where Interesting Areas for a Design Solution Could Lie (chapter 5)**
Utilize the synthesized insights to reframe the research question from a design perspective, pinpointing areas where innovative design solutions could be developed.
- **7. Design & Develop a Concept (chapter 5 & 6)**
Engage in the creative process of designing and developing a concept that addresses the identified challenges and leverages opportunities for sustainable renovation installation companies.
- **8. First Round of Reflection (chapter 06.04)**
Conduct an initial reflective analysis of the designed concept, assessing its feasibility, effectiveness, and alignment with the project's objectives.

04 Interviews

This chapter outlines the structure of the semi-structured interviews and detail the insights obtained through thematic analysis.

Key takeaways

The delivery of a positive resident experience is impacted by contextual challenges, such as:

- Low incentives stemming from the high demand for installation professionals.
- The prevalence of a subcontracting structure, posing difficulties for installation companies in steering the resident's journey.
- A strategic shift is imperative for installation companies aspiring to distinguish themselves in providing exceptional resident experiences.

Communication plays a pivotal role for installation companies, with project continuity often contingent on effective communication. Proficient communication can:

- Foster trust with residents.
- Uncover residents' needs, contributing to tailored installation offers.
- Aid residents in comprehending complex information.

Ensuring residents utilize installations as intended introduces another layer of challenge. Factors contributing to successful implementation include:

- Intuitive installations.
- Clear and understandable explanations.
- Integration of coaching strategies.
- Incorporation of lifestyle reminders.

The adoption of an iterative approach proves valuable in minimizing preventable mistakes, despite potential upfront investments. Key components of this approach encompass:

- Incorporating resident feedback from initial conversations to tailor installation offers.
- Designing for freedom of choice.
- Leveraging data-supported decision-making processes.

04.01 Interview design

The semi-structured interview were set up to engage with a diverse group of industry professionals and capture a wide range of perspectives, as is shown in figure 7. This inclusive approach ensured that insights were gathered across several aspects of the process.

The primary objective of these interviews was twofold. Firstly, they aimed to identify the facets of the customer journey that hold significant value for installation companies. By delving into these aspects, I sought to gain a nuanced understanding of the key touchpoints and pivotal moments within the customer journey that have the most impact on installation companies and their operations.

Secondly, these interviews were meant to find tangible examples of effective solutions employed by industry professionals to address the most prevalent challenges encountered during the customer journey. These real-world examples can offer valuable insights into strategies, practices, and interventions that have proven successful in mitigating common obstacles.

In essence, this interview setup was tailored to delve into the different aspects of the resident's customer journey from the perspective of installation companies. It allowed industry experts to contribute their insights, share best practices, and contribute to the body of knowledge surrounding the challenges and opportunities in this domain.

After the interviews, thematic analysis was carried out to synthesize insights from the interviews.

<i>Code</i>	<i>Function</i>	<i>Company</i>
<i>I1</i>	<i>Co-founder / commercial director</i>	<i>Installation company providing innovative sustainability solutions</i>
<i>I2</i>	<i>Founder</i>	<i>Installation company providing innovative sustainability solutions</i>
<i>I3</i>	<i>Director</i>	<i>Technical services within facility service provider</i>
<i>I4</i>	<i>Founder</i>	<i>Installation company specialised window frames</i>
<i>I5</i>	<i>Managing director</i>	<i>Facility Services Provider</i>
<i>I6</i>	<i>CEO and former division director</i>	<i>Facility management & multi-technical service provider</i>
<i>I7</i>	<i>General Director</i>	<i>Facility Services Provider</i>
<i>A1</i>	<i>Architect</i>	<i>Architecture firm focused on sustainable building</i>

Figure 7 - Description of interviewees.

04.02 Findings

The interviews gave insight into the challenges that installation companies face and ideas of which solutions the industry is coming up with. Four major themes were defined, which are expanded upon in this chapter:

- Contextual challenges
- Communication
- Usage
- Iterative way of working

Contextual challenges

Improving residents' experiences is essential for accelerating the energy transition, but it's important to acknowledge the challenges faced by installation companies in achieving this goal. Structural obstacles are abundant, and there are limited incentives to do well. These challenges may not directly align with the customer journey, but they can create pressure to take shortcuts or view a problem as beyond the designated scope or control, which makes resident experiences less likely to be optimal.

High demand

The demand for installers exceeds the supply, creating a situation with a lack of urgency. This poses a significant challenge in driving change, as one interviewee pointed out:

“There are not more installers than there is work [...]. In other words, the customers who complain may complain, but there will always be another customer to take their place. The urgency to want to change isn't really there. And that's a tricky part of this subject.”
– I6

Subcontracting

Additionally, the timing of installation companies getting employed in the process can be problematic. Sometimes these companies are brought in at later stages, where a lot of decisions have already been made, restricting their ability to be flexible. As one installation professional said:

“For the integrated approach, clients in the field of installation technology are not looking for an installer. They are looking for a construction contracting company, in the tradition that they are capable of effectively addressing [the client's] needs and, in collaboration with other parties, bringing them to a successful conclusion. So, in this case, my client is not the homeowner or property owner but a contractor.” - I3

This means that oftentimes, installers are not hired to think about the integrated approach of improving a residence's sustainability, but only for executing components of a project: the installations itself. In those cases an installer has limited influence on the selection of installations or the communication around it. However, The installer is still the one who comes inside people's homes, and can feel the consequences of residents' frustrations.

This creates a challenging landscape, where issues are not solely attributed to the resident's experience with the installer but influenced by the communication and decision-making of the housing corporation, cooperative, or project contractor in charge. It's a difficult set of circumstances, which makes it hard to deliver an optimal experience for the resident. As one interviewee succinctly expressed, after expanding on an area they

want to improve on:

“We have already tried so many things. [...] And if you ask me now, what should be better? It can always be better. But at a certain point, it’s also just human work.” - I3

Different processes and clients

Furthermore, different ownership structures demand tailored approaches. For instance, while one interviewee’s company (I1) achieved a remarkable acceptance rate of 97% with renters in a housing corporation, they faced persistent difficulties which resulted in so far not managing to successfully accomplish doing a project within a homeowners’ association (HOA) setting. Two of the participants also emphasized that while many lessons could be learned from each project, one size does not fit all, and it was important to not make assumptions.

*“One neighbourhood is not the same as another neighbourhood, one city is not the same as another city. That’s another thing you have to get used to and learn to deal with.”
The interviewees also had different processes based on the type of technology they provided, the type of client or sales process, or the size of the corporation. For each of these processes, it can be assumed that there should be different interventions to the business process for an optimal resident experience.” - I3*

Resident resistance

One situation that brings additional challenges beyond a traditional sales process, is providing installations for a collective of residents. For example, with the renovation of an apartment complex for a housing corporation, not all residents might want the renovation or feel like they are benefiting from it. This is inevitably consequential for the resident’s experience and can impact cooperation. As one interviewee explained:

“Often the renovation benefits the housing corporation or the real estate corporation, but not always the resident. That can happen too. Those are the kinds of things that are darn difficult to explain. From the resident’s perspective: What does it actually give me, then? [...] A critical resident who simply doesn’t have the money, who doesn’t benefit from it, and whose home he sees becoming less free, they might make things difficult. But they can’t when you have that 70%, then they have to comply. That can also lead to social problems within an apartment building. - I3

In this case it can be imagined that principles like facilitating choice wherever possible, taking feedback into account, and choosing less restrictive installations can be beneficial.

Strategic shift

With these challenges, low urgency, and it being hard to make improvements, a company really needs to commit to prioritising the resident’s experience to improve it. Otherwise, it will invariably take a backseat to other, more immediate factors. As mentioned in the previous section, even when a company provides a subpar or unsatisfactory experience, there will always be a new customer to fill the void. Nonetheless, making a strategic decision can offer long-term viability, as highlighted by one of the interviewees:

“Fortunately, there are exceptions, parties that set up resident collectives for design sessions. In the last 5-8 years, it is gradually finding more ground. Some developers have also ventured into it, and some have since stepped back. “Wow, it takes so much time, and they have so many questions, and...” But I dare say, I am convinced that those parties who do it have a greater right to exist in the long-term.” - I6

Another strategic direction companies can be thinking about one of the companies was making was to become a trusted chain partner on energy transition projects. In such an

approach, he highlighted the need for a shift from an effort-based project proposition to a results-oriented one.

“When you promise to achieve a certain percentage of savings, it should not remain just a promise; you have to deliver on it. If you have the persuasion to convince a client or a property owner that you are capable of providing a specific improvement in operational costs, energy savings, and CO2 reduction and you can substantiate it, then you are in. And for that, knowledge is essential. Not everyone possesses this knowledge, especially not the comprehensive knowledge. Additionally, put bluntly, it takes the courage to follow through and declare that you’re not offering a project but a result [...]. What you need is the right strategic choice, and a roadmap for getting there. It all starts with a sound strategic vision. - I3

In the case of such an approach, a company would have more influence over the entirety of the process, instead of just being one link in it. This wouldn't improve the resident experience by itself, but it does give companies a greater ability to influence the resident's experience.

Product offering

Lastly, while the product offering is currently limited, it's a dynamic landscape with ongoing changes. Staying attuned to these changes can be challenging for companies. However, keeping pace with these developments is vital to remain at the forefront of the industry. It's necessary for companies to allocate attention to identifying products that are user-friendly and easily comprehensible for residents, minimizing the need for extensive manuals or guidance. As one interviewee elaborated:

“I can imagine that when a manufacturer is developing a Heat Recovery Unit (WTW), they do research on how to design a panel that a future user will use or understand. I think that's important because you see, for example, that kits are being created that people receive at home to better insulate their homes. However, most people don't know what to do with it. So that product sits at home, not being used. And it's the same with a panel of the Heat Recovery Unit (WTW) that I mentioned. If I don't understand what it does, I won't use it.” - A1

Communication

Communication was one of the aspects that came up in almost every interview, as either a fundamental challenge or a key factor in a good resident interaction. The different aspects are highlighted below. The importance of communication shows up in all phases of the customer journey, but primarily the orientation phase, choosing a solution phase, and handover phase.

Building trust

The orientation phase at the outset of the renovation process poses significant challenges for installation companies. During this phase, companies invest time and effort in assessing residences, providing information and education, and building trust. This can be a time-intensive phase.

For example, about a HOA information evening, one participant had to say:

“The most perfect situation is that you have brought a team together on such an evening that all questions can be answered correctly. Sometimes questions are not answered quite accurately, or a nonsense answer is given, which makes people doubt that the execution will be good. So, you really need to be very clear and spot on with your information provision at such moments, and we don’t always succeed at that.” – I3

Furthermore, with such renovations concerning a whole apartment complex, two participants mentioned employing coffee table conversations, which are a large time investment that is not guaranteed to pay off. However, building this trust was crucial to the projects they did.

“That first conversation is, looking back, mostly about building trust. Just giving it a face, hearing the pain. Listening to what’s going on in that building, where the fears lie. [...] And, I think for a certain target audience, it works when they simply feel that there is someone who is involved in their neighborhood and surroundings, and that simply builds trust that problems will actually be resolved.” – I1

For those two participants, the resident-contact intensive approach was only possible because of government subsidies. One mentioned that it would be a necessity for them to find a way to streamline the process in future projects. However, they also mentioned that doing it for an initial ‘proof of concept’ project gave them an advantage for future projects.

“Now we have more knowledge and experience, and more evidence, which makes it easier to have a conversation with someone for the first time. It’s really a process of gaining trust. To make it more efficient, we might need fewer conversations with residents, and we have to delegate more of that back to the housing corporation in consultation.” - I1

However, being an independent third party could be beneficial in situations where there’s bad blood between the resident and the housing corporation.

Discovering needs

Another benefit to coffee table conversations that came up is discovering hidden or undiscovered needs from residents. Seemingly small factors can be crucial to getting the required approval rating (I1), or making the a sale (I2).

For a project with an older resident population, providing moving and preparation assistance helped take away one of the big fears that residents had. Another example was offering a new oven on top of the usual replacement induction pans, as they discovered



this had major importance in cooking for the majority cultural background of the residents.

However, this is also useful when talking to private homeowners, where knowing their situation, needs and budget was crucial to informing them on the right information. A very straightforward example, when residents are planning to move in a few years, they might be less interested in the most luxurious option.

And lastly, when underlying needs are not discovered, it can also cause problems even if a sale is made. For example, choosing the wrong installation solution because fundamental needs were overlooked or underestimated can result in residents that are unhappy with the chosen installation itself, like unpleasant airflow through a ventilation system. One interviewee who consults in the industry, expressed a critical perspective on the current industry's approach to this aspect.

“How installers work now, it’s too much about pushing their products. Whether from their preferred suppliers, based on their knowledge, or grounded in how they historically grew and were trained. There are obstructive beliefs there about how things should be. This results in a lack of good communication with customers. It’s related to heating, ventilation, sustainability, but when you see how customer inquiries are met, it’s very one-dimensional.” - I6

This can either result in the aforementioned fundamental mismatch between resident and installation, or frustration because residents feel they haven't been adequately informed about what to expect.

Communicating complexity

One of the ongoing challenges is how to explain complex installations in a way that the resident is able to understand it. Multiple participants mentioned that often, technicians overestimated how much detail to go into when explaining the difference between installation options, or the installation that residents were getting. As one participant put it:

“What I noticed is that many of the residents, senior residents in this case in particular, weren’t really interested in what we were going to do. I could explain to them about installing a heat pump, but it all boiled down to the fact that they knew that at the end of the day, they had hot water from their tap, and functioning heating.” - I1

Other interviews confirmed this sentiment. One owner had resolved this issue by hiring employees from other fields.

I believe that you should hire people who can interact well with others. So, I have hired many people from the fashion industry. Because, yes, we can talk about a very technical detail on the window frame, but that doesn’t interest the consumer. It just has to be of good quality, so you can dive into the technical aspects, but what matters is that you are well-informed. It’s about asking the right questions.” – I4

So finding an effective way to communicate the difference between options and technologies, and focusing on which aspects of that are most important to residents, can be hugely beneficial. And hiring creatively can also alleviate the difficulty of finding people on a stressed job market.

Informing the resident

Another aspect of communication is how to inform the resident well about what is going to happen. Sometimes, this is a shared responsibility with the client, for example a housing corporation.



“Usually, the client starts with certain sustainability measures, through portfolio management. Then they start warming people up a bit for what they’re going to do. Sometimes they might just ask people, do you want this option or that one? But that doesn’t happen often.” - I3

He details that this is just the preparation:

“When it comes to implementation, it gets harder because you can’t just tell people what’s going to happen and what the benefits are. You also need to tell them what pain they have to go through to eventually get a home with those benefits.



They might have to be out of their homes for three days. They might have to go to a hotel. They might be in unbearable noise. Parts of their houses might be demolished, which they don’t want. It’s a difficult task.”

Making sure that people know why they’re going through the difficulties, what the benefits will be, helps. Additionally, sustainable renovations often come with other necessary maintenance, which can make this easier. To minimize problems, it’s also possible to deploy a project consultant, as one participant explained:

Sometimes we deploy a project consultant, who really goes door-to-door, and explains what will happen in a residence. They also assess which furniture or alterations in those homes obstruct the project’s progress in that residence. That’s also resolved on a case-by-case basis with the residents because otherwise, people might be scared by generic information, thinking they suddenly have to change everything or that an adjustment is required. It’s better to be specific and have someone, either in-house or hired externally. In cases where it’s more complex or varied between residences, you receive a detailed plan for each one.” - I3

Maximally utilize appointments

To accomplish all these objectives, maximizing the utility of appointments, can be helpful. For example, measurement sessions can be leveraged for various objectives. Not only to collect measurements and assess existing installations but also to establish trust and convey your commitment to the task at hand.

Usage

One participant (I1) mentioned one of the biggest challenges being to get residents to actually use the installations correctly so satisfaction stays high. This was supplemented by other interviewees, showing the following aspects.



Ease of use

One interviewee detailed their own experience as a resident moving into one of the newly delivered homes with a heat recovery ventilation (HRV), and mentioned that learning how to use it was not intuitive to them, while the manual was many tens of pages long. Another interviewee also made the point:



“There is one thing I would like to emphasize in favor of the installers because, ultimately, they can only sell what is offered. So it’s not just about the installers; they are also limited or hindered by the products they can sell.” - I6

Usage explanation

Explaining to the resident how to use their new installations is another factor in making sure they use them correctly. This can be supported by creating an accessible manual, in easily understandable formats such as instructional videos. As one of the interviewees put it:



That’s also a development. At the beginning, you just do the work, and then you finish it and close the door behind you. But if you introduce new installation technology somewhere, you also have to explain to the residents how it works, right? Provide behavioral instructions, offer follow-up, leave something behind that they can read, and things like that, really pure resident information about usage and benefits. Yes, that is important. [...]

We didn’t do that in the beginning. We were a bit, well, a bit clueless. But you have to take people with you. Not only in the pre-project phase but also when it’s completed. Most importantly you need someone in-house who demonstrates it. You really have to say, “You have to use these buttons; when you do this, it means that,” and then calmly explain.” - I3

Coaching

Another avenue to provide support was monitoring of use. In one case, when residents had a higher usage than expected, they could get lifestyle intervention coaching. Another company mentioned that they would like to have continued usage insights, but because of GDPR regulations they were not able to see such data. However, in such a case, agreements may have to be made with the energy provider or the housing provider.



“First we wrote home user manuals for them, and afterwards an energy coach visited the residents. In May, there will be another visit from an energy coach for residents whose consumption exceeds their energy bundles.” - I1

Usage reminders

From a property owner’s perspective, an additional focus was on lifestyle interventions to promote energy efficiency. This approach involved assisting residents in identifying high-energy-consuming devices within their homes, a facet often overlooked by residents. Additionally, sending timely reminders, such as notifications about adjusting thermostat settings during temperature drops, played another role. An consideration is whether the need for these interventions could be replaced by the integration of a smart thermostat capable of offering similar recommendations, further enhancing energy-conscious living.

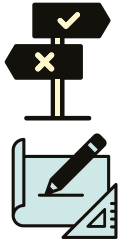


Iterative way of working

An additional element in creating a good installation concept that fit the resident well, was taking an iterative approach to working. This was highlighted mostly by a company that provided an innovative integrated renovation solution for apartment complexes, who emphasised a few aspects.

Incorporating resident feedback

The company in question initiated their process by developing an installation concept. During this phase, they actively engaged residents through meetings, obtaining feedback on the installation concept. Then, they proceeded to create a concept apartment, wherein further interaction with residents led to new crucial insights. These insights were subsequently integrated into the final design concept, underscoring the iterative and resident-centric nature of their development process.



In both cases, the feedback did not come up in earlier stages of the process, or residents' requests even seemed to advice designing the opposite. For the first example:

“It’s a very straightforward example. In the existing flat, the balcony door opened outward, and the balconies were quite small, so we had redesigned it initially to allow the new balcony to open inward, like a window. And it could also be tilted, so it was easier in terms of air sealing. It would create more space on the balconies because a common request was that the balconies were small.

From the subsequent conversations and residents’ meetings, it emerged that almost no one wanted the balcony door to open inward for this project. Because resident 1 had a chair there, and resident 2 had a TV there, you know. So, based on these discussions, design adjustments were made.” - I1

For the second phase, he explained:

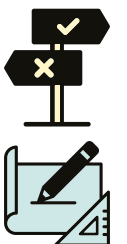
“We created a model apartment during this time. All residents were invited to see it, and based on feedback from that model apartment, there were further design adjustments. [...] After the feedback round and observing the apartment, it was clear that the adjustment could be implemented quite easily and had very little impact [on the installation process].

So we made several iterative steps where we received feedback from residents and where they felt they were part of the decision-making process for their homes. I think the art is to give residents freedom where that freedom is possible, especially in a situation involving renters.” - I1

Design around freedom of choice

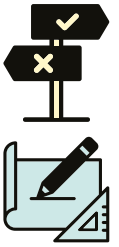
This brought up another aspect: designing for freedom of choice, which was not only beneficial for private homeowners, but also important to give more choice to renters, who otherwise might not get much input (I1):

“The design aspect is quite challenging. We try to design for choice, particularly for the private market. We’re exploring the idea of offering a menu of options within a basic renovation that meets the required standards. For example, residents can choose to keep their existing radiators or replace them with more efficient ones that offer better heat distribution. This choice can improve efficiency and potentially pay for itself over the next 5 or 10 years. Residents can decide based on how long they plan to stay. By giving them some control over what they receive, they don’t feel like it’s an all-or-nothing proposition.”



Another had the following to say on the topic:

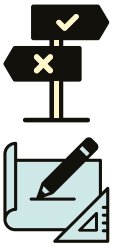
“And to, to make it very specific, I believe that a resident should always be able to open their windows. I think that’s still a kind of choice that you can’t take away from them. Maybe the energy efficiency of your system might not be as good, but I do think it’s important that they have that choice.” - A1



Data-supported decision making

Related to the iterative design approach, the company that spoke about their use of a model apartment, mentioned that it facilitated more a more data driven design approach, which made explaining design choices to residents easier as well as making more founded decisions.

“In the model apartment, we installed two types of sunshades, and the data clearly showed that the external sunshade was cheaper, with a lower investment, and resulted in a temperature reduction of 4-5 degrees inside. So, the choice was quite obvious, and there was no debate about it.



If you can ensure that you move away from subjective discussions and instead focus on data-driven or at least data-supported decisions and choices, everything becomes very explainable, and you can communicate openly and transparently. I think people can always sense whether that is happening or not.” - I1

05 Ideation

This chapter defines the starting design goal, along with an exploration of two essential design inspirations that significantly contribute to the ideation of the eventual design concept.

Key takeaways

- The established design concept is formulated as follows: *“To invite installation companies to integrate resident feedback into their design phase, fostering a more iterative approach.”*
- To effectively achieve this objective, the design should present an appealing vision for change within installation companies.
- Moreover, it should actively encourage user interaction, transcending mere passive information transfer.

05.01 Design goal

After the interviews, the original research question was reframed into the following design goal:

Invite installation companies to integrate resident feedback into their design phase, fostering a more iterative approach

First, the nature of insights gathered from the interviews played a pivotal role. These interviews, conducted as part of the exploratory research, encompassed a diverse range of perspectives and roles within the installation industry. Participants included founders or leaders of both small and large installation companies, consultants holding leadership positions in the field, and various stakeholders operating within the industry's context. Therefore there was less detail

Secondly, interactions with students and academics from the IDE (Industrial Design Engineering) faculty, who were engaged in different aspects of the energy transition and focused on enhancing residents' experiences throughout this transformation, contributed significantly to shaping this design goal. During these discussions, a noticeable gap became evident between the design approaches adopted by installation companies and the preferences of design professionals. This gap occasionally led to frustration on both sides when attempting to collaborate effectively.

From the perspective of design professionals, they expressed a desire for installation companies to engage in more iterative design processes. They felt that resident feedback had limited influence on the design concepts developed by installation companies, resulting in unfavorable resident experiences. These negative experiences often stemmed from a misalignment between the residents' needs and their ability to adapt to the realized renovation concepts and products. For instance, residents perceived the location and type of ventilation as drafty, leading them to open windows for fresh air, which compromised the promised energy efficiency.

Another example was the utilization of a model residence at a stage where it was challenging to incorporate meaningful feedback from residents into the design process. At this point, making substantial changes to the renovation concept or products became impractical due to the advanced project stage.

Lastly, one installation company's decision to use heavy, difficult-to-access filters stemmed from the assumption that "residents wouldn't change the filter anyway." However, had the filters been more accessible, intuitive, and prominently displayed the need for replacement, even a modest percentage of residents managing filter replacement themselves would have significantly reduced maintenance demands for the company.

From the perspective of installation companies, they did not perceive the benefits of the designers' approach, viewing the suggested changes as processes that would unnecessarily prolong project timelines.

Taking these considerations into account, an opportunity emerged to bridge the gap in perception through design. The goal was to outline a vision of how installation companies could adapt their processes within a more idealized design framework. Importantly, this approach recognized that installation companies are experts in their own process, and the objective was to stimulate new possibilities for process improvement. This approach would allow installation companies to decide which changes were most relevant to their specific situations, fostering flexibility and adaptability within their practices.

05.02 Design characteristics

An ideation session (see figure 8) was held to determine the character of the concept. This resulted in guiding principles for the vision.

Form

- Non judgemental
- Recognizable
- Clearly structured storyline
- Zooms in- and out in level of detail
- Leaves out unnecessary detail
- Leaves room for the user's imagination
- Combines text and visual
- Uses the appropriate terminology
- Promote on relevant channels

Goal

- To inspire imagination
- To inform
- To inspire reflection

Ways to achieve the goal

- Showing the possibilities
- Give examples from practice
- Showcase multiple sides of the subject
- Remove perceived barriers
- Highlight (hidden) benefits
- Highlight relevance by playing into personal perspective and experiences
- Lead by example
- Be honest about gaps in knowledge
- Work together with professionals from the field
- Be open to feedback



Figure 8: Ideation process

05.03 Target group

The target audience for this design is installation professionals who aspire to initiate organizational change but may lack a clear starting point. They are:

- Employed within a small, medium-sized, or rapidly growing installation company.
- Holds leadership positions within their respective organizations, indicating decision-making authority or responsibility.
- Is interested in improving their company's process / way of working

While the design may benefit installation professionals beyond this defined target group, it serves as a focal point and initial focus for the design process. By centering the design around these individuals, it provides a strategic starting point for addressing the complexities of organizational change within the installation industry.

05.04 Design cycles

The initial design cycle revolved around presenting a compelling and inviting vision for change. It aimed to answer questions like: How can we effectively communicate this vision? How can we make it convincing and engaging? While this cycle generated diverse ideas, they primarily remained descriptive and didn't encourage much user input. Consequently, it became evident that a second design cycle was necessary to address this limitation.

The second design cycle centered on the challenge of presenting a vision in a way that encourages user interaction and input. Two main sources of inspiration guided this phase.

First, the 'Smart Start' project by IDEO (IDEO, 2023) emphasized the importance of co-creating a new narrative with the subject to drive behavior change. As noted by Sadeghian (2021), the transformative power lies in the process of crafting a narrative rather than the narrative itself. This process, if engaging, personal, and involving, can lead to a commitment to shape a different reality. This insight inspired my approach for this project, leading me to explore the use of questions to foster user engagement.

The second source of inspiration influenced the format of the concept. Wanting to inspire interaction with the product, I drew inspiration from "Wreck this Journal" by Keri Smith (Libris, 2023), a book that encourages interaction by posing unconventional questions and inviting users to engage actively. My design seeks to inspire similar interaction from readers.



Figure 9: IDEO's smart start project (IDEO, 2023)



Figure 10: Keri Smith's 'Wreck this Journal' - (Libris, 2023)

06 Concept

This chapter introduces the design concept with a delineated structure, featuring detailed elaboration on certain pages. Towards the conclusion, insights gathered from the validation stage are provided as valuable input for subsequent ideation.

Key takeaways

- The design concept is a booklet that should invite the user to interact with it, relate the topics in it onto their own business process, and invite reflection.
- From validation sessions, the importance of the concept being easily shareable by users is highlighted.

06.01 Design goal

The goal of the design is to stimulate installation professionals to interact earlier and more with customers to the benefit of their process.

Given that this can span the entire customer journey, the booklet is structured along the steps of the customer's journey, concluding with a strategic chapter and an invitation for reflection. It serves as a resource for businesses seeking to enhance their operations and achieve more favorable results by considering adjustments across the entire customer experience.

By:

- Giving tools to start reflection on the business process
- Giving tools to start internal conversations
- Showcasing best practices of resident interaction incorporated into the business process improving outcomes
- Emphasizing benefits to resident interaction

Whilst:

- Leaving room for the professional's expertise and preferences on a more detailed / technical level

06.02 Use scenario

- You are a senior manager in an installation company grappling with the following questions: You have the feeling your company could take a more innovative approach, and you've noticed numerous areas within your processes that could be significantly improved.
- While browsing online (on platforms like LinkedIn, or a industry website), you come across a post highlighting the power of resident feedback in innovating your installation company's approach.
- Intrigued, you click on the post, which leads you to a booklet that promises to guide you in the right direction.
- With the intention of taking a longer moment of reflection, you keep the booklet at your home on the coffee table, or on your office desk, occasionally flipping through it to stimulate your thought process.
- After you've had time to let the ideas sink in and get your own thought process started, you feel motivated to use the booklet as a tool to initiate a dialogue within your organization.
- Following this, you are encouraged to create an action plan and select one intervention to kickstart improvements.
- You decide to start with one chosen intervention, paving the way for a potential transformation within your company.

06.03 Design

The structure of the design is as follows:

- Introduction
- The steps of the customer journey
- Strategy chapter
- Invitation to reflect
- Invitation to discuss

In the following pages, I go through each of these chapters and note down key ideas & points that will appear in the design. Some of the pages will be more detailed to give an idea of what the full version would look like.

Maak bij een conceptwoning ruimte om je inzichten in het installatieconcept te verwerken

“

We hebben een proefwoning gemaakt, en vanuit die proefwoning zijn ook meer ontwerp aanpassingen geweest.

Bijvoorbeeld heel simpel: Er zat eigenlijk een rinkel boven het raam, dat we hadden een draai kiep raam, met airco's aan de buitenzijde, maar toch hadden de bewoners er behoefte aan dat er een rolgordijn strook op het raam kon worden geplaatst, en daar was geen ruimte meer voor.

Nu die feedbackende en die conceptwoning, dan kan een rinkel voor het rolgordijn vrij eenvoudig ook geïmplementeerd kan worden, dat heeft heel weinig effect.

Dus, zo zie je wel dat er iteratief een paar stappen zijn gemaakt waar je feedback ontvangt van bewoners, en zij ook het gevoel krijgen dat ze onderdeel zijn van. De besluitvorming van hun woning of hoe het eruit gaat zien. En ik denk dat de kunst is om de bewoners die vrijheid te geven op de plekken waar dat kan, zeker in een situatie waar het om huurders gaat. Binnen de kaders van technische en financiële haalbaarheid.

installatiebureau dat een iteratief renovatieconcept ontwikkelt met betrouwbare langjarige

”

Heb jij hier ruimte voor in je bedrijfsproces? Zou je extra ruimte kunnen maken?

Wat zou het je kunnen opleveren?

Hogere acceptatie bij draagvlak meting	Bewoner voelt zich serieus genomen	Minder faalkosten
Vertrouwen van de bewoner	Bewoners werken mee gedurende renovatie	Fijner werksfeer voor je installateur

Kies samen voor de juiste oplossing - Zie het gesprek met de bewoner als een kans om erachter te komen welke behoeften er zijn

De vraag die erbij jou wordt neergelegd, bijvoorbeeld "Ik heb een nieuwe CV ketel nodig", is soms een uiting van de onderliggende emotie: Angst, onzekerheid. Die kan een andere oplossing hebben. Zoals een onderhoudscontract.

Er zijn veel verschillende redenen die mensen kunnen hebben om te willen verduurzamen. De grootste drijfveren om een keuze te maken zijn:

- Wooncomfort
- Hogere kwaliteit levensomstandigheden
- Kostenbesparing

Maar andere drijfveren kunnen zijn:

- Visuele verbetering van het huis
- Gevoel van zekerheid
- Status

Introduction

As you delve into these pages, the intention is to spark reflection. How are we currently operating, and how can we revolutionize our approach? The path to progress often begins with self-examination and critical thinking, taking the first step towards reshaping your company's process.

Orientation

A section dedicated to the orientation phase that addresses several key points. First, it acknowledges the inherent challenges faced by both residents and installation companies during this critical phase, as it demands a significant investment of time and effort from the company.

Secondly, it emphasizes the importance of this step, as without a good orientation for the resident, the project cannot proceed.

Benefits of committing to a thorough orientation phase

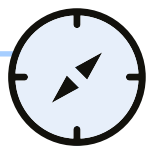
- 1. Higher Conversion Rate:** When you invest the time to build trust and understand the needs of the residents, you're more likely to secure their commitment. This translates to a higher conversion rate, as more residents will be inclined to move forward with the project.
- 2. Smoother Project Execution and Cooperative Residents:** When residents trust the process and the installer, the project tends to run more smoothly. Cooperative residents who are willing to collaborate and actively participate can make the installation process easier and more efficient.
- 3. Addressing Resident Fears:** Taking the time to engage with residents provides an opportunity to uncover and address underlying concerns or fears they may have. These fears can often be easily resolved. By listening to residents and addressing their apprehensions, you reassure them that their concerns are taken seriously.

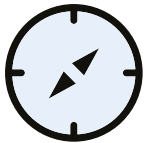
The fact that this is such an important but time-consuming step also creates opportunities for creativity and innovative problem-solving. For example:

Idea

Unburden the installer

Can you internally establish a project to ease the burden on your installers during the orientation phase? Since installers are in high demand, if you can hire individuals from other fields who possess the right communication skills, you can kill two birds with one stone. For example, something like Plieger Group has set up with hoomie (hoomie, 2023). Alternatively, you can consider outsourcing this service to a third-party provider.





Example page

Kies samen voor de juiste oplossing -
Zie het gesprek met de bewoner als
een kans om erachter te komen welke
behoeften er zijn

De vraag die erbij jou wordt neergelegd, bijvoorbeeld "Ik heb een nieuwe CV ketel nodig", is soms een uiting van de onderliggende emotie: Angst, onzekerheid. Die kan een andere oplossing hebben. Zoals een onderhoudscontract.

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- Wooncomfort
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- Kostenbesparing

Maar andere drijfveren kunnen zijn:

- Visuele verbetering van het huis
- Gevoel van zekerheid
- Status

“

Hoe heb jij dit opgelost?

Afb. 1: Een koppel thuis. De een zegt tegen de ander:

Afb. 2: De partner gaat met de buurman praten:

Afb. 3: Partner belt de installateur en zegt:

Ik vind het maar niks met die ketel, ik vind het eng met gas, kan jij zorgen dat er een andere komt?

We hebben een nieuwe CV ketel nodig

wordt vertaald naar

Wat is de motivatie om een nieuwe CV ketel te willen?

Afb 4. De bewoner en de installateur die een goed gesprek hebben

Hoe wonen jullie?

Ga het goede gesprek aan. Met als doel om bewoners inzicht te geven door voorbeelden aan te reiken. Door goede vragen kan de bewoner zelf tot dat inzicht komen. En des te sterker is dan uiteindelijk ook de referentie naar dat merk, naar dat bedrijf, want ja, ik ben goed geïnformeerd. Ik vroeg om een CV-ketel, en uiteindelijk heb ik een onderhoudscontract. Bij wijze van spreken.

”

Managing director en CRE executive met brede ervaring in vastgoed-, facility- en projectmanagement.



Example page

Verwerk input uit de bewonersgesprekken in je concept

Als je open staat voor verrassingen, kun je erachter komen dat bewoners aspecten belangrijk vinden die je niet had kunnen voorspellen. Als je ruimte maakt in je proces om deze inzichten te verwerken, dan kan dit het verschil zijn tussen een project dat wel doorgaat of een project dat niet doorgaat.

“

In de bestaande flat was het zo dat de balkon deur naar buiten draaide. De balkons waren vrij klein, dus wij hadden in eerste instantie bedacht om de nieuwe balkondeur net als een raam naar binnen toe te laten draaien. Dan kon hij ook in een kiepstand, dus dat was luchtdichting technisch makkelijker. En het zou meer ruimte op de balkons opleveren, want een veelvoorkomende verzoek was dat die balkons klein waren.

Vanuit de gesprekken en bewonersavonden kwam toen naar voren dat ze bijna het hele project niet wilden als de balkon deur naar binnen zouden draaien. Want de een had daar een stoel staan en de ander had daar de TV. Dus vanuit die gesprekken zijn er wel komen er wel ontwerp-aanpassingen voort.”

installatiebedrijf dat een innovatief renovatieconcept aanbiedt voor bestaande hoogbouw

Heb jij hier ruimte voor in je bedrijfsproces? Zou je extra ruimte kunnen maken?

Wat zou het je kunnen opleveren?



Hogere acceptatie bij draagvlak meting



Bewoner voelt zich serieus genomen



Vertrouwen van de bewoner



Bewoners werken mee gedurende renovatie



Fijnere werksfeer voor je installateur

Choosing a solution

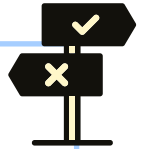
Residents often find it challenging to make a decision on which sustainability measures to take, given the significant financial investment and the uncertainties involved.

Idea

Simplify offering

Simplifying your offerings can save you time in explanation and prevent residents from becoming overwhelmed by choices. It's crucial to convey information in a way that residents can easily comprehend. They are often less interested in the technical or in-depth explanations, and more interested in what the consequences are of choosing one system over the other.

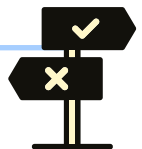
Consider conducting a small experiment with a small group of residents to gather feedback on your product offerings. Try this approach, and assess if residents find the product offering more understandable after.



Idea

Offer flexibility

When making a quotation, if the resident understands what each aspect means they can make more informed choices on which measures to take first, and understand how your offer compares to that of the competition.

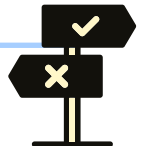


Idea

Consider less traditional solutions in challenging housing situations

For example, in historically significant city centers the renovation of buildings poses a substantial challenge for the industry. In such cases, conventional insulation may be prohibited due to the historical nature of the structures, necessitating alternative approaches. Internal insulation could be a viable solution, although it often comes at the cost of losing valuable living space, which can be quite expensive in these areas, often valued at €10,000 per square meter.

To address this, necessary but minimal insulation can be combined with alternative heating methods, such as infrared (IR) heating combined with hot water. This can be achieved through different means, including the use of a boiler or a secondary heater. With this approach, warm water is readily available in both the kitchen and bathroom, complemented by infrared panels, offering an efficient and cost-effective solution to the unique challenges posed by these historic homes.



Preparation for installation activities

A good preparation can make the whole project run much smoother. More time invested here can pay off enormously. For example, employing a concept home in a stage where decisions are still flexible, can prevent a whole apartment building to be outfitted with ventilation which residents perceive as unpleasant, either because of the type of installation or the location of installation. This can cause residents to open the window when they want fresh air, losing the promised energy savings.

Benefits of good preparation

1. Project runs smoother, less delays
2. Technology gets tested
3. Problems found before mass installation, less unexpected costs for rework
4. Proper use of installations by residents

Idea

Ensure thorough preparation

"I believe the key to success in the projects we've undertaken lies in the fact that the responsible project manager visits each resident and property before any construction begins. They create a checklist and a tailored plan for each home, allowing residents to get to know them. During certain stages of the project, residents can approach them, as there's a consultation period in place for asking questions. For each property, a detailed plan is established, and the project manager is well-informed, having built trust. I take pride in the fact that time is dedicated to the project manager, even after working hours, to approach and build trust with the people who will be affected. This approach significantly enhances how smooth a project runs."



Idea

Check the accessibility in advance

Use an accessibility checklist to check the design in advance. Are all the displays in an easy to reach place? Will the buttons be easy to read by elderly residents? Test the logic of the design with 5-6 residents, using 3D modeling and virtual reality to catch what residents might stumble over.



Idea

Utilize the concept home as a testing ground to make data-driven choices

"We've made many decisions based on data, which makes them demonstrable. In the case of the trial home, we installed two types of sunshades, and the data clearly indicated that exterior sunshades not only involved a lower investment but also resulted in a temperature reduction of 4-5 degrees. This made the choice straightforward, eliminating any room for debate. By steering away from subjective discussions and focusing on data-driven or data-supported decisions and choices, you can ensure clarity and transparency in your communication. People tend to sense whether actions are based on data or not, making it a more trustworthy approach"





Example page

Maak bij een conceptwoning ruimte om je inzichten in het installatieconcept te verwerken

“

We hebben een proefwoning gemaakt, en vanuit die proefwoning zijn ook weer ontwerp aanpassingen geweest.

Bijvoorbeeld heel simpel: Er zat eigenlijk een richel boven het raam, dus we hadden een draai kiep raam, met screens aan de buitenzijde, maar toch hadden de bewoners er behoefte aan dat er een rolgordijn strak op het raam kon worden geplaatst, en daar was geen ruimte meer voor.

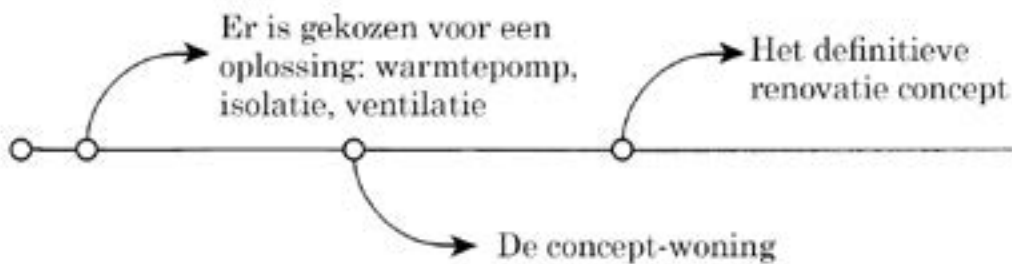
Na die feedbackronde en die conceptwoning, dan kan een richel voor het rolgordijn vrij eenvoudig ook geïmplementeerd kan worden, dat heeft heel weinig effect.

Dus, zo zie je wel dat er iteratief een paar stappen zijn gemaakt waar je feedback ontvangt van bewoners, en zij ook het gevoel krijgen dat ze onderdeel zijn van. De besluitvorming van hun woning of hoe het eruit gaat zien. En ik denk dat de kunst is om de bewoners die vrijheid te geven op de plekken waar dat kan, zeker in in een situatie waar het om huurders gaat. Binnen de kaders van technische en financiële haalbaarheid.

”

installatiebedrijf dat een innovatief renovatieconcept aanbiedt voor bestaande hoogbouw

Heb jij hier ruimte voor in je bedrijfsproces? Zou je extra ruimte kunnen maken?

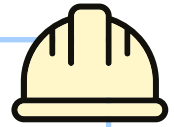


Wat zou het je kunnen opleveren?



Installation activities

Residents often find it challenging to make a decision on which sustainability measures to take, given the significant financial investment and the uncertainties involved.



Idea

Evaluate projects actionably

Evaluate projects on: How they went, what could go better next time, and what would make the biggest impact to improve for the next project. Your installation workers may have interesting insights in this regard. You can determine the impact on the resident's experience, and the biggest impact for yourself. Reach out to the residents for feedback, or employ an unbiased agency to help you determine where you could improve your process.

"It's essential to evaluate a project to identify areas for improvement and carry those lessons into the next one. In essence, you should aim to make each project better than the one before. However, don't assume going into the next project that everything will be the same. You have to adapt and learn to deal with the unique characteristics of neighbourhood or city. What works in Amsterdam may not necessarily work in Rotterdam, so it's a process of adjustment and adaptation."

Benefits of good evaluation

1. Fewer repeated, preventable mistakes
2. Insights from the renovation get registered so you can make them actionable, and less knowledge is wasted
3. Eventually you will be able to show prospective clients data on how you manage to do projects on time, with high resident satisfaction

Handover

The handover phase presents an opportunity to ensure that residents fully comprehend the installation and utilize it effectively, so that you have to spend less time later receiving calls and complaints, or time to send an installer back because the resident thinks the installation is not working properly



Idea

Make video's on how to use the installations that residents can watch back

The more accessible it is for residents to re-watch a video of how to control their new installations, the higher the chance that they use it properly.



Idea

Take the opportunity to evaluate

identify common issues that previously required follow-up visits to residents or situations where residents failed to achieve the calculated reduction. Which of these cases could potentially be prevented through a more comprehensive explanation during the handover?



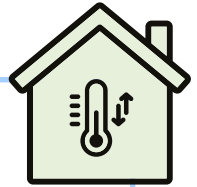
Idea

Send someone well-suited to do the handover

It's essential that this explanation is conducted by someone skilled at conveying how residents should operate and maintain the installations, emphasizing the reasons behind it, without delving too deep into technical intricacies. This approach ensures a smoother post-installation experience for residents and minimizes the need for subsequent interventions.

Living within warranty

After the handover, the challenge is to ensure that the installations are put to use.



Idea

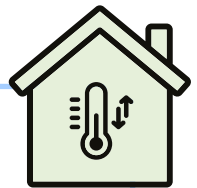
Continue gathering feedback after the installation

"The greatest challenge comes after everything is implemented, ensuring that residents actually use the system to maintain high satisfaction levels.

We recently introduced a system with a room thermostat displaying the temperature in each room, which represented a significant investment. Surprisingly, we received feedback that many residents found it difficult to understand. This puzzles me because it's just a screen displaying the temperature, which, in my opinion, should be simpler than a radiator knob with numbers from 1 to 5. Nevertheless, we're addressing this issue. Because it doesn't improve resident satisfaction, and we need to reduce the cost of our product to scale our sustainability efforts.

Benefits of continuing to gather feedback

1. You gain the ability to continuously evaluate your installation concept. What works well, what doesn't? Where can costs be lowered, or where might a higher investment result in less hours fixing complaints?
2. You don't need to do this with *all* residents in a building. Do you not evaluate the use at the moment? Then even calling 10 residents for feedback can give surprising insights



Idea

Challenge limiting beliefs

In the case of a ventilation unit, filter replacements often fall under the responsibility of the resident. However, past experiences may have led to the belief that residents are unlikely to fulfill this duty.

This perspective can be restricting. What if, through thoughtful design, filters become easily accessible, their status visible from outside through a display or indicator light, and residents receive timely reminders for replacement? Moreover, could the system be equipped to monitor whether a filter has been replaced or not?

By enhancing the resident replacement rate of filters, raising it from 5% to 50%, you can significantly reduce the workload of your installers and prevent system malfunctions.

Living outside warranty

Living outside of warranty means that technically, the installations are no longer within your responsibility. However, there are still a few measures that can be taken to ensure their longevity, and residents' continued satisfaction



Idea

Stay updated with product developments and focus on user-friendly products

"With developments like the current AI hype, product development cycles are now significantly shorter than ever before, placing us firmly in the steep part of the industrial revolution curve. The ultimate course of this curve remains uncertain, but it will undoubtedly impact the availability and delivery of products to consumers. Therefore, it's essential to pay attention to user-friendly products and their adaptability in this evolving landscape."

Strategic shift

Putting the resident's experiences first can certainly be challenging. But it can also give you a strategic edge in the long run, as well as a better work environment for your installer. What is your strategic priority at the moment? Where would you like it to be?

"Fortunately, there are parties that set up resident collectives for design sessions. In the last 5-8 years, it is gradually finding more ground. Some developers have also ventured into it and since stepped back. "Wow, it takes so much time, and they have so many questions, and..." But I dare say, I am convinced that those parties who do it have a greater right to exist in the long-term." - I7



(Centrum voor Woononderzoek, 2023)

Reflect

Now it's up to you to decide, which of these ideas could be valuable for you?

Exercise

- Go through the booklet. What are the top three most beneficial interventions for your company, in your opinion?
- Engage in discussions with others within your organization to gather their perspective. Do they agree?
- Seek input from your installers, what are their thoughts on how the most significant impact can be achieved and what potential issues could be prevented?

Exercise

- Choose three interventions that you want to start with
- Which is easiest to start with? Which is most impactful? What changes would you need to make in your process to do them?
- Do you have the resources to start? Do you need someone to manage the changes?
- Make a plan: where would you begin?

06.04 Validation & recommendations

To validate and refine the concept, two feedback rounds were conducted. The first involved a professional deeply engaged in the installation sector with a strong focus on the orientation & choosing a solution phases of the customer journey, while the second round featured one of the initial interviewees. Valuable insights and feedback emerged from these sessions, which can be incorporated into redesigns:

- The level of abstraction in the recommendations was deemed suitable, and yet underscored that recommendations should be exceptionally concrete, with a cautionary note about the conservative nature of the construction and installation industry.
- Emphasizing the need for information to be presented in bite-size chunks of information to facilitate easy sharing, for example by presenting easily photocopyable pages for discussion and incorporation into company presentations.
- Defining the target audience to include management, responsible parties, commerce, business development, and marketing communication. Encouragement was also given to stimulate interaction with executing installers who have the closest contact with residents.
- Exploring the possibility of joining platforms like gideonstribenl.com/ to enhance outreach and engagement.

07 Conclusion & recommendations

This thesis delved into the value that the Customer Journey can bring to a sustainable renovation installation companies, along with the challenges associated with integrating it into the business process. The exploration involved a review of resident pain points in scientific and professional literature, outlining a conventional customer journey.

The findings highlighted avoidable challenges in the resident experience during sustainable renovations. By advocating a shift from an exclusive focus on initial phases to a more holistic approach, the thesis proposes that installation companies can mitigate failure costs and enhance overall satisfaction.

Expert interviews revealed the challenging operational environment for installation companies, and it became evident that, while not necessarily due to a lack of will, strategic thinking about the type of experience they aim to deliver is crucial for future relevance. Designers and design researchers could play a pivotal role in researching how to communicate the necessity of a more innovative iterative approach and provide guidance.

The final design presented in this thesis explores a way to assist companies in improvement. The initial exploration shows promise, indicating potential for further development both on further developing the design concept, or on the research side.

Suggestions for Product Development:

1. Further develop the product, testing the most effective way to reach and assist different stakeholders within a company, identifying the most effective means to stimulate internal sharing to gain widespread acceptance.

Suggestions for Future Research:

1. Conduct a case study at one or more companies to gain deeper insight into the specific challenges of incorporating a customer journey into the business process. This approach could provide more specific learnings about the obstacles companies face when implementing a customer journey.
2. Dive into a specific section of the customer journey and explore innovative approaches beyond the suggestions made in this project. Envision the characteristics of the installation company of 2050.
3. Or focus on one aspect of a more innovative approach. What are the best practices of incorporating a model residence into a company's business process?

08 Reflection

Reflecting on this thesis, my mind is prone to wander into all the possible directions this project could have gone in, contemplating what could have been approached differently or explored more profoundly. Despite my inclination to be critical, I find pride in the contribution this thesis makes to current research, hopeful that it will serve as a foundation for further study in this domain.

One aspect I've realized again during this project is the significance of a multidisciplinary team, which suits me much better than a solitary project. Acknowledging our predisposition to devise solutions aligned with our skills, I made conscious efforts to minimize and reflect on my biases throughout. Nevertheless, the final solution inevitably is affected them. The concept of 'design thinking' itself sometimes project a notion that designers assert the universal applicability of a design approach to every field.

This realization became apparent during collaborative brainstorming sessions with professionals from unrelated fields, offering external perspectives on my methods and solutions. However, as a designer with a focus on graphic design and visualization within the context of Industrial Design Engineering, the outcome inevitably leans towards my personal strengths and interests. I am intrigued to observe what alternative solutions might emerge from a similar design brief in the hands of someone else.

A co-creation approach might have yielded a different design solution, but the constraints of this project, coupled with the challenges inherent in graduation, directed me towards a more research-centric approach. This methodology, while delving deep into understanding the context of the problem through interviews, may unintentionally convey the final design as an imposed vision from a designer, rather than one that feels realistic and inviting to installation professionals. To mitigate this, further iterations involving close collaboration with installation professionals would be desirable.

On a similar note, my interviews primarily involved individuals in higher positions within installation companies or professionals advising them. Working with a different target group could shift the focus from strategic ideas to practical, on-the-ground solutions. The possibilities in each project are endless.

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10 Appendix

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

! USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".

Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name van Esch
 initials PMR given name Pip
 student number 4397789
 street & no. _____
 zipcode & city _____
 country _____
 phone _____
 email _____

Your master programme (only select the options that apply to you):

IDE master(s): IPD Dfl SPD

2nd non-IDE master: _____

individual programme: _____ (give date of approval)

honours programme: Honours Programme Master

specialisation / annotation: Medisign

Tech. in Sustainable Design

Entrepreneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair Stella Boess dept. / section: HCD

** mentor Matthijs Buijs dept. / section: DOS

2nd mentor _____

organisation: _____

city: _____ country: _____

comments
(optional)

⋮

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Stella Boess date - - signature _____

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC

YES all 1st year master courses passed

Of which, taking the conditional requirements into account, can be part of the exam programme _____ EC

NO missing 1st year master courses are:

List of electives obtained before the third semester without approval of the BoE

name _____ date - - signature _____

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: APPROVED NOT APPROVED

Procedure: APPROVED NOT APPROVED

comments

name _____ date - - signature _____

Integrating the CJM into the business journey of installation companies project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 27 - 03 - 2023 02 - 10 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The energy transition is one of the major challenges in moving towards a more sustainable society. In 2019 the Dutch government committed itself to the discontinuation of natural gas by 2050, of which household gas use is a large part. In the Netherlands, this means that 7 million household gas connections (klimaataakkoord.nl, 2022) will have to be replaced by a renewable alternative. And to meet the government's goals this needs to be done at considerable pace.

A big challenge for homeowners is that the possibilities and potential solutions depend wholly on the individual situation of the homeowner. This makes it hard for them to get an overview and make decisions, and requires a tailor-made approach for each household. Additionally, converting a house for the energy transition requires behavioural change from residents, which can lead to discontent when expectations are not managed from the start. For an overview of the process a resident goes through to get to a natural gas free residence, see image 1.

An installation company can play a crucial role in helping solve this, which is being recognized in the industry. Increased customer demands make that installers must be able to work more and more flexibly and communicate empathetically (Samenwerkingsorganisatie Beroepsonderwijs Bedrijfsleven, 2020). Or, as D. Terpstra, chairman of Techniek Nederland, expanded on in an interview (Westerlaken, 2023):

"[The installer of the future] can unburden the business client and consumer: from advice and execution of the work to management and maintenance. You already see installation companies taking over the entire energy chain from customers. They provide advice, install the systems, take care of maintenance and purchase energy. In short: The installation sector will really make a difference in the coming years in the transition to CO₂-neutral buildings and homes."

It is challenging for companies to meet this changing demand, and the building and installation sector is a particularly challenging sector. Costs are high, and errors have a large impact on consumers' living environment.

A recent report shows that while customer satisfaction is improving for the third year in a row, it still has the lowest score of all sectors in the Netherlands (Integron, 2023). Consumers specifically mention unburdening and customer-centricity as areas of improvement (see image 2)(Integron, 2022).

Performing well can therefore really make a company stand out from its competitors. One of the tools often used to get insight into how to improve customer centricity is the creation of a customer journey map. However, the customer journey map is just a first step. Equally important as the tool itself must be the way it is used. Experience shows that the way in which different companies implement the same tool can vary a lot, resulting in very different outcomes.

Research comparing 4 companies' approaches to Zero Energy renovations (Boess, 2022) illustrates this. While the renovation strategy of some construction companies looked similar, using a model dwelling to get feedback from residents, the execution and incorporation of feedback and ideas led to significantly different outcomes in ease of use of the final dwelling for residents, and how well the final installation fit into their daily lives.

To understand how installation companies can get the most value out of their customer journey map, I will look at how different businesses integrate it into their business process, and the downsides and benefits of their approach.

space available for images / figures on next page

introduction (continued): space for images

Klantreis aardgasvrij wonen

TNO innovation for life

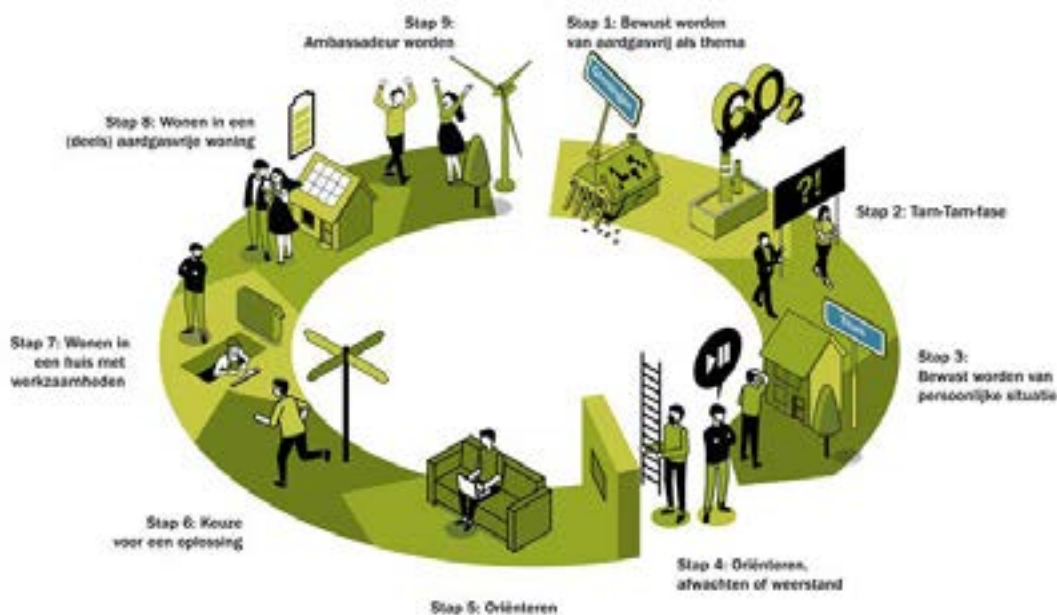


image / figure 1: Journey for residents' transition to a natural-gas free residence, TNO rapport (Koning, 2020)

Customer journey bouw en installatie: ontzorgen en klantgerichtheid concrete verbeterpunten



image / figure 2: Customer experience binnen de bouw en installatie 2022. Integron B.V. (Integron 2022)

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

This project aims to understand the different ways in which installation companies can integrate a Customer Journey Map (CJM) into their business process, and what value it generates for them. An additional point of interest is the benefits for the end consumer.

Scope:

I will look at the integration of the CJM into the business process of a company, not into the design of the CJM itself. A lot of research into CJMs focuses on how to create a CJM, or what the benefits of using a CJM are. However, less of the research focuses on how to effectively use a customer journey map, or how to integrate its findings into their business process. That is not to say that there is no research into this area, nevertheless, practice shows that many companies still experience difficulties in doing so.

A focus on business process comes from the example of the study mentioned earlier (Boess, 2022). It shows that the same strategy for implementation (using model dwellings for residents' input) can lead to different outcomes, depending on the way that strategy is executed and which activities are undertaken to bring it to completion. Therefore, I'm interested to look at the underlying process that produces the different results, rather than the overarching strategy.

The target group is Zero Energy Installation companies. They could play a great role in easing difficulties in the energy transition, while sometimes being hard to convince of the value of applying a design perspective to improve outcomes (Boess, 2022). Therefore, communicating the insights from the project in a way that they can gain value from, will be an additional goal in itself.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

This project aims to understand the different ways in which zero energy installation companies can integrate a CJM into their business process, and what value it generates for them.

As an outcome, I will generate actionable insights and design a framework/tool for companies looking to integrate more customer centricity practices into their business process.

The assignment consists of two parts: research & design. The results from the research phase will be: actionable insights that show what has been learned about the different approaches that companies have taken to integrate a CJM into their business process. These insights should address which considerations go into taking a particular approach, the benefits & value it could bring, and which pitfalls to look out for. Additionally, they should be written in a way that is actionable for installation companies to improve their business processes.

The results from the design phase will be a framework/tool. A framework could show the different stages/mindsets that companies are in and come up with an intervention based on those. Or it could show the different stakeholders within the company, and the kind of roles/responsibilities they can take, as well as which arguments/implementations will be most worthwhile from their perspective. A tool could look like many things, for example: - A 'how-to' guide for business managers of installation companies, - A 'do's and don'ts list', - A workshop/seminar.

Since determining what kind of solution is most desirable cannot be done without fully understanding the situation first, this will be determined and reframed after the research phase.

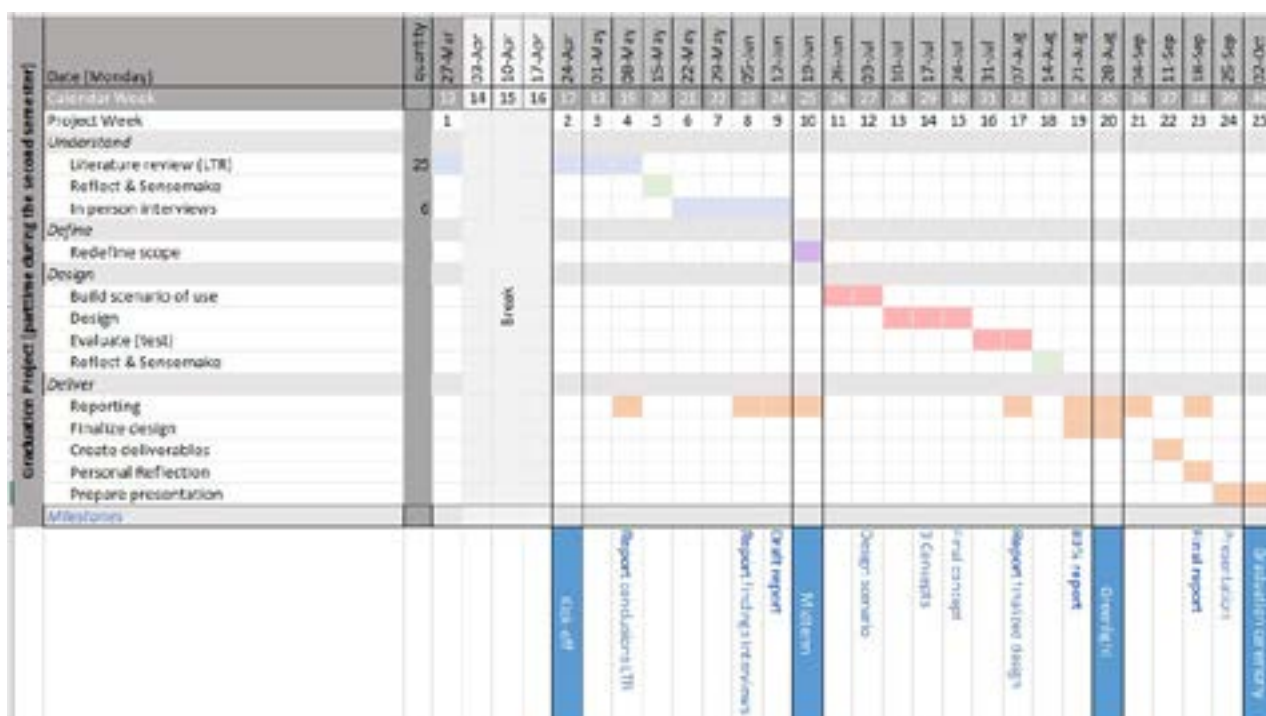
Finally, to test whether the tool really fits the needs of the target group, the final concept will be evaluated with potential end users, and improved accordingly.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

 start date 27 - 3 - 2023
2 - 10 - 2023

end date



Due to a part-time job I will do the project 4 days a week. Therefore, 100 workdays will be spread over 25 weeks.

The approach follows a traditional double-diamond method, split into 4 steps:

1. Understand
 - o Literature research:
 - Map out the current knowledge on CJM and business process improvement.
 - Report: Identification of gaps & direction of interviews
 - o Reflect & sensemake
 - o Qualitative interviews with installation companies to discover the different shapes integration of the CJM into the business process looks like in practice, and the value of those different approaches.
 - Conduct interviews, transcribe, analyze
 - Report: Present insights from interviews & translate into design directions.
2. Define
 - o Redefine scope: Translate design directions & insights into Design Proposal
3. Design
 - o Building scenario of use
 - o Design
 - o Evaluate with target group & stakeholders.
 - o Reflect & sensemake
4. Deliver
 - o Work on finalizing design, report & creation of final deliverables.

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

The reason I chose the SPD Masters is that I've been more interested in learning how design is used to solve complex problems than in designing products. In other words, I've found 'design thinking' more intriguing than product design. This makes the energy transition a fascinating problem to me. It is a societal issue that we all have to deal with, sometimes overwhelming in its complexity and hard to grasp. However, it also has many opportunities for change through the utilization of design solutions.

In the interest of not letting the complexity overwhelm me, I have set up a project that has clear boundaries, focusing on researching a specific issue. Understanding the business process of green installation companies, seeing how they currently use Customer Journey Maps, and what value it brings them.

In this subject, a couple of aspects come together:

- Research. During 'SPD research' I researched how the collaboration between IDE and the aviation industry came to be. This was done through qualitative interviews and thematic analysis. I would like to use these methods again and expand my experience.
- The importance of learning how a company adopts tools. Since 2019 I've worked in a strategic consultancy, and further developed my skills in research, communicating complex concepts visually, and tailoring communication for different audiences. However, I've also seen that making a strategy or tool is only the beginning, and the adoption process of that tool is the next part of the challenge.
- Communication. Through SPD I've learned the importance of learning the motivations and concerns of the different stakeholders, which information is important to them, and how it can be communicated. I think that approaching the benefits of CJMs from an industry perspective instead of a design perspective will be a valuable perspective to learn as a SPD'er.

This translates into the following main ambitions:

- Furthering my experience in qualitative research
- Developing an outcome that is convincing to industry professionals.

Boess, S. (2022). Let's Get Sociotechnical: A Design Perspective on Zero Energy Renovations. *Urban Planning*, 7(2), 97-107. doi:<https://doi.org/10.17645/up.v7i2.5107>

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<https://www.integron.nl/kennis-en-nieuws/klantbeleving/serviceniveau-bouw-en-installatiebranche-steeds-beter-op-peil/>

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FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Samenwerkingsorganisatie Beroepsonderwijs Bedrijfsleven (SBB). (2020). Trendrapport Techniek en gebouwde omgeving. Zoetermeer: Beroepsonderwijs Bedrijfsleven.

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