

Renovating with Residents

A more inclusive process to help residents shape the sustainable renovation of their apartments

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Summary

It's beneficial to involve residents in the design of the renovation plans of their own homes. This leads to more energy efficient, healthy and comfortable homes due to the removal of mismatches between the resident and their home. It also results in an easier approval process thanks to the increased ownership and a more fair process.

I propose a set of five interventions to accomplish this:

1. a survey session to understand current mismatches, hopes and worries
2. a printed renovation guide explaining the changes to the residents' experiences
3. a tour of a demo apartment focussed on experiencing the new installations
4. a co-creation session together with residents and the renovating party
5. and the communication of the resulting changes.

This should solve mismatches which might otherwise remain because the plans ignore existing issues. It also prevents extra mismatches where the new installations do not match the behaviour of the residents.

These interventions are designed based on research in the context of a renovation in Reigersbos (Amsterdam) for the Energie Lab Zuidoost. I interviewed and observed residents in a demo apartment, on the street and in their homes, sometimes aided by prototypes or ethnographic probes. I combined those findings with theory from literature and insights from experts I interviewed.

The resulting knowledge contributes to our understanding of apartment mismatches and communication surrounding sustainable renovations. The interventions fill a gap of concrete tools to involve residents. Together, it helps us in making these kinds of renovations more inclusive and, through that, making the energy transition more fair and sustainable.

Introduction

You are now reading a report which documents my graduation project. Between February and August 2021, I worked on including residents in a renovation process, to complete my master's degree in Design for Interaction at the [TU Delft](#) (Delft University of Technology). I was part of [Energie Lab Zuidooost](#), a collaboration of [Gemeente Amsterdam](#) (the City of Amsterdam), [AMS Institute](#), [TU Delft](#), [Hogeschool van Amsterdam](#) (Amsterdam University of Applied Sciences) and [Universiteit van Amsterdam](#) (University of Amsterdam), which aims to bring together research, companies, public organisations and residents in the energy transition in Amsterdam Zuidooost. The project was also part of the [Inclusive Design Lab](#), which is one of the Delft Design Labs and aims to make our designs more inclusive.

I developed five interventions based on my research around the renovation of 280 apartments in Reigersbos, a neighbourhood in Amsterdam Zuidooost. The apartments are spread over 10 buildings and include a mix of home owners, private tenants and tenants of Stadgenoot, a housing association. The condominium associations (*Vereniging(en) van Eigenaars*, *VvE(s)*), municipality, Stadgenoot, Klimaatmissie (a renovating party), and Stichting !WOON (an association which supports home owners and tenants

in Amsterdam) work together on improving the apartments and phasing out natural gas.

In the following sections, you can get a quick overview of my design, its aim, implementation and my process ([Design](#)); read about the context of the energy transition and this renovation ([Context](#)); understand what mismatches exist between the residents and their apartments and how they might arise ([Mismatches](#)); see my insights about involving residents in a renovation process ([Participation](#)); dive into a detailed description of my approach to this project including the scientific methods ([Approach](#)); and discover how this contributes to inclusive renovations, what the next steps should be and how I look back on this process ([Conclusion](#)).

Problem and opportunity



Resident involvement is lacking

Traditional sustainable renovation approaches exclude residents from the redesign of their own homes (Breukers, 2014). This means knowledge about the behaviour of residents, social knowledge, is missing. However, involving residents and their expertise about their homes and their own behaviour has multiple benefits.

Benefits

1. Primarily, it reduces the amount of mismatches between the residents and their renovated homes ([Mismatches](#)), which leads to more predictable and lower energy consumption (Guerra-Santin et al., 2017), improved health, and more comfort (van Vliet & de Feijter, 2017; Sasha, 2018). This, in turn, leads to three kinds of benefits:
 - a. the reduced energy consumption and improved health and comfort are direct benefits for the residents ([Figure 2](#)),
 - b. stakeholders like the housing association need to spend less on handling complaints and on maintenance, also because residents will be more willing to adopt their behaviour to match their new homes (van Vliet & de Feijter, 2017), and
 - c. the lower energy consumption leads to a more sustainable built environment, which is beneficial to everyone ([5 Global](#)).

Figure 1: The end result of a renovation can become more comfortable, but residents' knowledge is crucial.

2. When it is clear what design decisions are made, ghost stories are prevented. By also showing how residents' experiences influenced the plans, a shared story among the residents is created. In the renovation process, this means it becomes easier to get the legally required approval from residents (Itten et al., 2021; van der Bol & van der Arend, 2007).
3. Lastly, involving residents in the renovation of their own home is the fair and just thing to do (Bianchin & Heylighen, 2018; Sasha, 2018). Doing this on the small scale of a renovation, makes the energy transition more fair and inclusive, too.

Room for tools

Resident participation is already mandatory for housing associations (Hoppe & Lulofs, 2008) and Verenigingen van Eigenaars (VvE) (Glumac, Reuvekamp, Han, & Schaefer, 2013), but the extent can be limited (such as only being able to choose the color of new window frames [M. Rijlaarsdam, personal communication, June 4, 2021], or even just being able to say 'yes' or 'no') and gaining permission from enough residents can be a hassle (Hoppe & Lulofs, 2008). Earlier research has led to advice on how to shape participation (Glumac, Reuvekamp, Han, & Schaefer, 2013; Breukers, 2014), but there seems to be room for more concrete tools to involve residents in the design of renovation plans (Boess, 2020). My design fills part of this gap by providing additional tools to include residents in the renovation process.

Practices (behaviour)
→ comfort, health, efficiency, etc.

=

Material (apartment & installations)
Technical

+

Competences & skills
Social

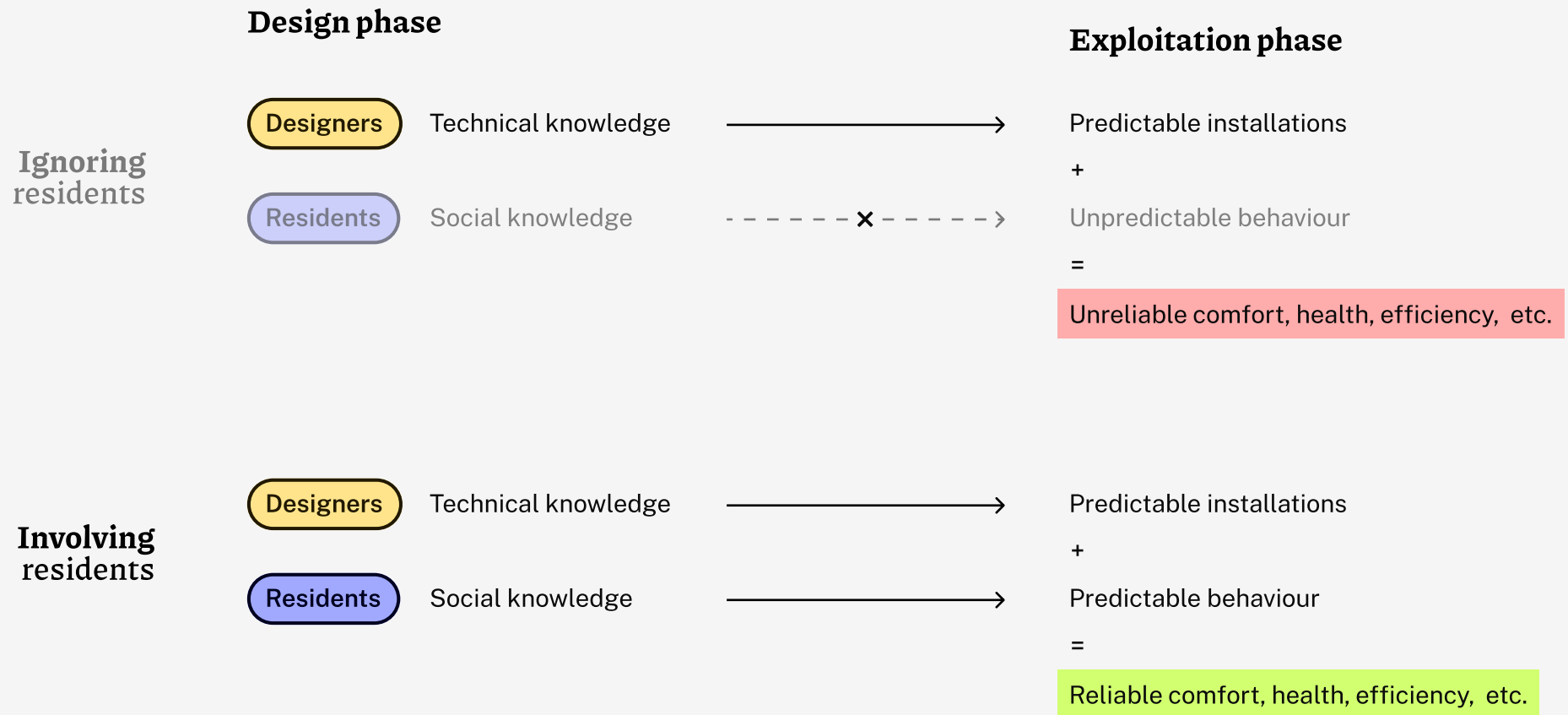
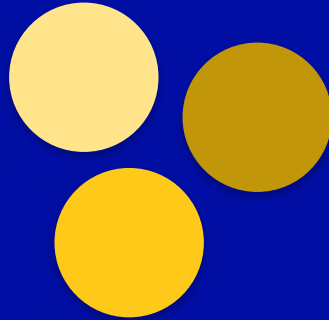


Figure 2: Residents have knowledge about their behaviour: the social knowledge (opposing technical knowledge) about their own competences and meaning. Without putting it to use, the desired renovation results are unreliable and might not be achieved.

1



Survey session

Meeting with all residents and main stakeholders to talk about the project and get a problem overview.

2



Renovation guide

Provide information about the planned changes on paper in a visual and simple format.

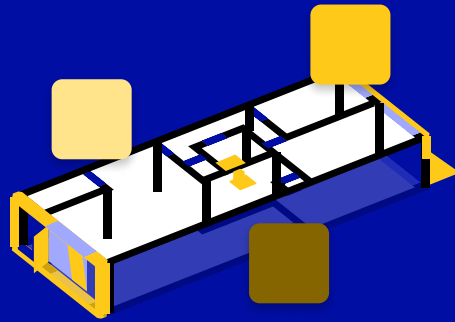
3



Experience tour

Guide residents through the demo apartment while they see and experience the changes.

4



Co-creation session

Use the residents' knowledge to improve the plans and prevent mismatches in the apartments.

5



Result communication

Communicate back to the residents and other participants what has changed in the plans.

Section 1

Design

Residents need to be involved in the design of sustainable renovations of their homes. I propose five interventions in the renovation process to achieve this. It starts with surveying a diverse group of residents to understand the current problems. The plans are then presented with simple, visual and change-based information in print, so residents know better what the plans mean. Afterwards, they experience the proposed changes in a demo apartment. Their feedback is then integrated in a co-creation session with the main stakeholders and finally the results are communicated back. Those interventions require work and are not the silver bullet for renovations, but they are a step in the right direction to make sustainable renovations more inclusive.

1. Interventions

In this section, I describe the interventions. The rest of this report supports my design decisions by providing context, explaining how mismatches are sustained or created, and describing my approach.

1.1 Context

The five sequential interventions help to evaluate and improve renovation plans. They are created in the context of the renovation of 280 apartments in Reigersbos ([Figure 3](#)), but can be implemented in similar (sustainable) renovation processes.

1.2 Overview

[Figure 4](#) shows a renovation process, which includes Klimaatmissie as the designing party and Stichting !WOON as an association which supports tenants and home owners in Amsterdam. Thanks to the interventions, both home owners and tenants are involved in creating the renovation plans.

1.3 1. Survey session

The first intervention focusses on uncovering the current issues in the shape of one or multiple meetings with diverse groups of residents. On its own, that already helps to solve more of the right mismatches with the renovation, and to create a shared story among residents about what is necessary ([17.3 Involvement from the beginning](#)). That improves the acceptance of the end result later on (Itten et al., 2021; van der Bol & van der Arend, 2007). It also feeds into the next intervention with quotes for the renovation guide.



Figure 3: A view of Reigersbos.

1.4 2. Renovation guide

After making an initial design, the renovation guide helps residents understand what the proposed changes mean for them. This makes the residents more trusting of the process ([16 Communication](#)), but more importantly, it allows them to formulate more relevant feedback on the plans. This feedback can be voiced through existing channels (like asking questions during the demo apartment tour, email, or condominium association meetings), but it is even more valuable when combined with the the co-creation session. In [2 Renovation guide](#), I explain more about the design of the renovation guide.

1.5 3. Demo apartment tour

Currently, residents learn about the plans, finances and upcoming process during a tour of the demo apartment. They can ask questions, which helps the residents to understand the plans better ([16 Communication](#)). However, the tour can only take up a limited amount of time, due to a limited budget and planning. This means residents can pay little attention to experiencing the apartment. So, the tour is valuable, but can be improved upon.

With the renovation guide, the resident already has a basic understanding of the plans. This means the tour guide has to present less information, which opens up the possibility for residents to do three things:

- Asking clarifying questions, just as they would otherwise.
- Have conversations with the technical experts and neighbours, which can lead to new and deeper questions.
- Seeing, feeling and experiencing the changes and trying out the actions which are explained in the guide. For example, they should be able to try turning up the ventilation or changing the temperature.

These three actions will help residents to check whether they have understood the renovation guide correctly. Together with the richer experience of the apartment, this allows them to formulate even more (concrete) opinions and feedback.

1.6 4. Co-creation session

The newly formed opinions, fears and hopes concerning the renovation should be used to improve the plans. During a co-creation session, the residents can then do that together with the architect and suppliers, incorporating technical and social knowledge. These meetings can also involve landlords and the housing association to create more buy-in from those decision making parties. The integration of social knowledge in this step helps remove mismatches from the final design.

As an example, the session could consist of four steps:

1. *Feedback dump*: The participants note down their tips, tops, worries and fears, similar to the approach described by Boess, Silvester, de Wal, & de Wal (2018). The notes in the renovation guide are a good starting place, but there should also be space for new thoughts. This ensures the perspectives of all participants are voiced — and all participants are open to hear them, too. By having stakeholders like the housing association there, the participants can be more confident in that their feedback is heard and the decisions can be supported from within the organisation by the stakeholder representatives.

“all involved parties, it would be good if they also heard us, because they’re changing our home, (...) we are the ones who need to live in it.” –Resident during [22.4 Second iteration tests](#)

“alle partijen die hiermee te maken hebben, zou handig zijn als ze ook ons horen, want ze veranderen ons huis, (...) wij moeten erin wonen.”

2. *Clustering*: The notes are combined into clusters, by combining notes with a similar message, and the clusters are grouped based on themes such as fresh air and heating. This creates a shared story, because the participants get to know other perspectives on the renovation. Doing these steps in

a group means participants can build upon each other and ‘translate’ statements (e.g. reformulating worries from a resident to the architect, or explaining a technical concept to a resident).

3. *Formulating changes*: Based on the shared story and the clusters, each participant gets to think of changes. It helps to have a representation of the apartment showing the changes (such as a floorplan or even a 3D model) and a mix of existing alternatives and ‘clean slates’ to support different levels of creativity (Sanders & Stappers, 2008). The representation makes it easier to manipulate because it’s tangible.
4. *Picking changes*: Participants present their proposals shortly and then pick the most important and liked changes through discussion. By having the architect or other people with technical know-how there, the technological and behavioural knowledge are already integrated in the solutions.

1.7 5. Result communication

Lastly, after working out the technical details, the results of the session should be communicated back to the residents. Things might change in that process, and if there are multiple sessions, the outcomes still have to be combined and adjusted. This update provides them with trustworthy information about the plans and increases their ownership even further.

1.8 Ensuring diversity

It's important that the groups of participants for the survey and co-creation sessions reflect the diversity of the neighbourhood. This will make sure as many different experiences as possible taken into account, which means more social knowledge is used. There are several factors which need attention to include more residents and achieve this diversity.

Location

The session should be organised in the neighbourhood in a location which feels either neutral or as 'owned' by the residents; it's better to meet them in their space (Goodwill, 2020). The accessibility of the location should also match or exceed that of the apartment buildings. For example, if the Reigersbos apartments were wheelchair accessible, the location for the session should be, too.

Time

It will probably be necessary to organise the session at different moments, during working days, in the evening and in the weekend. This allows people with different kinds of schedules to join.

Invitations

The guide acts as an invitation, but might not work for everyone (as I noticed myself, too, during the recruitment for [22.4 Second iteration tests](#)). Email, ringing door bells and local notice boards are other mediums which could help to appeal to more people.

Language

Dutch is a second language for some people, so organising a session in another language like English might be necessary. If people expect they might not be able to follow along, they could be reluctant to go. ([16 Communication](#))

Supplementary options

Aside from the meetings, other mediums like phone calls or email should also be available. Even though the diversity can be stimulated with the mentioned measures, some people might still be uncomfortable with joining or speaking up;

“Not everyone will speak up in a large group, because only if they are really certain, they will say something.” – Resident during [22.4 Second iteration tests](#)

“Niet iedereen staat in een grote groep op, want pas als ze heel zeker zijn zeggen ze iets.”

“People think ‘oh I’m the only one, so let me just stay quiet’” –

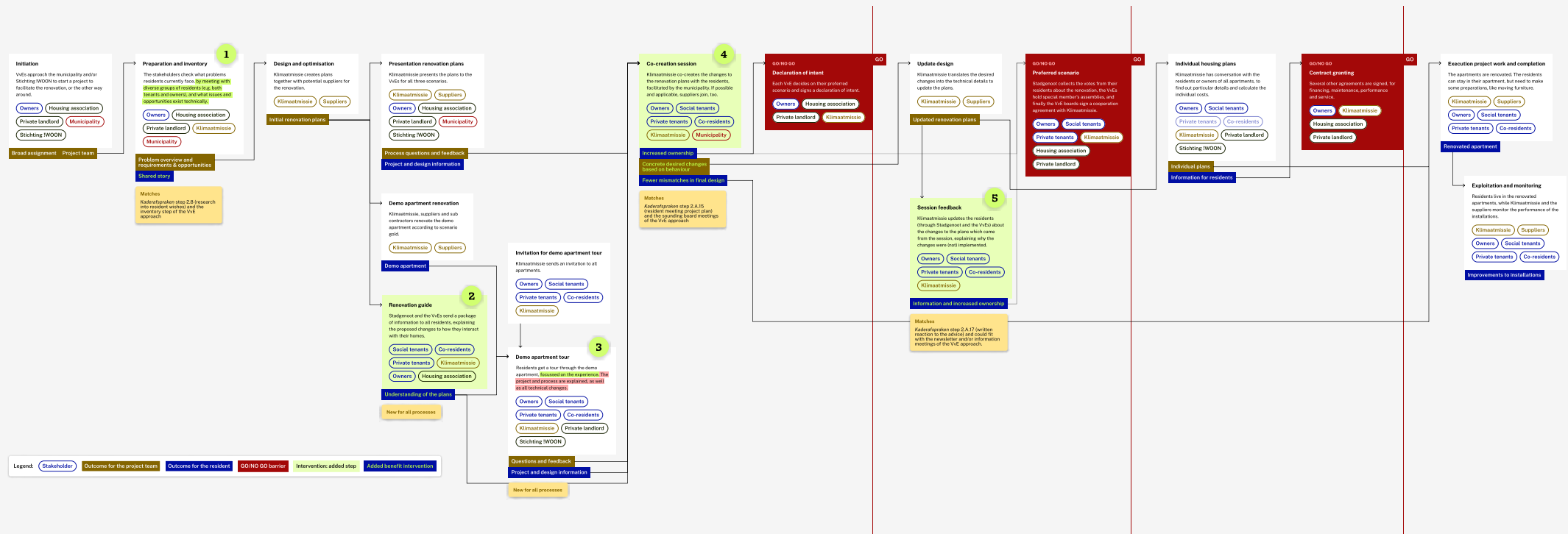
Resident during [22.4 Second iteration tests](#)

“Mensen denken ‘oh ik ben de enige dus laat ik mijn mond maar houden.’”

1.9 Effects

So, all five interventions lead to some benefits, also mirrored in [Figure 4](#). but some of the effects feed into the other steps (such as the quotes from the survey session in the renovation guide, or the more specific feedback from step 2 and 3 in the co-creation session), making the combination of all interventions lead to even greater benefits as described in [Problem and opportunity](#).

Journey with interventions



🔍 Zoom for details

Figure 4: The complete renovation process with my proposed interventions.

2. Renovation guide



The renovation guide explains the expected changes to the residents. The necessary or expected resident behaviour and effects are compared through themes like fresh air, heating and cooking. It allows residents to learn about the plans in their own time ([16 Communication](#)), including those without a technical background, and it facilitates conversations between residents, neighbours and friends about the renovation.

2.1 Existing communication

Compared to the flyers ([9.7 Communication to residents](#)), this guide is not aimed at the VvEs to explain the different scenarios, process and finances, but at all residents to explain the experience of the apartment after the renovation.

2.2 Form

The language, vocabulary, imagery, medium and perspective are chosen to be accessible for people with low literacy (Stichting Lezen en Schrijven, n.d.), (financial) stress (Gebruiker Centraal, 2019a) and/or a lack of technical knowledge ([16 Communication](#)).

2.3 Design details

The next pages show the design details and their argumentation, supported by my [22.3 First iteration tests](#) and (quotes from) [22.4 Second iteration tests](#), also described in [16. Communication](#), unless indicated otherwise. The full guide can be found in appendix I.

Figure 5: The printed renovation guide.

Printed

The guide is a printed booklet accompanied by a letter, for several reasons:

- residents noted that some people don't have a device to visit websites or read email, so the best way to reach them is through postal mail;
- some people do have a smartphone, but experience reading large amounts of information as unpleasant on a small screen, so printed information works better;
- a letter is treated as being more important than a flyer or an email, so people read it more carefully and are more likely to store it;
- a booklet affords storing it in a specific physical location, which allows people to easily retrieve it later on.

However, it would be good to have a digital copy available. That would make the information more accessible to people who use text-to-speech or a translation service.



Frisselucht

Frisselucht is belangrijk voor een fijne omgeving. Het is gezond, helpt je concentreren en het voelt prettig. Bij de renovatie veranderen een paar dingen aan hoe je frisselucht krijgt.

Arrows

The coloured arrows help people understand what is supposed to be happening in the photos.

"I thought it was clear, simple and visual, with those arrows — hot air, cold air, here and there — accessible, that's what I noticed" / "Ik vond 'm duidelijk, simpel en visueel, met die pijltjes—warme lucht, koude lucht, hierlangs en daarlangs—toegankelijk, dat viel me op."

Neutral

The texts are written to be as neutral as possible, to support the feeling that residents should form their own opinion about the plans.

"Then it seems as if everyone should think it's bad now, and better afterwards. And I don't see that at all." / "Dan lijkt het alsof iedereen moet vinden dat het nu niet zo goed is en straks is alles beter. En dat zie ik dus absoluut niet."

Changes

Everything is described as a change instead of just presenting what is new. This allows residents to understand their expected behaviour and installations in their context, as well as validate whether the designer has properly understood the current behaviours. The photos are taken from the same angle as much as possible, to make it easier to compare. If an effect or interaction stays the same while the installation changes, that should also be mentioned, such as the new ventilation still blowing in cold air in winter.

"They can see like 'my house looks like this,' on the one image, and then 'it will look like this,' so that would be useful." / "Ze kunnen dan zien van 'mijn huis ziet er zo uit,' op het ene plaatje, en dan zien ze 'het wordt zo,' dus dat zou handig zijn."



Quotes

Using quotes, current problems and assets from neighbours are shown. This way, the resident knows why things change. It also shows the plans were already made with input from neighbours, which builds trust that their contributions will have an effect. Finally, this allows them to check if there are 'missed' issues, which they experience but are not yet taken into account.

"It's nice to hear other people have those problems, too, so you're not alone." / "Het is wel prettig om te horen dat andere mensen ook dat probleem hebben, dat je niet in je eentje bent."

"Even if someone is angry, angrier than me, they don't have to find this dreadful. They will think 'oh, I have this problem too, so it's known to them' / "Zelfs iemand die boos is, bozer dan ik ben, hoeft dit niet vervelend te vinden. Die denkt 'oja, dit probleem heb ik ook, dit probleem is bij hen bekend.'"

Practice & effect

Renovations are often explained with a focus on the new installations. Here, the changes are explained from their practices and intended effects. For example, instead of 'you get a ventilation box which also measures CO2 levels', it says 'when you cook or shower, the ventilation box will blow in more fresh air'. This matches with the way residents talk about their home. (Visser, 2020; 16 Communication)

Vocabulary

Technical jargon is avoided where possible, and otherwise explained in the context. For example, when explaining you have to replace the filter, it says "the filter prevents smells, dust and pollen from entering your home". (Stichting Lezen en Schrijven, 2020)

Simple & visual

The sentences are kept as short as possible and supported with photos showing specific actions in the context. (Stichting Lezen en Schrijven, 2020)

Conversations

The renovation guide supports neighbours in having a conversation about the renovation. The concrete information helps more knowledgeable neighbours to explain the plans and clear up differences in understanding. Secondly, the description of the behaviour facilitates a conversation about how people use their homes. In turn, that helps to build a shared understanding of the problems residents experience and how it differs between people.

"I would show that package, like this is the way it is, and this is the way it will be. So they can form an image." / "Dat [pakketje] zou ik laten zien, van nu is het zo, en dan wordt het zo. Dan heb je een beeld."

"Ik wilde zonnepanelen. Dat het milieuvriendelijker is, maar ook dat het me wat oplevert qua minder kosten..." – Een buur



"...want hier klappt alles nu open en komt alles naar binnen als het regent." – Een buur

Nu



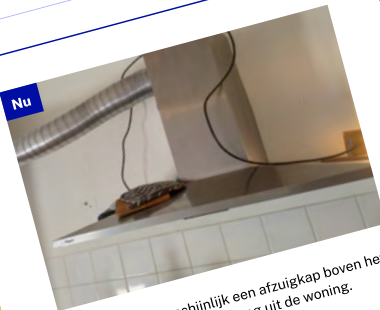
Nu kunnen de ramen op één manier open. Als je het op een kier zet, kan harde wind het open blazen. Soms regent het daardoor ook naar binnen of vallen planten op de vensterbank naar beneden. Sommige burens lossen dit op met een knijper op de vensterbank.

Straks



Straks heeft u draai-kiepramen. Die kunnen 'normaal' open, maar je kunt ze ook 'kiepen'. Daarmee kan het raam op een kier worden gezet. Dingen op de vensterbank voor het raam kunnen bij het kiepen blijven staan.

Nu



Nu hangt er waarschijnlijk een afzuigkap boven het gasstel. Die zuigt de lucht weg uit de woning.

Straks



Room for notes

There is room for notes, to help remember questions and feedback, for during the tour and the co-creation session. This is also afforded by the physical copy.

"I wrote down some things, so I wouldn't forget." / "Ik heb dingen opgeschreven, zodat ik het niet zou vergeten."

Sender

The guide itself is created by Klimaatmissie; they are the stakeholder with the most combined knowledge. However, it should be sent by the direct contact of a resident (the VvE for an owner, Stadgenoot for a tenant), accompanied by a letter explaining the context.

"This seems like something I would send to the residents of our building, on behalf of our board, to inform and prepare them for such a project." / "Dit lijkt op iets wat ik naar de bewoners van dit gebouw namens ons bestuur zou willen sturen om in te lichten en voor te bereiden op zo'n project." - A resident and board member of a VvE

"Stadgenoot, because they are part of it too, and they should keep their tenants up-to-date." / "Stadgenoot, want die zit ook erin, en die moet z'n huurders op de hoogte houden"

Translations

Depending on the demographics of the neighbourhood, a translation in English or other languages should also be provided. The housing association or VvE might already know what language each resident prefers.

"It depends, English doesn't work for them, their own language does, but Dutch only a little bit." / "Dat verschilt, Engels werkt voor hen niet, hun eigen taal wel, Nederlands een beetje."

Context

The letter from Stadgenoot or the VvE explains the relation between the renovation and other projects in the neighbourhood. This helps residents understand the meaning and importance of the guide.

2.4 Aim and benefits

This guide leads to a better understanding of the changes for more residents, which means they can better form an opinion and check if it fits with their own behaviour and needs. Those opinions can then be used during the [1.6 4. Co-creation session](#). Secondly, it serves to invite people to visit the demo apartment, so it's important that they can plan that visit soon after the guides are distributed. Thirdly, it provides trustworthy details about the renovation plans, countering ghost stories and helping when people forget what was said in a conversation or presentation.

“You hear bits and pieces, the one says something while the other says something else, so you're not really sure what's true” – Resident during [22.4 Second iteration tests](#)

“Je hoort stukjes, de een zegt het een, de ander zegt het ander, dus je weet niet zo goed wat waar is.”

“In a conversation, I don't remember the details, I remember the feeling, so I want to retrieve those details later on.” – Resident during [22.4 Second iteration tests](#)

“Ik onthoud in een gesprek ook niet de details, ik onthoud het gevoel, dus die details wil ik later nog ophalen.”

2.5 Other versions

While the printed format is chosen for specific reasons, it does not work for everyone. For example, for people with visual impairments, a digital version is likely to perform better, such as a website built with screen readers in mind. Such a solution might also work better for people who don't speak one of the languages in which the guide is published, since it allows them to use translation tools.

3. Implementation



3.1 Specification

I've defined the renovation guide in quite some detail, but the other interventions are still more loosely defined and as of yet unvalidated. This means those activities should be further developed and tested, but this can happen while implementing it, too. This way, renovation processes already start reaping the benefits, while the tests are more comprehensive and realistic.

3.2 Process changes

These five interventions require the collaboration of multiple stakeholders, each with their own view on the process. Specifically, housing associations, renovating parties such as *Klimaatmissie* and the municipality each have their own documented approach ([10 Process perspectives](#)). This means they need to understand how their own process changes and agree on where the interventions need to happen. Some activities overlap with existing steps in those approaches, while others are a new addition (also shown in [Figure 4](#)).

Survey session

The survey session matches with the resident meetings and inventory of the municipality's VvE approach, and the research into the housing wishes and requirements of the *Amsterdamse Kaderafspraken* (the regulations for housing associations, of which step 2.8 corresponds to this intervention). However, for the latter, this is a more specific approach to this research. For *Klimaatmissie*, there is no standardised and documented way to approach the inventory for these kinds of projects, so in that sense this is a new addition.

Figure 6: The placement of the new facade for the demo apartment (*Klimaatmissie*, 2020).

Renovation guide and experience tour

The renovation guide and demo apartment tour are new for all three of the parties and their processes. However, all approaches involve meetings and conversations about the renovation plans, which are better supported by these new ways of providing the residents with information. This means those meetings have to be planned after the residents have received the guides and had the opportunity to experience the demo apartment.

Co-creation session

The VvE approach already includes sounding board meetings. The co-creation session could be seen as a specific implementation of one of those meetings. It would be a new addition for Klimaatmissie's process. The *kaderafspraken* include a meeting to formulate advice to the housing association (2.A.15) about the 'projectplan'. That concerns both the design plans and a social plan. Separating the two can help to get more rich insights, so the co-creation session could be seen as an alternative implementation of this meeting for the design plans. It's smart to address the worries about planning and finances ([16 Communication](#)) before the co-creation session is held, with that separate social plan meeting.

Result communication

The *kaderafspraken* specify the need for a written reaction to the advice about the *projectplan* (2.A.17), which matches with the result communication. The VvE approach lists a newsletter and information meetings, which both could be used as a way to communicate the results. In the Klimaatmissie process, it is smart to do this before the individual housing plans are made. That way, residents can prepare for the conversation while knowing exactly what the final plans look like.

3.3 Roles

To execute these interventions properly, there are some natural roles, based on what residents expect and need ([17 Improving plans](#)), as well as the skills and knowledge of different parties ([18. Stakeholder activation](#)).

City of Amsterdam

The municipality has knowledge about sustainable renovations (technical, financial and organisational), pushes for environmental sustainability, and is likely to provide subsidies. In their VvE approach, they specifically act as the driving force behind these renovations and provide process managers. As more organisations get experience with these kinds of renovations, their role might start to become smaller. In scenarios with VvEs, however, a process manager is still needed,

since VvE boards are rarely equipped to organise these kinds of processes.

Housing association and VvEs

The housing association, their resident committee and VvE boards act as the commissioning party, care for the communication with their tenants and members (e.g. sending the renovation guide accompanied by their own letter), provide other parties with information about the neighbourhood and existing initiatives and might do extra work to talk with residents about the plans to inform them better and to let worries and questions surface throughout the project.

Renovating party and suppliers

The renovating party creates the design, creates the renovation guide and demo apartment, and integrates the session outcomes. Their suppliers deliver extra information and could help in the co-creation sessions by providing their technical knowledge.

Resident support

A party like !WOON acts as resident support. As one resident said:

“!WOON is there for the tenants, so it’s nice to have someone at your side who has know-how, so you’re not alone opposite the big business” – Resident during [22.4 Second iteration tests](#)

“!WOON is er voor de huurders, dan is het fijn dat er iemand bij is die er verstand van heeft, en dat je er niet alleen staat tegenover de big business.”

3.4 Tuning to context

While documented processes ([10 Process perspectives](#)) are great to have a starting point to organise a renovation, stakeholders might often deviate from them, as is already the case in Reigersbos. This means that the application of the different activities is always context dependent and requires tuning with the different stakeholders.

Additionally, these roles and processes are based on the unique situation of Reigersbos. So, it involves a mix of home owners and (social) tenants, which means both the municipality with their VvE approach can be involved, as well as the housing association. However, the roles can also apply to the scenarios with just tenants or just home owners. In that case, there are just fewer stakeholders.

3.5 Use existing local initiatives

It would be good to collaborate with existing local initiatives, such as Bewoners Reigersbos (a 'resident platform'), the VvEs and resident committees. They can help to pick the right locations, times, renovation guide content, etc. It also creates a link with the residents from the start and makes sure they don't feel ignored ([16 Communication](#)).

3.6 Finances and logistics

Residents tend to worry about the financial and logistical aspects of the renovation ([13 Worries & hopes](#)). This prevents them from thinking about the experience after the renovation. This also applies to some stakeholders, such as the housing associations, who tend to require certainty before making decisions to act, because they fear backlash from residents if things like cost estimates or schedules turn out differently. I can imagine that facilitating residents to calculate their personal costs and communicating transparently about the planning might help, but more research is needed on these topics.

4. Process



This concept is based on my design and research (both research *through* and *for* design [Stappers & Giaccardi, 2015]) over the past few months. I set out with the goal to design an intervention to influence the renovation process and its outcomes with the residents' perspectives, to enable an inclusive and socially and environmentally sustainable renovation of the Reigersbos apartments (appendix A). Throughout the project, this evolved to the goal of including residents in the renovation process, with the benefits mentioned in [Problem and opportunity](#).

I put a lot of focus on inclusion ([20 Inclusion](#)). This meant I tried to ensure a diverse selection of participants and an accessible form for my research activities, paid attention to my privileges and the possible resulting biases and worked on making the renovation process itself more just and fair.

The first part of that process resembled the Discover and Define diamond of the Double Diamond (Design Council, 2019): I did research by interviewing stakeholders, experts and — with the addition of ethnographic probes — residents. Combined with observations and desk research, this led to my design direction. The theoretical approach was based around the concept of practices ([21 Practices](#)) within the home.

The second part of the process consisted of three iterations of a concept in that design direction. In the first two iterations, I created a prototype of the renovation guide to test that and other parts of the concept with residents. In the last iteration, I created a final prototype and created an overview of the interventions to evaluate with Klimaatmissie, Stadgenoot and the City of Amsterdam.

Figure 7: A photo of my notes from my street interviews ([22.4 Second iteration tests](#)).

Overall, this means the interventions are grounded in literature and the design research I did in the context of Reigersbos. The rest of this report explains the context and provides an overview of the problems residents experience in their homes and with renovation processes. In the section [Approach](#), I have documented my research and design activities, what theoretical frameworks and methods I used, and why.

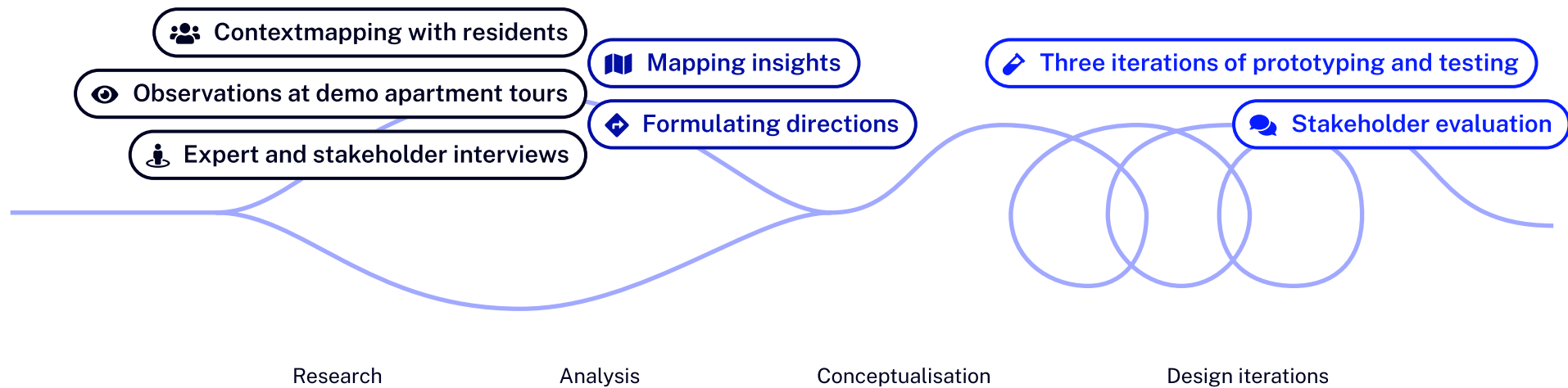
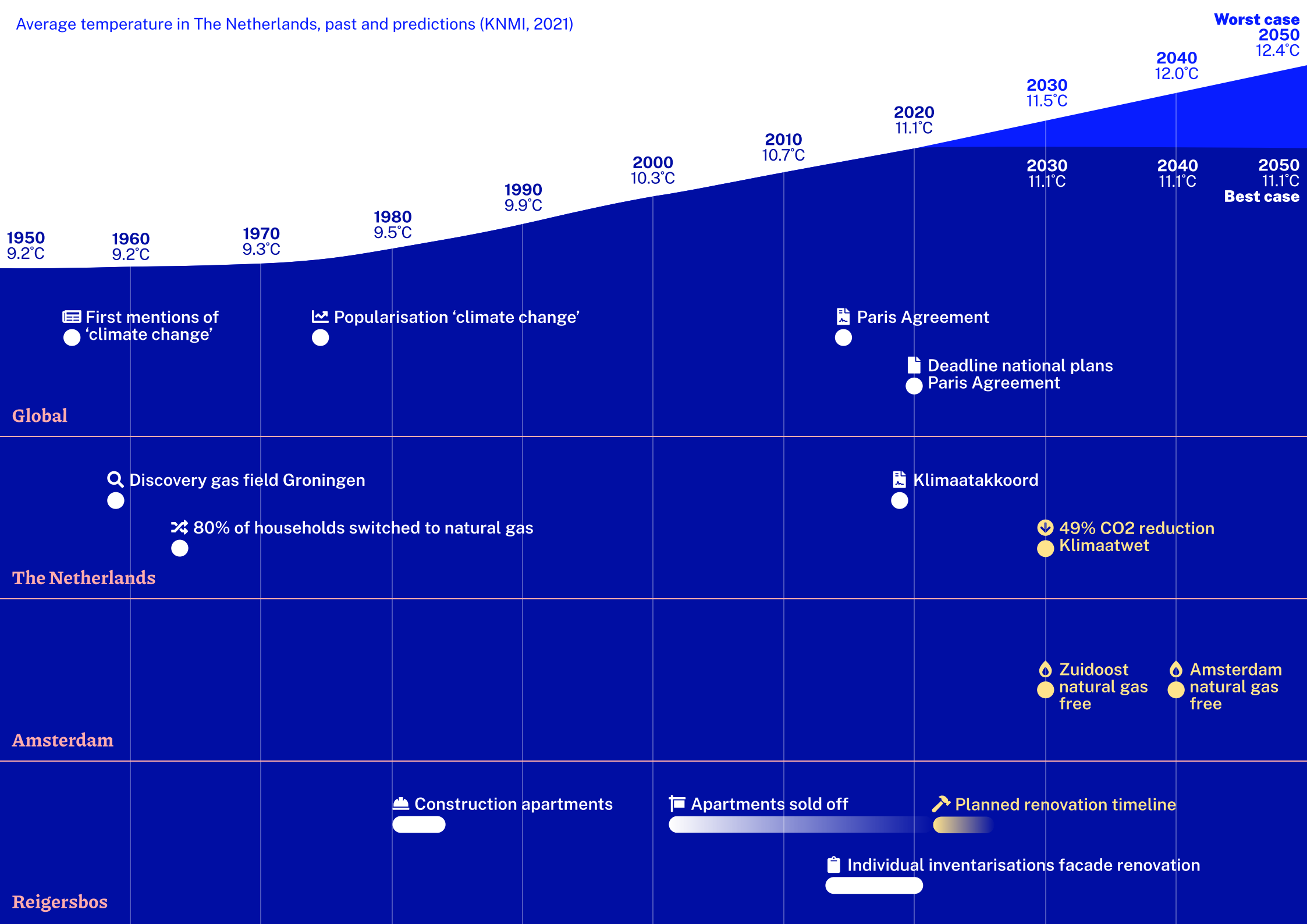


Figure 8: An abstract overview of my graduation process, leading to the five interventions.

Average temperature in The Netherlands, past and predictions (KNMI, 2021)



Section 2

Context

Our climate is changing due to CO2 emissions and with the Paris Agreement, countries have agreed to take the necessary measures to limit the warming. Amsterdam has decided to phase out natural gas by 2030 in Zuidoost, which is sooner than dictated by the national Klimaatakkoord. Phasing out natural gas strengthens the need for insulation and new heating and ventilation installations, but that does not always result in a more pleasant home. Reigersbos, a neighbourhood in Zuidoost, has 10 apartment blocks which are in desperate need of a facade renovation. The residents report temperatures of over 35 degrees in summer, while ice covers inside of the window frames in winter. The municipality has stepped in to facilitate a facade renovation.

5. Global



5.1 Climate change

Already in the 1950s, the concept of *climate change* was mentioned (Weart, 2021). Whether it could be ascribed completely to human activity was still unsure, however, and it took until the 70s for the term to gain some popularity, partly thanks to a publication of Broecker (1975). In the 80s, it was a topic for U.S. Senate hearings and policies (Pomerance, 1989). And yet, we're in a situation where we have done so little that we've already contributed to an average warming of about 1°C and we're likely to reach 1,5°C between 2030 and 2052 (IPCC et al., 2018). In large part due to the CO₂ emissions from human actions.

5.2 Threatening livelihoods

The results of global warming are things like disappearing islands and people's homes there (Klein, 2016), an increase in weather disasters (Smith, 2021), droughts resulting in famine and violent conflicts (Box & Klein, 2015) or "increased displacement, disrupted food chains, threatened livelihoods" (IPCC et al., 2019). And the list goes on.

5.3 Paris Agreement

To reduce our emissions and limit the negative effects of climate change, 196 parties, including The Netherlands, signed the *Paris Agreement*: a "legally binding international treaty on climate change" (United Nations Climate Change, 2016). Participating countries agreed to hand in their action plans by 2020, specifying how they will limit global warming to 2°C (but preferably 1,5°C).

Figure 9: In 2016, the Paris Agreement was signed, trying to limit global warming to 2°C (UNclimatechange, 2015).

6. The Netherlands



6.1 Climate change risks

In the Dutch context, the average temperature increase has already reached 1,7°C (Rijksoverheid, 2020). The specific problems we already face are failing infrastructure, reduction of productivity and an increase in heat-related deaths (KNMI, 2018). Of course, The Netherlands are also at high risk of floods due to the amount of land below sea level (Rijksoverheid, 2020). Additionally, the Caribbean Netherlands, especially Bonaire, are at risk of becoming completely uninhabitable (de Graaf, 2017).

6.2 Klimaatakkoord

The Dutch government has translated the Paris Agreement into the *Klimaat-akkoord*. This agreement, signed in 2019, is also meant to help us achieve the 49% reduction of emissions by 2030 as agreed on in the *Klimaatwet*, a piece of legislation dictating the goals for the *Klimaatakkoorden* (Ministerie van Economische Zaken en Klimaat, 2018). A large part of our emissions come from the built environment: almost 40% (Lambregtse, 2017). So, there's a lot to save.

6.3 Measures

More specific measures from the government are subsidies for insulation measures (Milieu Centraal, n.d.) and the increase of taxes on natural gas, paired with the decrease of taxes on electricity (Ministerie van Economische Zaken en Klimaat, 2019). Insulation should reduce the energy need for heating, while the move towards green electricity should reduce the need for fossil fuels, specifically natural gas. This move away from fossil fuels is often called the *energy transition*.

Figure 10: A shot of gas ranges being retrofitted to work on natural gas instead of coal gas, free of charge (Polygoon Hollands Nieuws, 1963)

6.4 The Netherlands and natural gas

This energy transition is not the first of its kind. In the 50s, Dutch households relied mostly on coal and coal gas to heat their homes (Buiting, 2016; [Figure 10](#)). When the gas field in Groningen was discovered in 1959, we started switching from coal gas to natural gas. Coal had become more expensive, while the newly discovered gas field made natural gas a lot cheaper. Parts of gas ranges and central-heating boilers had to be replaced. After five years, 80% of households had already switched (van der Steen, 2018). So, this transition in the 60s towards the cheaper natural gas, now has to happen towards electricity. However, electricity is not yet the cheaper alternative, but it should become that in the future as gas prices will rise. And where the transition then was mostly a technical one, this time it also requires changes in behaviour and interaction.

6.5 Renovation problems

Although it's not our first energy transition, there are still a lot of new factors. The switch away from natural gas is often paired with more insulation and ventilation, different kinds of heating and cooking, and a new way to interact with all those systems. This can lead to a mismatch between a house and its residents (Chiu & Lowe, 2019; [12 Expected problems](#)). For example, low temperature heating combined with open windows during the winter lead to a cold house throughout the day. These mismatches can decrease comfort of living or exclude people

from their homes. For example, the switch to a touchscreen control panel could exclude people with a visual impairment or those who are digitally illiterate from controlling their home temperature. Additionally, these mismatches can lead to more complaints, increased energy costs, decreased sustainability and even health problems. So, it will be worthwhile to pay attention to these mismatches and prevent them.

7. Amsterdam



7.1 Phase out natural gas by 2040

The city of Amsterdam has a possibly even more ambitious goal than the national government: natural gas free in 2040. They have come up with a plan to phase out natural gas for each city region, specifying the preferred heat source and sometimes the planning, too ([Figure 12](#); Gemeente Amsterdam, n.d.-a).

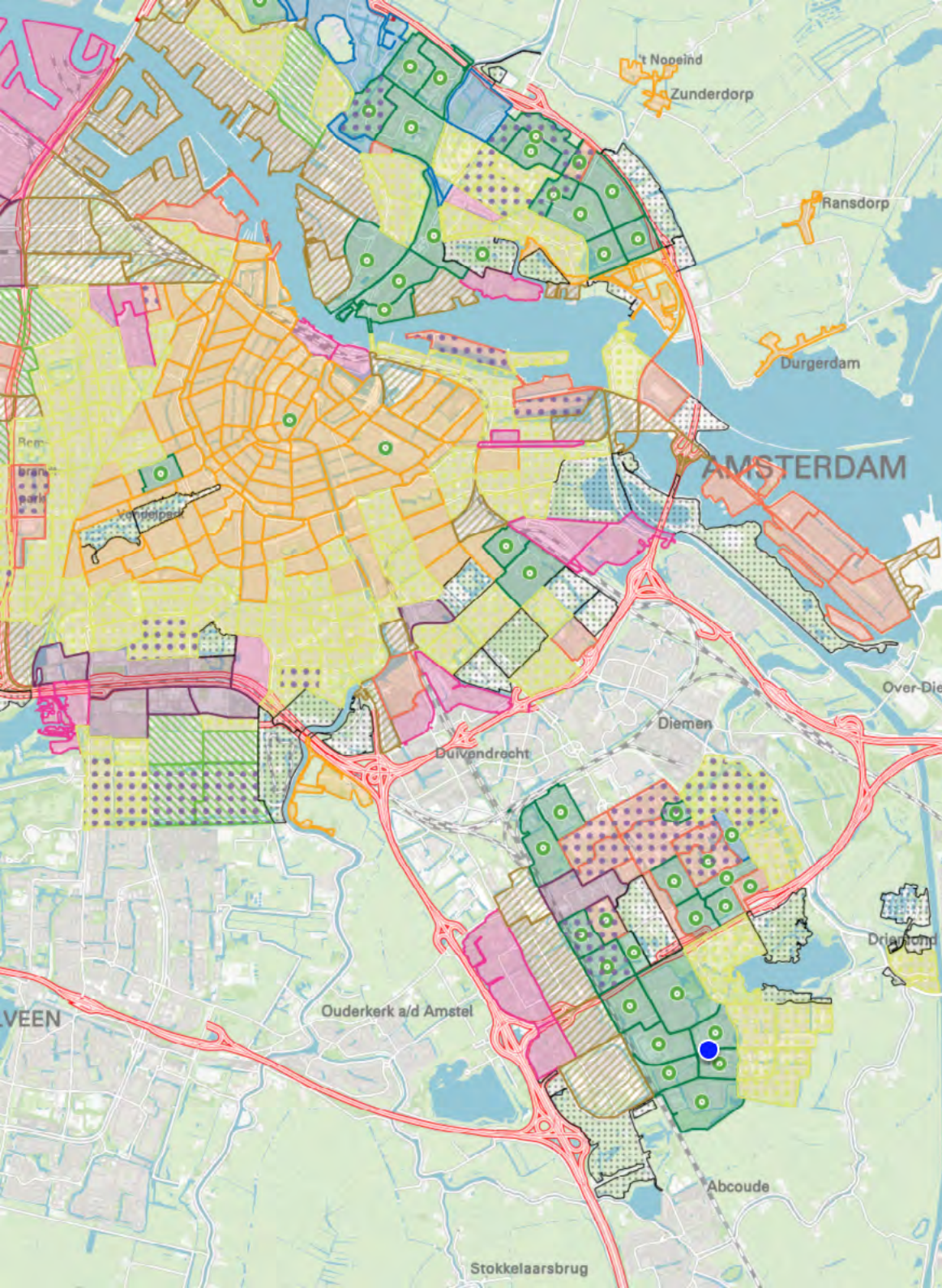
7.2 Zuidoost

For the borough of Amsterdam Zuidoost, the deadline to phase out natural gas has been set for 2030. This means that in the coming 9 to 10 years, about 10.000 homes need to be retrofitted to get the required insulation and new heat source (R. Ruijtenbeek, personal communication, February 12, 2021). For Reigersbos, a neighbourhood in Zuidoost, district heating is the preferred choice.

7.3 Development neighbourhoods

At the same time, Amsterdam has 32 *ontwikkelbuurten* (or development neighbourhoods): regions where the municipality wants to work towards ‘more future proof and balanced neighbourhoods’ (Gemeente Amsterdam, 2019). There are five aims with these *ontwikkelbuurten*: improve the quality of the built environment, liveability, socio-economic position of the residents, link larger urban developments to strategic local developments, and, lastly, improve the sustainability of the built environment.

Figure 11: An aerial view of the neighbourhood of Reigersbos, about one year after completion (Stadsarchief Amsterdam, 1985)



Initiatief gestart



All Electric



Duurzaam gasnet



Warmtenet, al aangesloten



Bronnet



Bronnet, 2020-2032



Warmtenet, 2020-2030



Warmtenet, 2022-2032



Warmtenet, vanaf 2030



Nieuwbouw & transformatie



Onbebouwd



Kookgas



Figure 12: The City of Amsterdam map showing the proposed energy alternative per area. The blue dot shows Reigersbos' location in the green area, which means the city plans to implement district heating by 2030.

8. *Reigersbos*



8.1 1980s

One of the *ontwikkelbuurten* is Reigersbos (Gemeente Amsterdam, n.d.-b): a neighbourhood in Zuidoost with a metro station at its center, around which a shopping center was built ([Figure 14](#)). The *Winkelcentrum Reigersbos* was built in the early 1980s and consists of four levels: one with shops, the other three with different sizes of apartments (shown in [Figure 15](#) and [Figure 16](#)): 280 spread over 10 blocks. The blocks around the main street (also called Reigersbos) have been adjusted to create more space for the shops. The staircases were also moved to the side of the buildings with this change. Otherwise, little has changed with regards to the construction of the buildings.

8.2 Ownership

Initially, all apartments were owned by a social housing association, but since the early 2000s, the association has been selling off some apartments. By now, between 50 and 70 percent of each block is privately owned. This is either the actual home of the owners, or rented out privately. The other 30–50% still has social tenure.

8.3 Condominium associations

Because the apartments share a facade, stairs and more, they are united in two condominium associations (in Dutch known as *Vereniging van Eigenaars* or *VvEs*) per block: one which oversees all the living units, the other which also contains the shops below. All of the Reigersbos *VvEs* were assisted by *VvE Beheer Amsterdam* (or *VBA*) for things like administrative work.

Figure 13: One of the Reigersbos apartment blocks, showing the current facade.

8.4 Structural problems

Condominium associations are supposed to provide the upkeep of the facade and other shared parts of the building. However, throughout the years, too little was done in most blocks.

Additionally, the facades are aluminium frames with old double pane windows, which provide very little insulating capacity. For several years already, the different VvEs have looked at options to upgrade the facade to improve the quality of the apartments. However, due to a mix of mismanagement, lack of budget and other factors, nothing has come to fruition.

8.5 Gevelaanpak Reigersbos

The combination of overdue upkeep, failing initiatives and the neighbourhood being an *ontwikkelbuurt* and the decision to phase out gas by 2030, led the municipality to step in, after being asked to by the residents. They assembled a group of organisations, among which Klimaatmissie, Stichting !WOON and Stadgenoot, to work on a renovation of these buildings. This project is called ‘Gevelaanpak Reigersbos’; facade renovation Reigersbos.

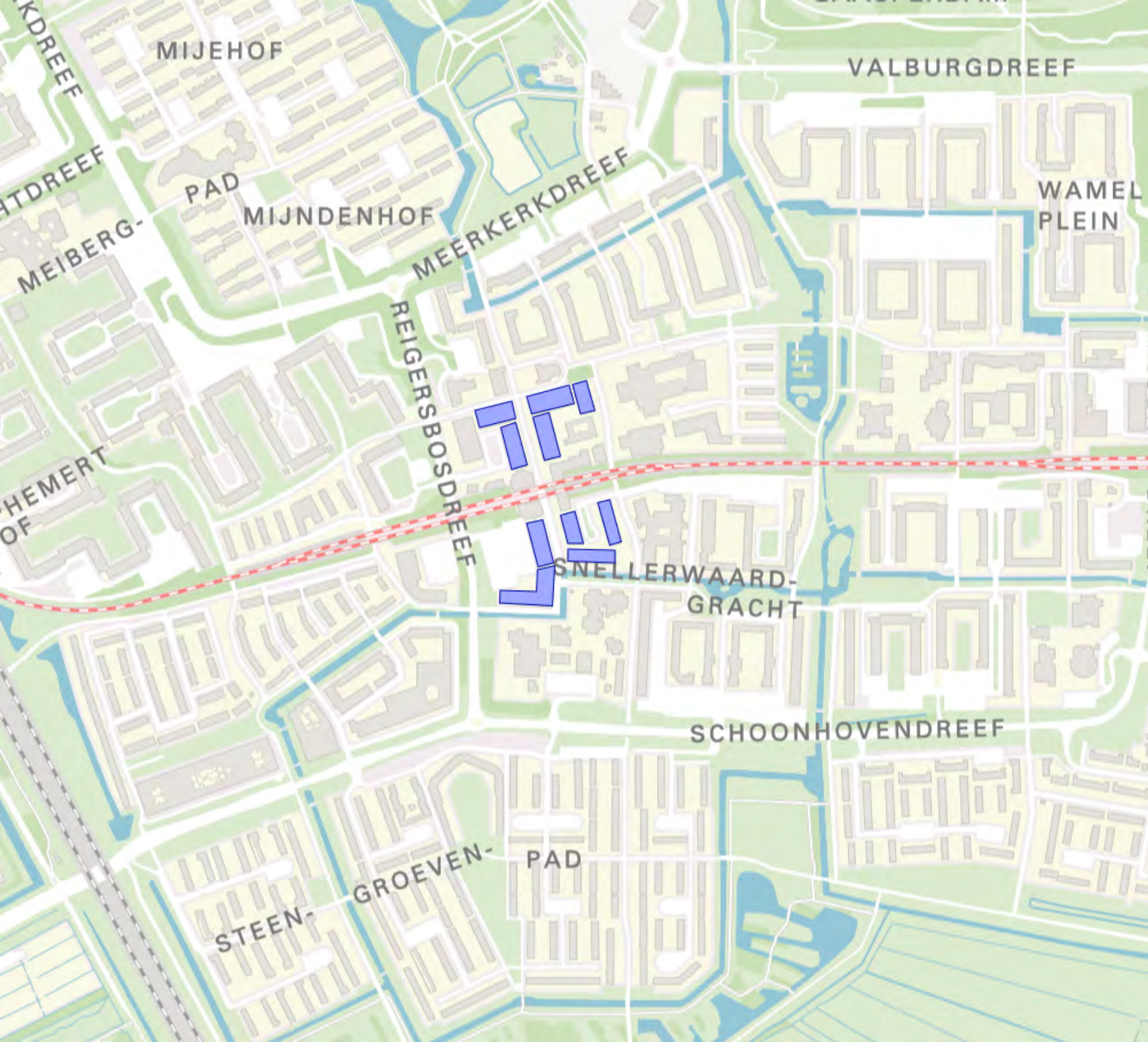
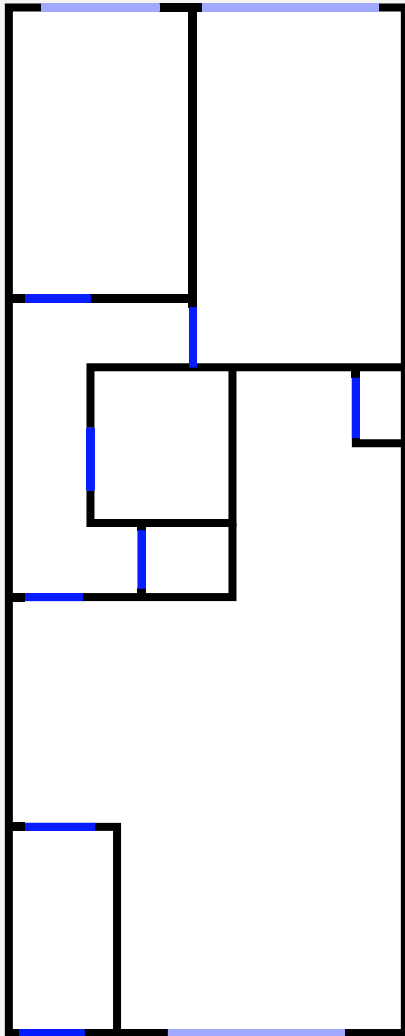
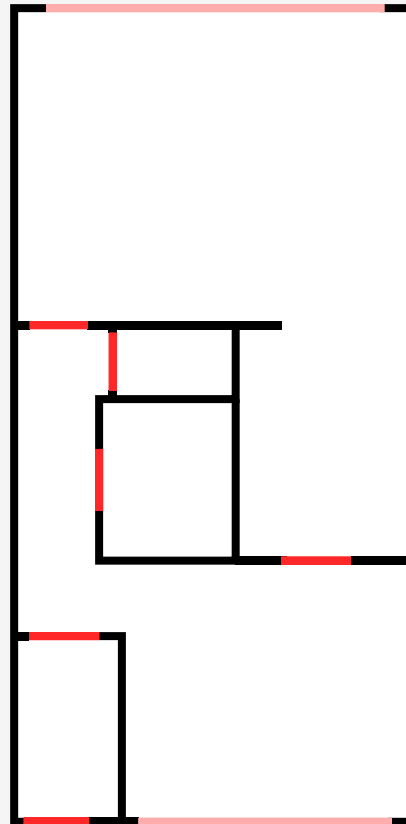


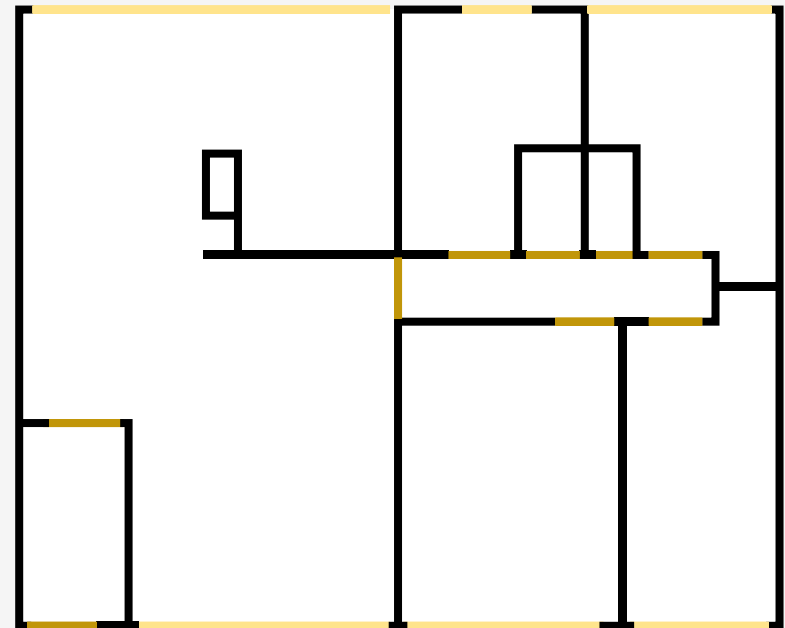
Figure 14: The 10 apartment buildings.



First floor: three rooms



Second floor: three rooms



Third floor: four rooms

Figure 15: The apartments on three floors have different layouts.

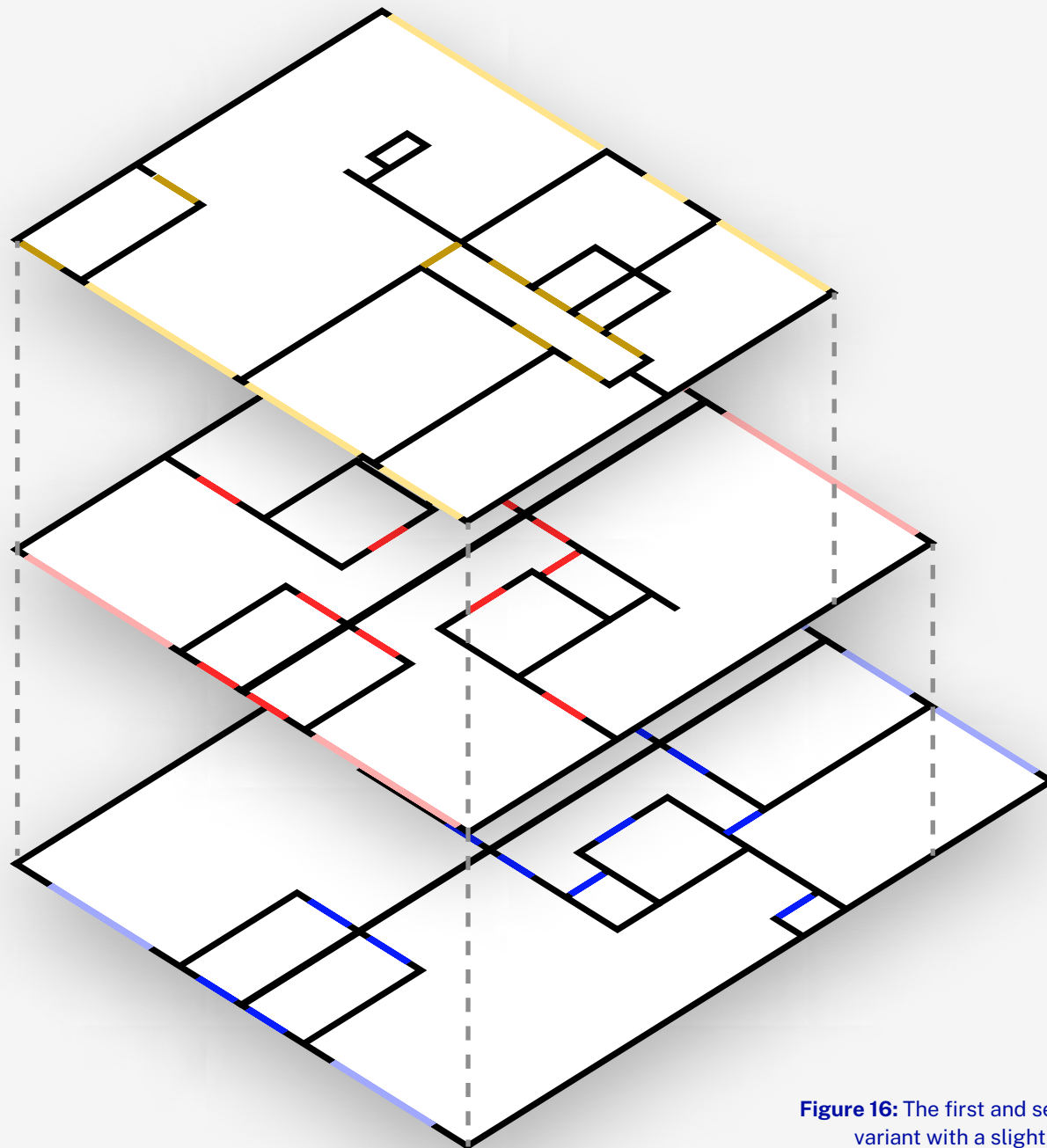


Figure 16: The first and second floor get mirrored, the third floor also has a variant with a slightly different plan at the outer sides of the building.

9. Gevelaanpak Reigersbos



9.1 Stakeholders

The Gevelaanpak Reigersbos project concerns many stakeholders, with many different perspectives, interests and levels of involvement. The relation of the stakeholders to both the apartments and the contract is shown in [Figure 18](#).

Residents

The residents could be split up in several groups, based on the kind of legal representation they have in the renovation process:

- Social tenants - Residents in the *sociale sector*, renting their apartment from Stadgenoot.
- Private tenants Stadgenoot - Residents in the *vrije sector*, renting their apartment from Stadgenoot.
- Private tenants - Residents in the *vrije sector*, renting their apartment from a private owner.
- Owners - Residents who bought the apartment and live at that address.
- Partners, children, and possibly even pets - Residents who don't have a contract but do permanently reside in the apartment.
- Temporary residents - People who stay over as visitors of the residents or as vacation tenants through platforms like AirBNB.

Stadgenoot

Stadgenoot is one of the larger social housing associations operating in Amsterdam. There are several relevant roles within the organisation concerned with this renovation:

Figure 17: A side view of one floor, with the white, extending facade in front of the demo apartment.

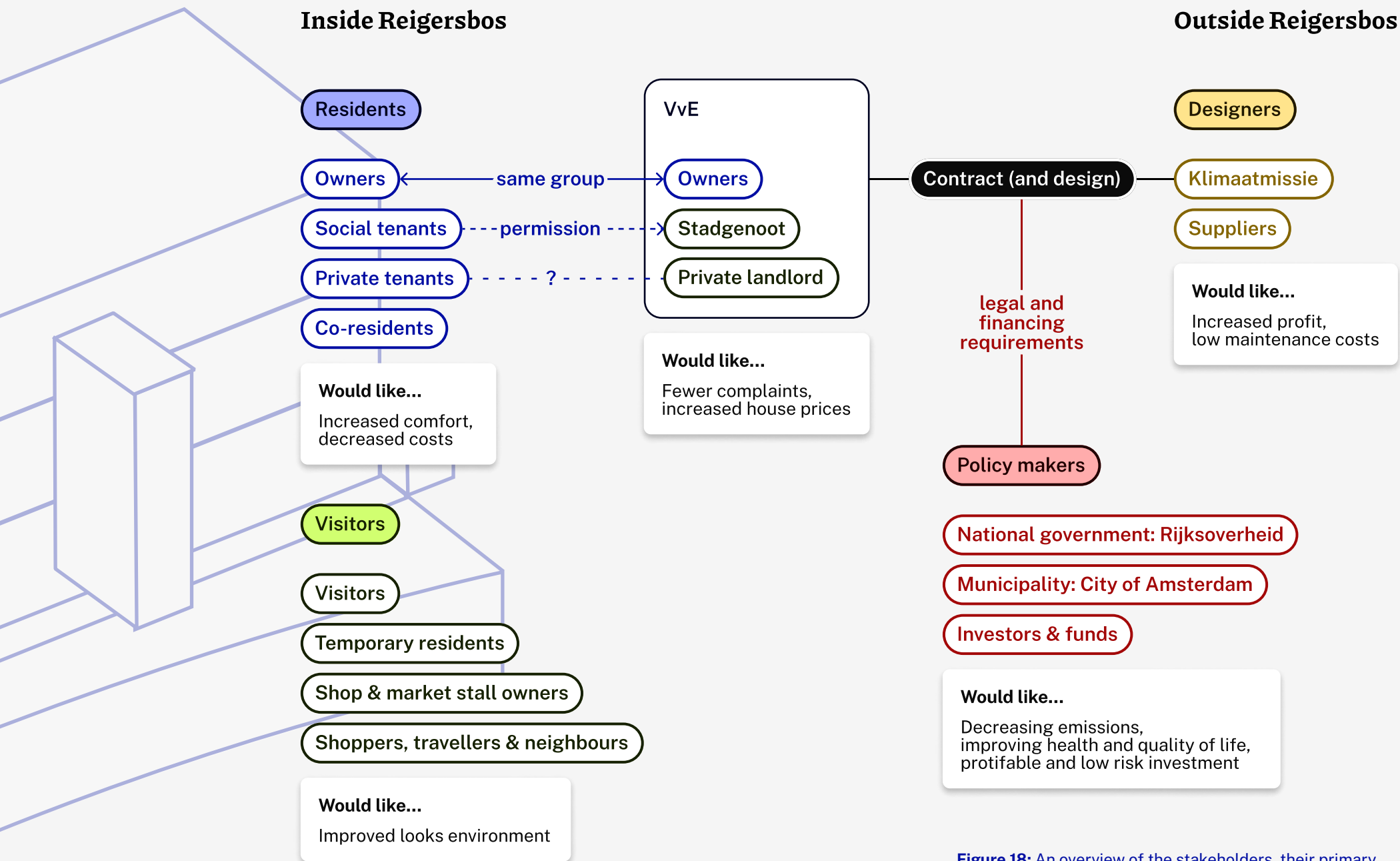


Figure 18: An overview of the stakeholders, their primary stakes in the project and relation to Reigersbos and renovation contract (signed per apartment block).

- Area manager - This person is responsible for the communication with tenants and picking up on larger issues.
- Communication department - Communication to the tenants is executed by another department. So, when the area manager wants to communicate something, they have to let this department sign off on and send the letter.
- VvE representative - Because Stadgenoot owns apartments which are part of the condominium association, they have a say in decisions in the same way private owners do. This legal representation is enacted through a representative who attends meetings and votes for proposals with the mandate of Stadgenoot and their share of the apartments. They can only vote in favor of a renovation, however, with permission from the executive board and permission from at least 70% of the tenants.
- Executive board - Some decisions, like whether to agree with the financial part of the renovation, are made by the executive board.

Private landlords

Some apartments are privately owned and then rented out. Some of these owners are former residents who have kept the apartment after moving, so they have experience living there. Others are investors with more apartments in different neighbourhoods. They don't have the lived experience and are more likely to see the apartment just as an investment asset.

VvE

The three groups mentioned above are represented in the 'living' condominium association. It consists of all homeowners and a representative of Stadgenoot. A subset of the members form the board of the association. This board makes smaller decisions and arranges members assemblies. They are also the first point of contact for other parties, like Klimaatmissie.

To be considered a 'healthy' VvE, they need to have a registration with the Chamber of Commerce (Kamer van Koophandel; KvK), a multi-year maintenance plan (MeerJaren Onderhoudsplan; MJOP), savings and yearly meetings. For many of the VvEs, the current savings and MJOPs are too little to pay for the necessary renovations of the facade. That is one of the main reasons why earlier initiatives to renovate the facade have failed.

VvE Beheer Amsterdam

VvE-Beheer Amsterdam (VBA) is mostly involved in this project as a provider of information. For example the administration of the MJOP or email addresses of home owners might be maintained by VBA.

Klimaatmissie Nederland

Klimaatmissie is the company involved by the municipality to arrange the renovation. Their aim is to improve the living comfort

while phasing out natural gas. They are closely linked with ee'yoo, a company which provides residents with a digital system (a box and app) to control and give insight into installations within homes. This means the ee'yoo app will be used in the solution.

To enable the renovation, Klimaatmissie arranges:

- financial structure with the subsidiaries and investors;
- technical plans for the renovation;
- contracts with vendors of the installations for the supply, guaranteed performance and maintenance;
- contracts with the VvEs;
- communication with the VvEs and residents;
- a demo apartment to show the proposed plans.

Suppliers

The suppliers of the different parts are required by Klimaatmissie to have a guaranteed performance for 30 years. If, at some point, the products don't live up to that guarantee, the supplier is required to replace the product or meet the performance in another way. The supplier of the ventilation units will also have to send replacement filters every year.

Local technical workers

One of the wishes of the municipality is to have as much work as possible executed by locals, to stimulate the local economy.

!WOON

Stichting !WOON is the association providing advice to tenants and home-owners in Amsterdam. In this case, they help protect the VvEs and residents' interests by providing knowledge and advice on energy transition renovations and legal advice. They are independent, but funded by the City of Amsterdam.

City of Amsterdam

The City of Amsterdam, the municipality, is involved in several ways in this project:

- Initiators and facilitators described in [8.5 Gevelaanpak Reigersbos](#)
- Policy: described in [7.1 Phase out natural gas by 2040](#)
- Financial aid: for residents who might encounter financial trouble because of the renovation, the municipality wants to set up a fund, to make sure everyone can participate in and benefit from the transition.
- *Welstand*: there is a committee to judge the looks of a building, to make sure it fits with the municipal agreements on *welstand* (aesthetics). (Gemeente Amsterdam, n.d.)

- Checking plans: to ensure the quality of the plans, the municipality has hired a company to check the (financial) calculations of the renovation.

Energie Lab Zuidoost

Several educational institutions, AMS Institute and the City of Amsterdam are collaborating on combining academic research and practice with regards to the energy transition. This collaboration takes shape as Energie Lab Zuidoost, under which several research and graduation projects are focussed on the Gevelaanpak Reigersbos, such as this graduation project.

Project investors

Each VvE will get subsidies and loans from parties like the national government (Rijksoverheid), Nationaal Warmtefonds, pension funds or banks. Each of these parties have their own requirements for the project. For example, some subsidies only apply when a certain label or energy consumption level is achieved with the renovation. These requirements aim to increase the sustainability or to ensure a low-risk investment.

Neighbours

Neighbours from other buildings close-by are invested in this project because the looks of the shopping center will change, but

also because it is likely that a similar project will have to happen at their apartment, soon, too.

Shoppers & travellers

The changing looks and any construction work will influence the experience of people visiting the public space around the buildings. These might be customers of the shopping center, travellers on their way to the metro station or people just passing through to get from one side to the other.

Shop & market stall owners and staff

On Wednesday, Reigersbos houses a market. For the owners and staff of the market and shops, both their own experience as well as that of their customers will change.

9.2 Legal power

All in all, many stakeholders influence the renovation plans, but as shown in [Figure 19](#), some residents have little legal power. Traditionally, that means little influence over the design, too, which is unfair ([20.4 Power](#)), but also means social knowledge (about how people interact with their homes) is lost. This means it would be beneficial for the project and more just to give residents more control over the plans.

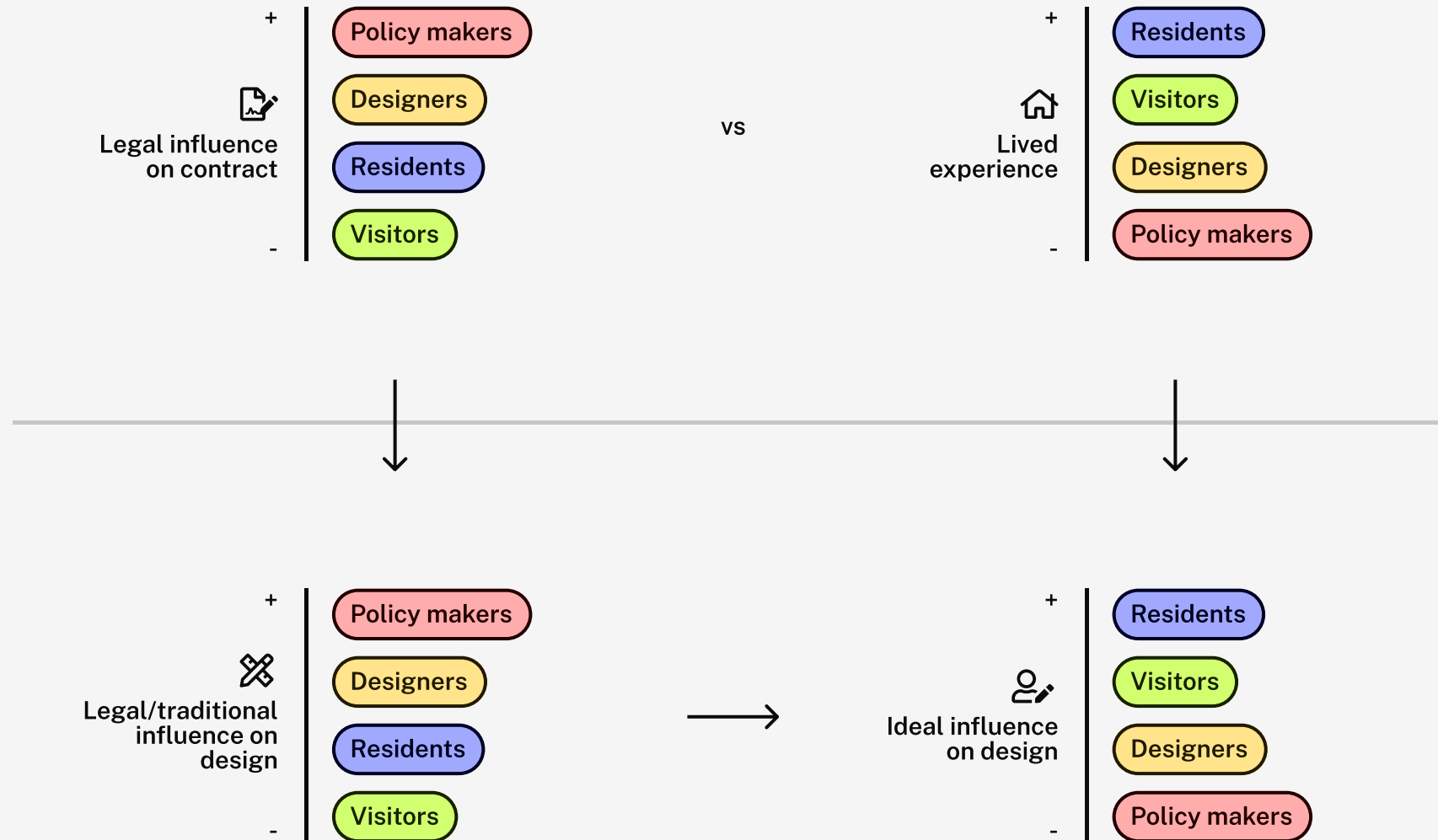


Figure 19: The legal influence over the contract corresponds to the traditional influence on the design for the different stakeholder groups. Ideally, however, this would be linked to the amount of lived experience, and thus social knowledge.

9.3 Financing

The project is financed with subsidies and loans, all taken on by the VvE. The payment of the loan and its interest are covered by an increase in the service costs paid by owners to the VvE. For tenants, this might lead to an increase in rent or the addition of an energy performance payment (energieprestatievergoeding; EPV). Because of the insulation and switch away from gas, the energy costs (combination of electricity, gas, boiler maintenance) should decrease. Klimaatmissie is aiming to make sure these changes cancel each other out, to make sure the monthly expenses stay the same. However, the increase in service costs will differ per VvE and the energy cost savings will differ per household, depending on the current energy usage.

9.4 Timing

Before an apartment can be renovated, there are several steps that need to be taken. This means that although the demo apartment was finished in February 2021, the first renovations are unlikely to happen before February 2022. Each renovation itself should take five days, during which the resident can remain in their home.

9.5 Four scenarios

Klimaatmissie worked out four scenarios with regards to energy consumption, investment costs and corresponding monthly costs.

The first scenario handles the situation without a renovation, while the other three scenarios have increasing amounts of investments. The ‘gold’ scenario is the cheapest scenario, with not just insulation but also the switch to all-electric. The proposed changes for this scenario are shown in [Figure 20](#). I focussed my graduation project on this gold scenario, as most VvEs have already signed a declaration of intent for it.

9.6 Process

To get from the initiation to 280 renovated homes, there are quite some steps the stakeholders have to take. Together with Klimaatmissie I’ve drawn up the map in [Figure 21](#), which shows the activities Klimaatmissie is undertaking, which are relevant to the residents and their experience in the apartments. Activities regarding the decision making process, like general members assemblies, and checks by the municipality, have been left out. The alternative views on the process are discussed in the next chapter, [10 Process perspectives](#).

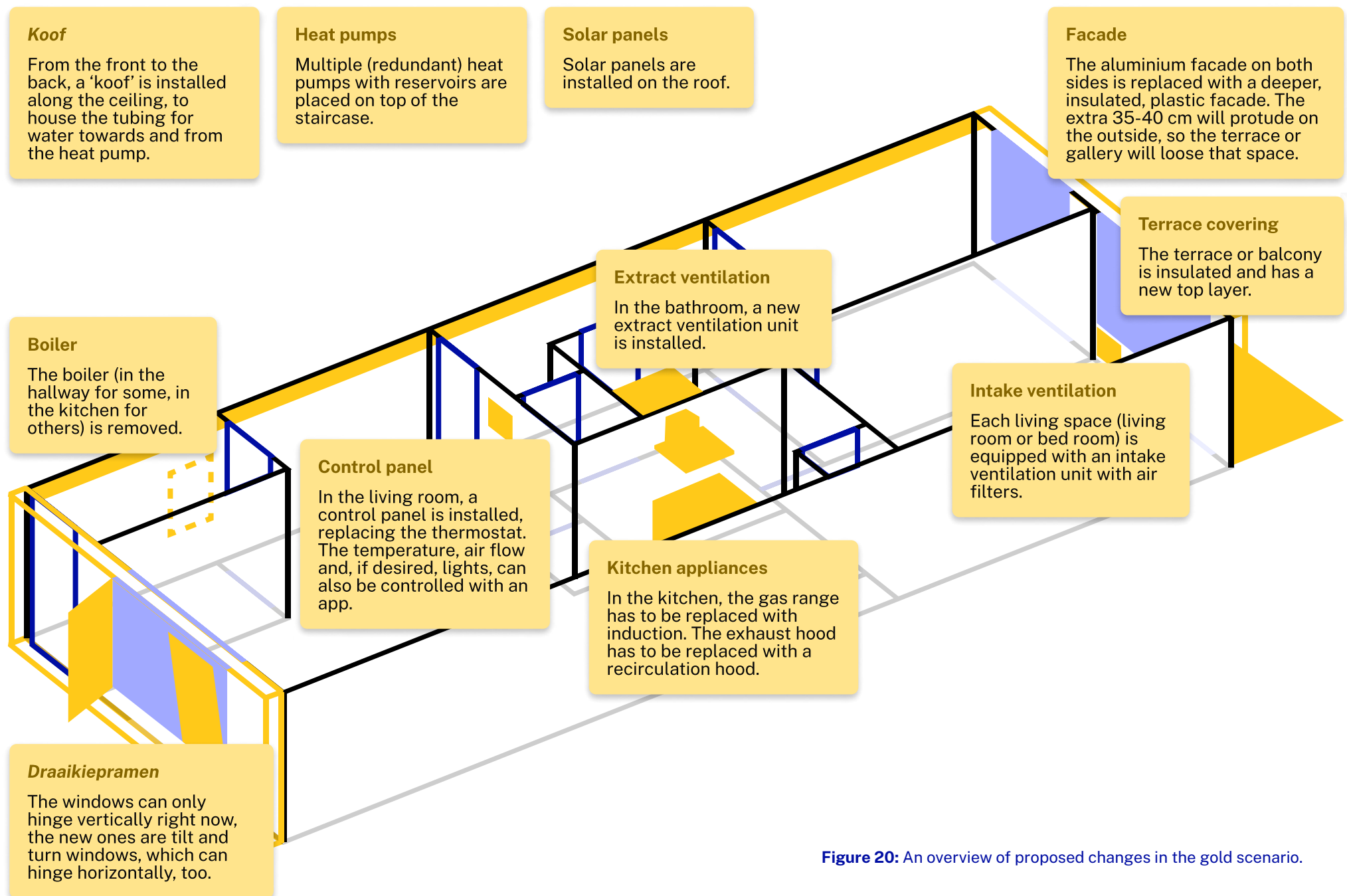


Figure 20: An overview of proposed changes in the gold scenario.

9.7 Communication to residents

Klimaatmissie, !WOON and Stadgenoot have several media and moments for communication with the residents about the renovation. These are some of the most notable ones:

- *Flyers* ([Figure 22](#)) - An introduction of the project and team, explanation of the scenarios and their finances, and a timeline with upcoming activities; available in both Dutch and English.
- *Core group* - A group with meetings and a messaging group with the more involved residents, mostly VvE board members.
- *Tour invitations* ([Figure 23](#)) - Each household (both tenants and home owners) got a postcard invitation; Dutch only. Residents then needed to reserve a spot on the website or send an email.
- *Demo apartment tours* - A scripted tour by !WOON showing the changes in the demo apartment, as shown in [Figure 20](#), focussed on the technical changes and planning.
- *Meetings* - The VvEs have all had presentations of the plans. Where necessary, !WOON and Klimaatmissie also organised extra meetings to explain more details of the renovation plans.
- *Letters Stadgenoot* - Two letters at different points in time, explaining the basics of the renovation plans.
- *Website* - The website gevelaanpakreigersbos.nl with information about process, three scenarios and the demo apartment, as well as updates and contact details.



Figure 22: Three pages of the flyer explaining the renovation plans.



Figure 23: The front and back of the invitation to visit the demo apartment.

10. Process perspectives



Handboek Vernieuwing & Verbetering

Amsterdamse Kaderafspraken

Amsterdamse Federatie van Woningcorporaties
Federatie Amsterdamse Huurderskoepels
Gemeente Amsterdam

Several stakeholders have their own documented approach to renovations. This means that any changes to the approach should be linked to the steps in those approaches, to ensure agreement and understanding between the different parties, no double work and unified communication. At least Stadgenoot, Klimaatmissie and the City of Amsterdam have their own views of the process.

10.1 City of Amsterdam

The municipality is planning to work with VvEs to accelerate the energy transition (Slauerhoff, Stants, & Rijsman, 2021). After recruiting and selecting the VvEs, they start a process consisting of five phases:

1. setting the level of ambition,
2. research and a design draft,
3. definitive design,
4. technical design with an offer, and
5. execution, maintenance and monitoring.

The municipality supports the VvEs in these steps and pays for some parts.

This process already includes meetings with residents to provide them with information, understand the current complaints and wishes and act as a sounding board later on in the process. Additionally, there are clear gates: the general assemblies where the VvE votes on the outcome of the phase, such as a scenario or an initial design. To make sure this process goes smoothly, the municipality aims to hire several process managers, who organise those meetings, among other things.

Figure 24: Part of the cover of the *Amsterdamse Kaderafspraken* (Amsterdamse Federatie van Woningcorporaties, Federatie Amsterdamse Huurderskoepels, & Gemeente Amsterdam, 2020)

10.2 Klimaatmissie

Klimaatmissie also has a stage-gate process, as also shown in [Figure 4](#). It consists of

1. a quick scan,
2. the design,
3. implementation, and
4. the exploitation phases.

Within and between those phases, there are several general assemblies or contract signing moments.

While the VvE is officially the commissioning party, Klimaatmissie (and in this case together with !WOON and the municipality) does a lot of the project management. This is especially useful because of the combination of 10 separate VvEs and the mix of housing association and private property.

As with many processes, the simplified representation does not entirely match reality. For example, before the declarations of intent were signed, Klimaatmissie had already made the first design, as they could then present that in the demo apartment

10.3 Stadgenoot

Lastly, Stadgenoot also has a standardised process. Housing associations (and in a way, the municipality) in Amsterdam have

to adhere to the *Amsterdamse Kaderafspraken* (Amsterdamse Federatie van Woningcorporaties, Federatie Amsterdamse Huurderskoepels, & Gemeente Amsterdam, 2020; [Figure 24](#)): the regulations surrounding renovations for buildings with tenants. These agreements dictate a certain process with three steps:

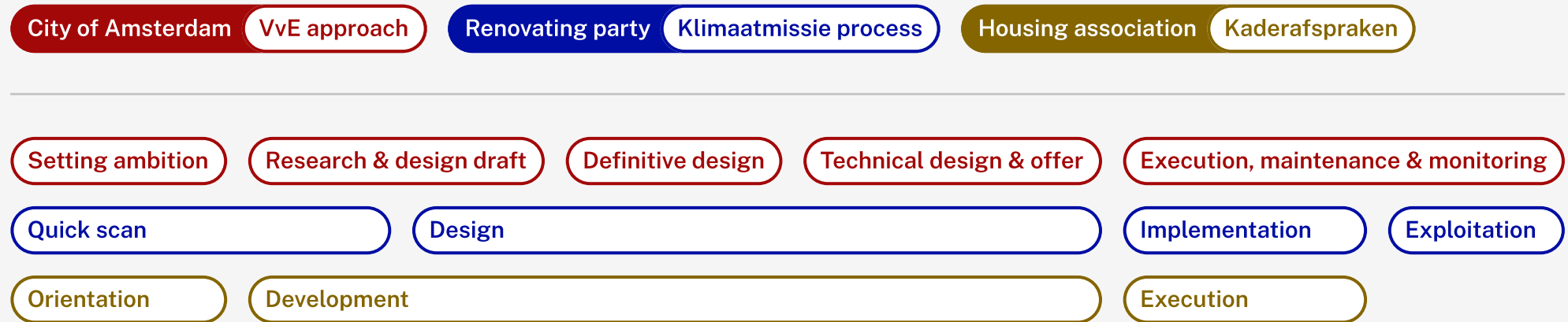
1. orientation,
2. development, and
3. execution.

Additionally, it requires the housing association to set up a resident committee which then has a say in several decisions surrounding the renovation plans.

This process starts when the housing association decides they want to renovate, after which the resident committee is assembled and a participation plan is made, before the actual design of the renovation plans. However, this process is only necessary when the renovation is seen as such, instead of ‘maintenance’. In the case of Reigersbos, this is still unsure, so Stadgenoot has not yet started the assembly of the resident committee (M. Rijlaarsdam, personal communication, July 27th, 2021). So even though the phases seemingly overlap ([Figure 25](#)), this might not always be the case: for Reigersbos the Stadgenoot process only starts after the design processes have already begun.

Match process perspectives

Theoretical: how the processes could match



Practical: how the processes match in the Reigersbos case

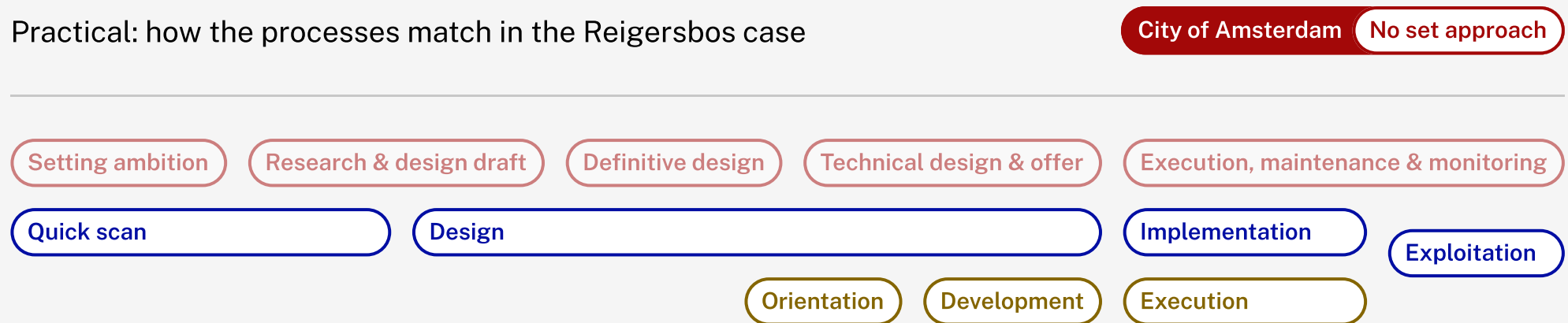


Figure 25: A comparison of the different perspectives on sustainable renovation processes.

Section 3

Mismatches

From my observations and interviews with residents, experts and stakeholders, I've gained insight into the mismatches between residents and apartments which might arise or remain after the renovation. There are current and expected problems, ways to counter expected problems, and the worries and hopes of the residents after hearing the plans and seeing the demo apartment. I think most of those problems exist because of the interplay of the indoor climate, practices and installations in the apartment: the installations do (not) facilitate practices to create a pleasant climate and this is influenced by incorrect knowledge or outdated shared stories. This means residents need to be involved to pick and shape the right installations.

11. Current problems



11.1 Main problems

My [22.2 Resident interviews](#) helped me understand the current problems with the apartment blocks. First, the facade and maintenance problems mentioned in [8.4 Structural problems](#) lead to two main issues with the indoor climate of the apartments: extreme cold and extreme heat ([Figure 27](#)). In turn, these problems lead to extra energy costs, more cleaning and the feeling of being unsustainable. The six residents I've interviewed about this all pointed out that they want to act sustainably, but for different reasons: because they have been brought up to care for nature, because they are worried for the future of themselves or their children, or because they think sustainability leads to a fair world.

The heat and cold can also lead to people closing vents ([Figure 26](#)) and windows, which can lead to mould and thus unhealthy environments. Together with the energy costs (leading to energy poverty) and the environmental impact, these were the initiating factors for the renovation plans.

11.2 Apartment problems

Next to these main problems, residents also experience other problems with their apartment ([Figure 28](#)) and the whole building ([Figure 29](#)). Of course, these problems are experienced differently by different residents.

11.3 Influence renovation

Many of the problems should be tackled by the renovation. Other problems, like noise and leaks from other apartments within the building are not necessarily

Figure 26: One resident has stuck tape over their vents to prevent cold air from coming in.

Problems

° Cold

The lack of insulation leads to cold, which is uncomfortable. This is noticed because of cold draft, cold radiating from the facade, and just an overall low temperature in the apartment.

"It's cold in winter, truly, really cold." / "Het is koud in de winter, echt waar, heel koud."

° Hot

In summer, sun-facing rooms get uncomfortably hot.

"In summer it's 30, 35 degrees inside, and you can't cool it down" / "In de zomer is het 30, 35 graden binnen en krijg je het ook niet echt lekker afgekoeld."

Results

🏠 Energy costs

The cold means I heat my house in such a way that it costs a lot of money.

"That's a bit of a waste. And it's expensive, too." / "Dat is een beetje zonde. Het is sowieso duur."

🧹 Cleaning

The cold leads to condensation on the window frames, which means more cleaning is needed.

"...the moisture stays on the window frames, so they really get wet and I have to clean more often" / "...dat het vocht op de kozijnen blijft, dus dat ze echt nat worden en ik moet vaker schoonmaken."

🌱 Sustainability

This also means I use a lot of energy, which is bad for the environment, but I want to act sustainably.

"And it's also not too good to burn so much gas, for the environment" / "En het is toch ook wel ergens niet zo goed toch om zoveel gas te verbranden, voor het milieu."

Motivations

🌳 Nature

I have been brought up to care for nature.

"...we're from indigenous descent, and you need—nature is quite important to us" / "...we zijn van inheemse afkomst, en je moet – natuur is voor ons wel een belangrijk ding."

👤 Future

I'm worried about the future of my child.

"...it's urgent. I've already had most of my time, but [my kid] still has quite some time ahead, that's quite urgent" / "...dat is wel urgent. Ik heb al de meeste tijd gehad, maar [mijn kind] moet nog een tijdje door, dat is wel urgent."

⚖️ Fairness

It's the fair thing to do.

"Sustainability, social fairness, what I meant with that is that everything which you have should have fairness to people, you know."

Figure 27: The main problems residents experience with regards to the climate in their home, the results, and their motivations to care about sustainability.

Broken parts

The vents and window frame handles tend to fail in most apartments.

"Those vents never opened or shut, because they're rusted" / "Die roosters, die gingen nooit dicht en open want die zaten helemaal vastgeroest."

Worn-out facade

In some apartments, the facade is so worn out it can wobble and it shows gaps.

"My windows are broken, there's a visible gap between the wall" / "Mijn ramen zijn kapot, je ziet gewoon een gat tussen de muur."

Mould

A lack of ventilation has led to mould.

"In the bathroom there's a lot of mould. That's barely ventilated" / "En in de badkamer zit ook veel schimmel. Dat is bijna niet geventileerd."

Blowing open

The windows and doors can only either be shut, or be open and loose.

"The door blows in every direction" / "Die deur waait heel snel alle kanten op."

No control

This means residents can't open or close those two ventilation options properly, leading to an even greater lack of control over the indoor climate.

"Even if they're closed, it's cold" / "Zelfs al heb ik ze dicht, dan is het koud."

Noise

The deliveries to the supermarket lead to noise pollution for some buildings; other residents have problems with noise from neighbours. This leads to sleep disturbance and general discomfort.

"Lorries come here for freight handling, and they're quite loud" / "Vrachtwagens hiervoor als ze komen laden en lossen, die zijn nogal luid zeg maar."

Smells

Through the vents, open windows or facade gaps, unpleasant smells enter the apartment, e.g. from trash, gasoline, spring roll frier, etc.

"You shouldn't open the window on Wednesday of course, then the egg roll car is here" / "Je moet het [raam open zetten] niet doen op woensdag natuurlijk, want dan staat die loempiaman hier."

Inefficient config

I would like to use my boiler as efficiently as possible, but I don't know how.

"Is it beneficial to turn down my boiler? Or should I leave it at 17 or at 15 in the night?" / "Heeft het nu zin om m'n CV laag te zetten? Of kan ik 'm 's nachts beter op 17 zetten of op 15?"

Windowsill

The windowsill can only barely be used for plants, also due to its instability.

"Even with a little bit of wind, it smashes down all plants from the windowsill" / "Ook al is er een klein briesje slaat het al alle planten van de vensterbank."

Rain in

When it's raining, this means the windows can't be used for ventilation, because it will lead to rain in.

"...because everything just blows open and everything comes in when it rains" / "...want hier klappt alles nu open en komt alles naar binnen als het regent."

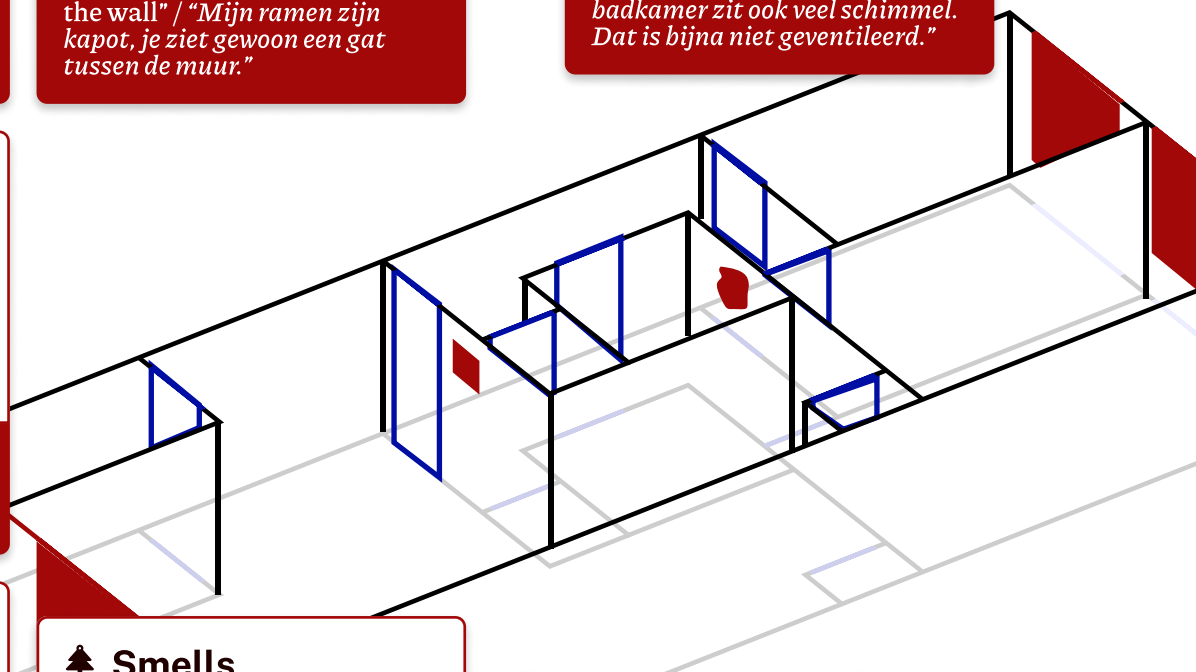


Figure 28: The other problems residents experience in their apartment.

✚ Lack of space

Residents lack space for their hobbies, personal business administration, or even a new family member.

"My house is quite alright, although it could have been a tad bigger" / "M'n huis vind ik op zich prima, had een tandje groter gekund."

🔧 VvE costs

The lack of maintenance leads to an increasing amount of repair requests, which is bad for the financial position of the VvE.

"There are already two or three apartments where the floor was broken open to repair something. Those kinds of things will happen more often in the long run. (...) So you're saving a little, but you're also spending while doing that, because things need to be repaired" / "Er zijn al twee of drie woningen waar bij die mensen de vloer opengebroken zijn om iets te repareren. Dat ga je op de lange termijn meer krijgen. (...) Dus je spaart, maar je bent ook aan het verliezen terwijl je spaart, omdat er dingen gerepareerd worden."

🏠 Wasted space

The roof space of the shops is only partly used for the terrace/balcony of the apartment on top, which feels like a waste of space.

"Now it is a piece of no man's land, with a sign 'Danger of falling'." / "Nu is het een stuk niemandsland, met een bordje 'valgevaar'."

💧 Leaks

Water leaks in through the facade or roof during extreme weather or the ceiling due to problems with e.g. the plumbing upstairs.

"I have had leakage since 2018, one of those big stains in the living room." / "Ik heb sinds 2018 lekkage, zo'n grote vlek in de woonkamer."

🔧 Repair costs

This leads to costs for repairs, like repainting the ceiling.

"The most comes from the neighbours upstairs, but, well, I can paint it myself" / "Het meeste heb ik van de bovenburen, maar ja dat kan ik zelf wel verven"

📁 Insurance hassle

Leaks have also lead to hassle with the landlord of other apartments and the insurance.

"they wanted to get 10.000 from my insurance to paint the whole house and those kinds of things" / "die wou op mijn verzekering voor 10.000 euro heel het huis laten verven en dat soort dingen"

🗑️ Deterioration

The common space is not well maintained and dirty. This makes my neighbourhood and building look deteriorated.

"...in the maintenance, the outside just doesn't look right, I think that's a little problematic" / "...in dat onderhoud, de buitenkant ziet er gewoon niet uit, dat vond ik echt een beetje fout."

⚠️ Dangerous stairs

The staircase becomes slippery when it rains or snows. This leads to a physically dangerous situation.

"I don't just like the stairs, they're scary and dangerous" / "Ik vind die trap gewoon niet prettig, eng en gevaarlijk."

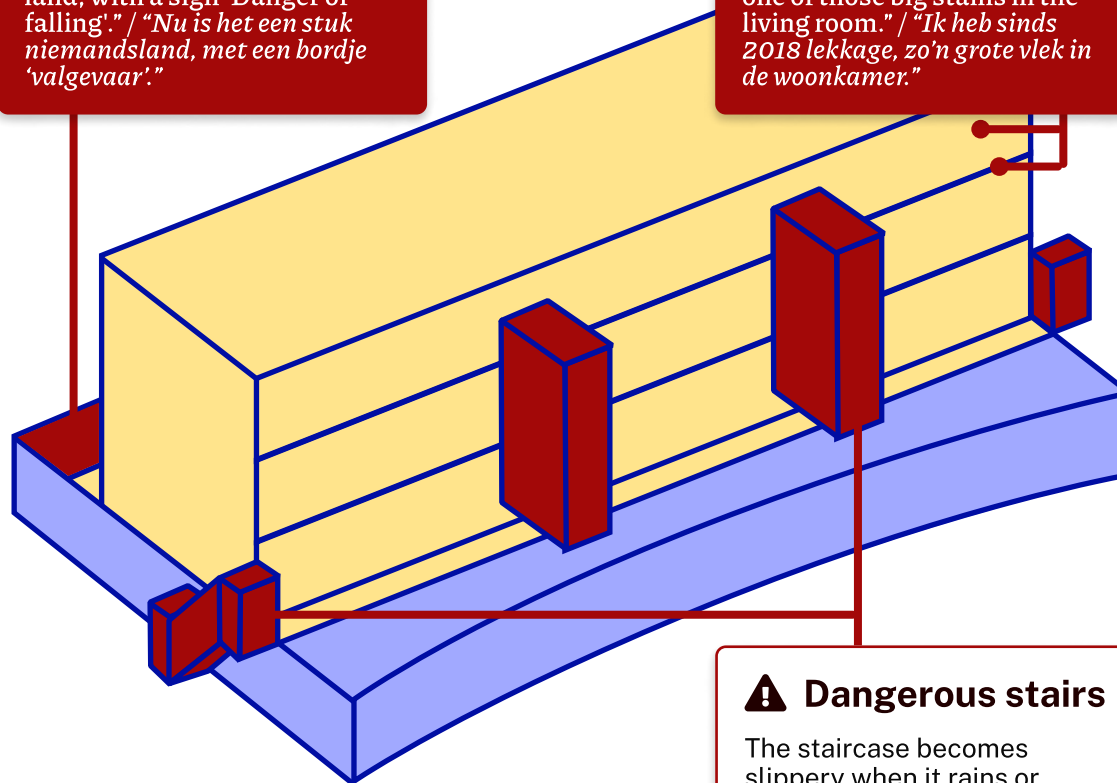


Figure 29: The problems residents experience outside.

solved by the renovation. The dangerous stairs and wasted terrace space have been discussed as possible extra places for intervention. Overall, it seems like the most important issues residents face will be dealt with, but there are still ‘missed’ issues.

11.4 Existing solutions

Of course, residents already have their way of dealing with these problems. The solutions people create (Figure 30) or enact might give some insight in good ways to solve the problems, while others might actually be counterproductive. Additionally, they are signals of existing problems and show ways people might be facilitated to solve future (individual) problems.

Curtains as insulation

By closing curtains, air flow is stopped, limiting draft, and the layer of air between the window and the curtains acts as extra insulation. Several residents have closed curtains by day to make use of this effect.

Warmth of the sun

Sun light helps warm a room. Residents use this concept by moving to rooms with sun light when it’s cold. Sadly, using curtains as insulation cancels most of this effect.

Hooks and brackets

Residents like to use the terrace door and windows as ventilation. To prevent rain from entering the building and or plants from being knocked of the windowsill, some have installed brackets or hooks to lock the window/door into place while having them open.

Figure 30: One household had replaced their extractor hood, but had had to be creative for a temporary solution for the outlet.



12. Expected problems

From the (22.1 [Expert and stakeholder interviews](#)) and the transcripts of two interviews with residents of an already renovated home (S. Boess, expert interview based on resident interviews, personal communication, April 13, 2021), I've learned what can go wrong with a sustainable renovation, aside from the missed issues mentioned before.

12.1 Noise and light mechanical ventilation

Mechanical ventilation produces sound and sensors might include status lights. When the sound or light are unpleasant, residents might try to turn off the ventilation or cover the sensor or outlets. However, a lack of ventilation can lead to a lack of oxygen, a surplus of harmful substances, or, in the long term, mould.

12.2 Cold air

Radiators below a window heat up the cold air coming from outside, for example through a vent. When the radiators are replaced with another solution like floor heating, this principle does not apply anymore. This can lead to uncomfortable cold air flows: draft. A common response is to close the vents leading to the same problems as turning off mechanical ventilation.

12.3 Lack of radiation heat

During cold days, people like warming their hands over their heaters. This is something which people miss after transitioning to low temperature heating, as those don't radiate heat to the same extent as radiators.



Figure 31: Open windows combined with low temperature heating can lead to high energy bills or uncomfortable homes.

12.4 Open windows and low temperature heating

A common energy saving solution is the switch to low temperature heating. Combined with better insulation, the lower temperature should still be able to heat the home. However, open windows disturb the balance (Figure 31), so either the home gets cold, or the energy use increases dramatically. This, in turn, leads to an uncomfortable home, a high energy bill, or both. Closing the windows seems like the most obvious solution, but clearly there are other unmet needs, most importantly a lack of fresh air. Either people feel the need to ventilate with their windows because they experience a lack of oxygen, headaches, or just because it's what they have learned to be necessary to prevent mould.

Removing control

In some buildings, the freedom of opening a window is taken away. While it solves the issue of energy usage and warmth, it also limits people in their other needs for opening a window, like enjoying smells from outside, communicating with someone on the other side, or passing objects through the window. In general, a lack of control leads to lower satisfaction for residents (Hellwig, Schweiker, & Boerstra, 2020).

Slow response time

Low temperature heating also means the control over the temperature is delayed. This can be annoying when doing certain activities, such as cleaning or exercising, which only take a short time but are more comfortable in a (temporarily) colder room. Or to put it in the words of one interviewee:

“You can’t turn off the heater, so to speak. (...) Yes, I can do that, but then next week it will be that temperature.” –
(S. Boess, expert interview based on resident interviews, personal communication, April 13, 2021)

12.5 Incorrect orientation insulation

The incorrect installation of insulation, with a damp-proof membrane facing the wrong way, can also lead to mould.

12.6 Relativity noise

When noise from outside is prevented through better insulation, noise from inside the building becomes relatively more disturbing.

12.7 Existing installations

The new installations might conflict with existing ones. For example, one interviewee could not use the new window together

with their 'old' blinds. Those items could be replaced, but that is both not necessarily sustainable and might prove to be problematic for residents with small budgets.

12.8 Access to maintenance or configuration

Some installations need maintenance. For example, air filters need to be replaced or cleaned. Access to the required maintenance can be blocked by residents, for example because they lack the skills or it doesn't fit with physical human ergonomics (i.e. something is placed too high or covered by something else). The same can happen with the configuration; if people can't adjust the temperature with the thermostat or any other control system because it is inaccessible, that causes a mismatch.

Fear of breaking things

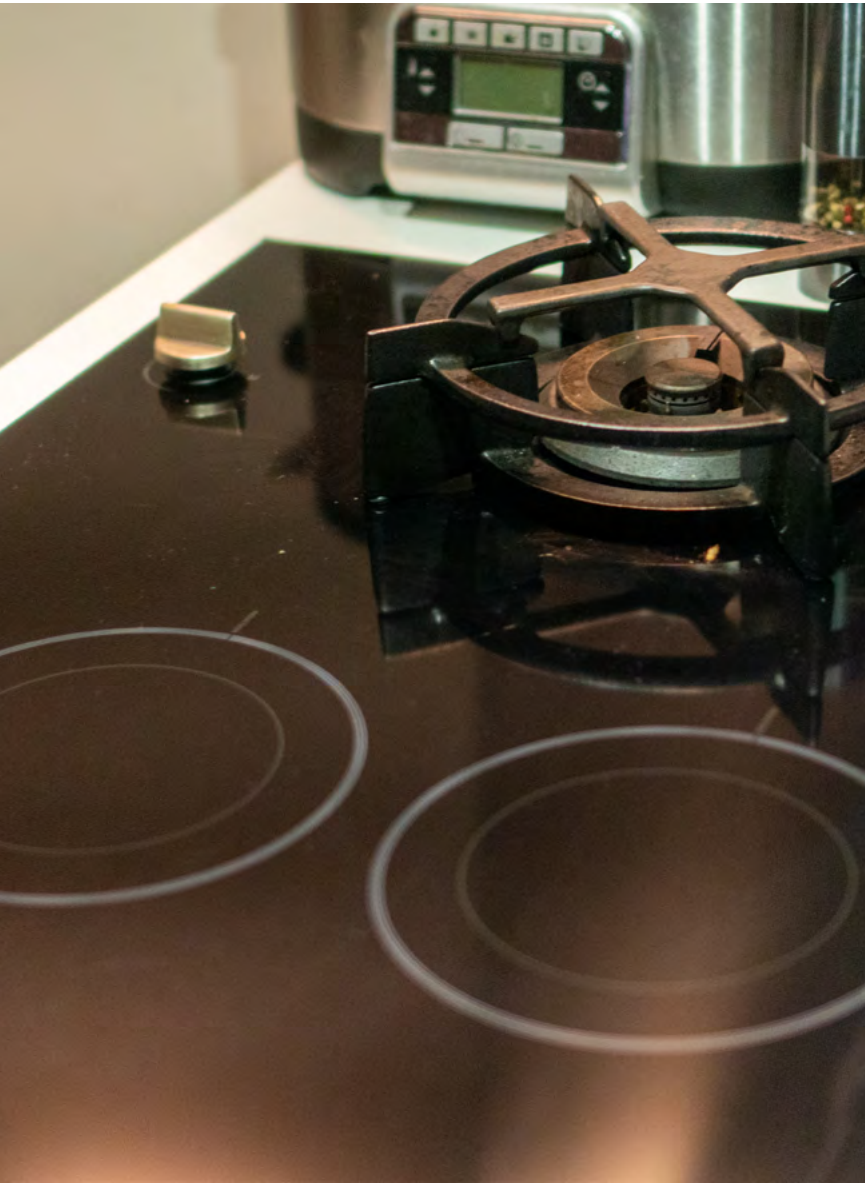
Additionally, a specific barrier could also be the fear of breaking things due to a lack of skills. For some people, not knowing *exactly* how to clean filters or fill up the water in the boiler and heating system prevents them from properly maintaining installations;

“actually I don't like the idea of touching the device at all. Suppose I break something on it, for example.” – Resident during [22.2 Resident interviews](#)

12.9 Adjustability

Lastly, the adjustability of buildings often reduces with newer construction methods. For example, the switch from wooden to metal or plastic facades means it's harder to attach extra objects like blinds. De Maat sees that this shift from softer to harder materials also limits the freedom of residents and users and points out the need for striking balances fitting with their needs (2015).

13. Worries & hopes



One way to influence the renovation plans is through voicing feedback based on what you hear, see and feel. The questions and remarks at the demo apartment tours and [22.2 Resident interviews](#) provide some insight into what the residents' worries and hopes are. The worries ([page 67](#)) can be divided into six categories:

- *Finances*: worries about your own financial situation and whether you can afford the renovation and living in your apartment afterwards.
- *Logistics*: the renovation itself is a complicated process with all kinds of influences on your life. These are worries about the planning and approach.
- *Differences*: depending on the floor of the building, the layout of the apartment is different from the demo apartment. Additionally, home owners tend to make changes to their layout and all residents have a different interior. These are worries about how the proposed renovation translates to their own home.
- *Outside*: worries about the communal facilities and looks of the exterior of the building.
- *Experience*: worries about what the experience will be like.
- *Technicalities*: worries about specific changes or installations, which influence the experience.

The technicalities are easiest to cover: they are concrete proposals to change something or a purely technical issue to solve. Together with the experience worries, they are the most important for the material in the renovated home, and thus for the comfort of living there. However, the experience worries are more difficult to address. The technicalities are practically only voiced by people with a technical background, who are able to turn their worries about

Figure 32: One resident already uses induction, except for her wok burner.

experience into concrete changes. Residents who lack this background need another way to make sure their worries are addressed.

Worries about the outside are either experiential or technical, too, but not directly important for the comfort in the apartment. So, I've left them outside the scope of my project.

The financial, logistic and difference worries play a different role. They are clearly important to the residents, so they need to be addressed, too. However, they also prevent the residents from thinking about the experience: visitors of the demo apartment who voiced these kinds of concerns rarely talked about the experience in the apartment. It appears that people with these kinds of concerns use the demo apartment tour as a way to voice them, without reflecting on the actual changes to the installation and, through that, the comfort.

The hopes ([page 69](#)) were voiced through remarks and compliments, which played a smaller role in the tours than the questions and concerns.

Worries

* Interviews

Most of these worries and hopes were voiced during the tours. The ones marked with an asterisk were only heard during interviews.

Finances

Monthly budget

I pay €50 euros for energy right now, I don't think the calculation will work for me.

Purchase budget

Who will pay for the new induction range and recirculation exhaust?

Service cost raise

When will the new service costs go in effect?

Neighbour budgets

Will everyone in my building be able to afford it?

Loan

I can't afford to take out a loan.

New boiler

I just got a new boiler, will that be a lost investment?

Logistics

Extra changes

How can I make sure the extra changes I want get executed, too?

Planning

When will the renovation take place?

Dwelling

Where will I be during the renovation?

Responsiveness

If there are issues with the finishing or a system, will you be there to fix it?

Cables*

How will they install the extra cables for the electric cooking range?

Own planning*

Will I be able to properly plan the work for extra changes I want to do?

Speed*

How soon will all apartments be done?

Differences

My changes

I recently renovated my bathroom/kitchen/walls/etc., will they survive?

Tiling

Some tiles might need to be replaced, but are my tiles still available?

Layout

My layout is different, because I live on another floor/because I changed things; where will these elements be in my house?

Awning

Can I keep my awning or other shading solutions?

Indoor space

Does this new facade mean I have less space indoors?

Custom shower

Will there be enough space with the ventilation for my built-in rain shower?

Outside

Gallery space

Will the gallery still have enough space for moving large furniture? And is it still conform the regulations?

Artwork

What will happen with the artwork outside?

Colours

What will happen with the colours of the facade? I do (not) like the red, blue and yellow, so white is (not) good.

Cleanliness

Will the (white) facade be kept clean and proper?

Experience

Privacy

Will third parties get my data?

Smartphone

Do we need a digital phone [to control the apartment]?

Heating

How hot can I heat it?

Heat pump/ventilation noise

How much noise will we hear from the heat pump and ventilation units?

Fresh air

Will the ventilation be so good that I don't need to open any windows?

Closet boiler

What will happen with the closet with the boiler?

Recirculation hood*

I fear a recirculation hood will not be as effective.

Control*

Will I still be able to control everything manually?

Technicalities

Extra changes

Can I also have the bathroom/ kitchen/floor/etc. renovated?

Vents indoors

Shouldn't there be vents in the bathroom doors to allow for air circulation?

Ventilation filters

Will it be easy enough for our tenants to replace the filters?

Cleaning heaters

Will it be easy enough to vacuum the undersides of the convector heater?

Finishing

The paint had already chipped a little on the windowsill; is that sustainable enough?

Radiation

Will the new installations expose me to dangerous radiation?

Insect screen

Can I install an insect screen?

Peak load*

Can the system handle the moment everyone is cooking, heating their home, etc.?

Cooling mould*

Won't the cooling with the heat pumps and heaters lead to mould?

Phases*

Will there be enough phases for the cooking range I want?

Solar water heater*

I would add a solar water heater besides the heat pump.

Hopes

Warmth

I imagine it to be warm and comfortable.

Looks

The new facade and heaters look a lot better.

Windowsill

The sturdy and large windowsill looks great for plants or making a little sitting nook.

Sustainability

It's great to be part of a sustainable initiative and to live in a sustainable home.

Ahead of the curve

It will feel good to have a new and innovative system.

Solar panels

I heard there will be solar panels, which should help save on energy costs.

Induction

I'm confident cooking electrically will be fine, or I already have induction and it's great because it's faster and easier to clean. Plus, it feels safer than cooking on gas.

Digital interface

A digital interface to the home feels innovative and more future proof.

Roller-blinds

With the new facade, I will be able to use roller-blinds. Right now, that doesn't work (aesthetically) because of it's shape.

Other projects

When the renovation is done, I can finally work on the projects I have been putting off until after the renovation.

14. Influencing practices



14.1 Meaning and competences

Aside from the materials, meaning and competences ([21 Practices](#)) influence the practices people have in their homes. The skills are learned through instructions (manuals, tours, verbal explanations, etc.) and meaning is changed through the stories and knowledge changing common beliefs. For example, residents need to learn how to use a panel to set the temperature or, ideally for the workings of the system, change the role of opening a window because it is not necessary (anymore) for healthy air. The following are some existing interventions which help build new competences and change the shared stories (meaning), collected through [22.1 Expert and stakeholder interviews](#).

14.2 Insight

Knowing how your behaviour affects situations and your needs changes your behaviour. One major factor for people is their energy bill. Residents in Reigersbos already adjust their usage of electrical devices and heating based on the height of their energy bill or the statistics shown on their thermostat. One company, Eante, provides these insights with an online dashboard at BENG/NoM buildings and sees this helps people reduce their energy usage.

14.3 Moment of instruction

After returning or moving into a newly renovated building, people need to adjust to their changed/new home. This adjustment period does not go well together with the learning of those new skills, so Eante has found that postponing the instructions by about three months improves the effectiveness.

Figure 33: Milieu Centraal's website with a section dedicated to saving energy.

14.4 Medium of instruction

Another thing multiple experts and the Reigersbos residents themselves pointed out, was that people don't read text-heavy manuals. Personal, verbal instructions work better to teach people how new devices or installations work.

14.5 Low barrier communication

Even with good instructions, people tend to forget how things work, or perhaps some things might be omitted in the first place. Providing an easy way to ask questions about the best way to configure and use installations helps people shape their practices for comfort.

14.6 Cooking workshops

In a neighbourhood in Rotterdam, cooking was found to be an important practice which changes with the transition to an electric range. To help people get the required skills to work with induction, cooking workshops were organised.

14.7 Experiments

Some people tend to start experimenting with new installations: trying certain configurations and seeing what the effects are. This way, they learn what the best way is to change their practices to optimise for comfort.

14.8 Accessible information

There are quite some resources available which could help residents improve their sustainability and comfort, like the website of Milieu Centraal ([Figure 33](#)). However, these resources only reach a limited part of all residents. Presenting information in existing touchpoints (e.g. the energy supplier or an appliance store) or bringing the information physically to people (e.g. a package with radiator foil and instructions) help people to receive and act on this kind of information.

15. Mechanics



People want or need things like a comfortable temperature, an affordable energy bill, a feeling of acting sustainably, fresh air, no noise, plants on their windowsill and a healthy living environment. There seem to be several ways in which mismatches can arise (such as in [Figure 34](#)), preventing those needs and wants to be met, split over the materials, competences and meaning ([21 Practices](#)).

1. The installations (materials) prevent the needs to be met at the same time. For example: the lack of insulation means a comfortable temperature and a low energy bill are in conflict with each other in winter. Adding insulation can resolve this conflict.
2. A lack of operational knowledge (competences) prevents people from configuring the installations for their needs. If a resident is unaware of how to activate extra ventilation, they might experience a lack of fresh air. Adjusting the interface to be more intuitive or teaching the resident how to operate it would remove this mismatch by allowing them to create a new ventilating practice.
3. Shared stories or common knowledge (meaning) are incorrect, leading to practices which sabotage the system. Even if new mechanical ventilation is sufficient to prevent mould, residents could still hold the belief that opening a window is necessary for this. Updating the 'wisdom' removing this practice.

Figure 34: Lacking installations, a lack of skills or unawareness of the necessity of ventilation can all lead to problems such as humidity, which can cause wallpaper to peel back.

Looking at mismatches this way, we can prevent them by intervening in ways influencing the installations, skills and wisdom.

However, I think improving the installations, the material of the apartment, has the most profound impact. In a way, building skills and updating wisdom is helping to change the resident to better fit their apartment, while improving the material changes the apartment to better fit the resident. Even better, changing the material can mean fewer skills have to be built.

Focussing on the material may seem to imply only technical knowledge is necessary. However, to create that better fit with the resident, practices need to be understood. This means the social knowledge about meaning and competences is necessary, so residents need to be involved to pick and shape the best materials possible. That, in turn, will lead to fewer mismatches, which means a more comfortable and sustainable home.

Section 4

Participation

Involving residents to help improve the renovation plans require fitting communication and ways to come up with changes. The content, medium and presentation are important to make sure all residents can understand what the plans mean. Then, they need to feel welcomed to the table to improve the plans, which means trust in participation meetings needs to be rebuilt. When the communication and participation are successful, it can lead to meaningful changes which make sure the renovation leads to fewer mismatches.

16. Communication



16.1 General problems and aides

Throughout the renovation process, there is a lot of communication: about the current problems, proposed changes, feedback on those plans and explanation on how to interact with the renovated apartment. While a lot is going well, there are also some barriers preventing residents from understanding the proposals and voicing their feedback. The next two pages show those barriers and aids, based on my observations in the demo apartment and the contextmapping interviews ([22.2 Resident interviews](#)). These barriers prevent residents from influencing what is installed to make sure it's fitting, and might later also prevent the changes in competence and meaning needed for practices which improve their comfort.

16.2 Explaining changes

With the [22.3 First iteration tests](#) and [22.4 Second iteration tests](#), I learned about what does and doesn't work when it comes to explaining the changes on paper. [Page 78](#) through [page 80](#) show those insights.

Figure 35: Residents are invited to visit the demo apartment, to see what is planned to change.

Communication problems

Default story

If the tour is clearly a practiced story, it removes trust in the ability to answer questions.

"...the man didn't really know how to answer that. It was clearly a rehearsed talk, the people after us got the exact same story" / "...daar wist die man niet echt antwoord op. Het was duidelijk een ingestudeerd praatje, de mensen na ons kregen exact hetzelfde verhaal."

Legal structure

The legal structure of VvEs and jargon can limit understanding of the process.

"What is a deed of division?" / "Wat is een splitsingsakte?"

Knowledge gap

Without a technical background, it's harder to formulate concerns and give concrete feedback.

All comments and questions about technicalities came from people with a technical background in education/their job.

Information gap

A lack of expected communication from a party (e.g. Stadgenoot) can cause frustration.

"Why didn't I hear anything about this from Stadgenoot?" / "Waarom heb ik hier niks over gehoord van Stadgenoot?!"

Language barrier

The language spoken at a meeting can be a barrier for residents to participate.

"'there's a meeting like this,' and I said 'I'd love to go there, but (...) I don't really fully understand if they're talking, talking, talking.'"

Communication aids

Own pace

Consuming information about the renovation at ones own pace helps.

"I said 'It's better that you explain it to me later,' and they gave me a booklet and those kinds of things."

Workings

Knowing how an installation works creates understanding and helps imagining for the future experience.

"How does that [convection heater] work?"

Experience

Experiencing the demo apartment helps create understanding and trust.

"The demowoning influenced the understanding, to give more understanding to people, so that's my impression. Because I'm able to see it, I'm able to feel it"

Sharing

Residents share the plans with friends and family and get new insights and questions from it.

"I was sharing it to my sister, when she came here."

Used before

Earlier experience with something like induction cooking can create trust in the solution.

"Where did we have that? One time we have uh- (...) It was okay, it's easy to learn" / "Waar hadden we dat nou? We hebben dat een keer uh - (...) Dat viel wel mee, dat heb je eigenlijk zo onder de knie"

Specifics plans

The specificity of plans creates trust.

"They explain what they are going to do, how many days they are going to do it (...) Hearing these kinds of things will make you feel comfortable."

Questions

Being able to ask questions creates trust.

"I'm able to hear what are the plans, I'm able to ask questions"

Showing problems works

The problem was instantly recognized by residents of the apartments and made them understand better what the changes were for.

Problem

Broken vents

The vents break easily. That means you have less control over the temperature and fresh air.

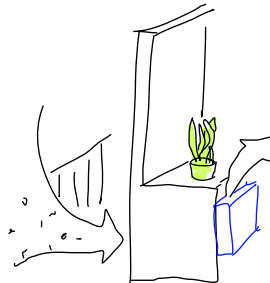


"Those vents, I never opened them or closed them, because they're stuck (...) sometimes you just wanted to close it for a short while, but that wasn't possible."

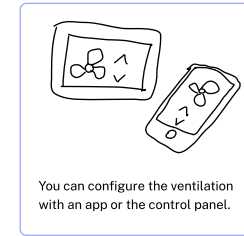
Solution

Ventilation

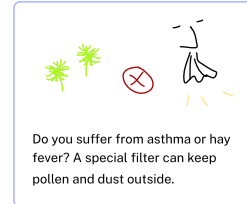
The new facade does not have vents. Instead, a device takes air from the outside, cleans it, and blows it into your apartment.



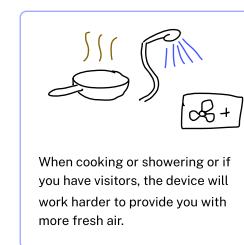
Every year, you should replace the filter. The new filter is automatically sent to you.



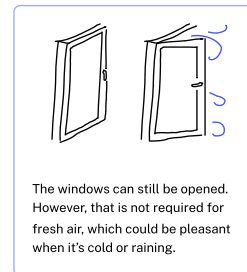
You can configure the ventilation with an app or the control panel.



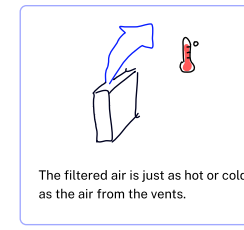
Do you suffer from asthma or hay fever? A special filter can keep pollen and dust outside.



When cooking or showering or if you have visitors, the device will work harder to provide you with more fresh air.



The windows can still be opened. However, that is not required for fresh air, which could be pleasant when it's cold or raining.



The filtered air is just as hot or cold as the air from the vents.

Impacts unclear

These boxes should explain the changes and their impacts for the residents, but that was not clear.

Comparison

Showing these elements compared to the current situation might help.

Use practices

Perhaps linking the changes to residents' practices makes it easier to understand the impact.

Text too complex

Even though I tried to make the text as simple as possible, several words were not understood (e.g. 'filter').

Use effects, not objects

People mention the effect ('turning up the heat') rather than the object ('thermostat'), except for 'famous' objects like double glazed windows.

Illustrations not good enough

Although some parts of the illustrations were understood (the air coming in; the shower head), they didn't communicate the changes well enough.

Use photos

Photos probably work better to also contextualise the content.

Missed perspectives

The quotes only highlighted current problems. This led one participant to feel excluded: "Now, if there's something not there, people might think 'perhaps I'm the only one.'" / *"Nu, stel iets staat er niet bij, zullen mensen denken 'misschien ben ik wel de enige.'"*

Current situation too negative

Although I tried to describe the changes neutrally, the focus on current problems and some wordings still made one participant feel the guide was talking down on her current apartment; "I would remove this: Then you will have fresh air, maybe I already have enough" / *"Dit zou ik weghalen: Straks krijg je genoeg frisse lucht, misschien krijg ik dat nu ook al."*

Multiple perspectives

It could help to include quotes which represent different perspectives. They can conflict, since it's meant to help residents form their opinion and feedback.

Arrows help

The arrows showing air and interactions helped: "I thought it was clear, simple and visual, with those arrows — hot air, cold air, here and there — accessible, that's what I noticed" / *"Ik vond 'm duidelijk, simpel en visueel, met die pijltjes — warme lucht, koude lucht, hierlangs en daarlangs — toegankelijk, dat viel me op."*

Een buur zei:

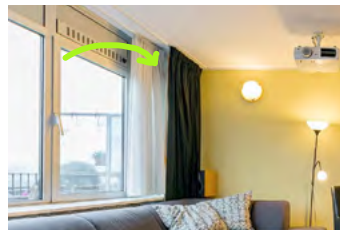
"En in de badkamer zit ook veel schimmel. Dat is bijna niet geventileerd."



Bij het douchen, koken, of met veel mensen in een ruimte zetten veel bewoners een raam of de deur open. De roosters doen dan namelijk te weinig.

Een buur zei:

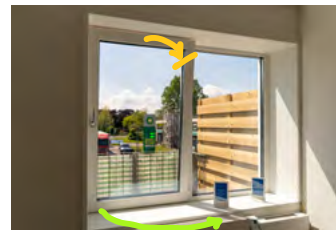
"...want hier klapt alles nu open en komt alles naar binnen als het regent."



Nu kunnen de ramen maar op één manier open. Als je het op een kier zet, kan harde wind het open blazen. Soms regent het daardoor ook naar binnen of vallen planten op de vensterbank naar beneden..



Straks zal de ventilatie vanzelf h... te muf of te klam wordt, wordt er... afgezogen. Tegelijk wordt er me... binnen geblazen. Je ramen en de... dicht blijven, zodat het niet veel kouder wordt. Ook blijven muggen en vliegen dan buiten.



Straks heeft u draai-kieperamen. Die kunnen normaal open, maar je kunt ze ook 'kiepen'. Daarmee kan het raam op een kier worden gezet. Dingen op de vensterbank voor het raam kunnen dan blijven staan.

Een buur zei:

"Vrachtwagens hiervoor als ze komen laden en lossen, die zijn nogal luid zeg maar."



Nu komt er geluid binnen via de roosters en open ramen of deuren. Door de ramen en deuren kunnen er ook insecten binnenkomen. Je kunt dus niet goed ventileren zonder geluid van buiten te horen en misschien zelfs insecten binnen te krijgen.



Straks krijg je genoeg frisse lucht, ook als je deuren en ramen dicht zijn. Zo kun je geluid en insecten buiten houden.

Different angles

Most photos were taken from different angles. This made it harder to compare the situations. In some cases, it also made the current situation seem unnecessarily shabby.

Before/after

The before/after photos helped participants contextualise the changes and they also said it would help them explain the changes to their neighbours: "I would show that, like this is the way it's now, and it will be like this. That creates an image" / *"Dat zou ik laten zien, van nu is het zo, en dan wordt het zo. Dan heb je een beeld."*

Same angles

Where possible, the photos should be taken from about the same angles, with the same type of light, etc. For the switch to an app, for example, this can be ignored.

Secondary source

The participants appreciated having a secondary source of information, next to the information they got from the tour; “In a conversation I don’t remember the details, but the feeling, so I want to retrieve those details later on.” / *“Ik onthoud in een gesprek ook niet de details, ik onthoud het gevoel, dus die details wil ik later nog ophalen.”*

Supplementing

Face to face conversations still need to be possible, though; “I hate anonymous emails. I want to talk with someone, who supports it.” / *“Ik heb een hekel aan anonieme emails. Ik wil eigenlijk met iemand praten, bij wie ik het gevoel heb die staat erachter.”*

People write down remarks

Two out of three participants wrote remarks and questions in the guide. One mentioned: “I wrote down things, so I wouldn’t forget” / *“Ik heb dingen opgeschreven, zodat ik het niet zou vergeten.”*

One place is not enough

They also wrote a few or even many remarks around the different changes. Space for general notes is necessary, but notes can be about individual changes, too.

Een buur zei:

“Vrachtwagens hiervoor als ze komen laden en lossen, die zijn nogal luid zeg maar.”



Nu komt er geluid binnen via de roosters en open ramen of deuren. Door de ramen en deuren kunnen er ook insecten binnenkomen. Je kunt dus niet goed ventileren zonder geluid van buiten te horen en misschien zelfs insecten binnen te krijgen.



Straks krijg je genoeg frisse lucht, ook als je deuren en ramen dicht zijn. Zo kun je geluid en insecten buiten houden.

Zoek op YouTube naar

Meer zien?

Klimaatmissie frisse lucht

Aantekeningen

Is er iets onduidelijk? Of kan er iets beter? Schrijf het alvast op!

Information spread about

For the vents, the changes were spread over multiple pages of the guide. This confused one participant.

Group changes

Different changes to the same system or element should be grouped.

Overall positive reaction

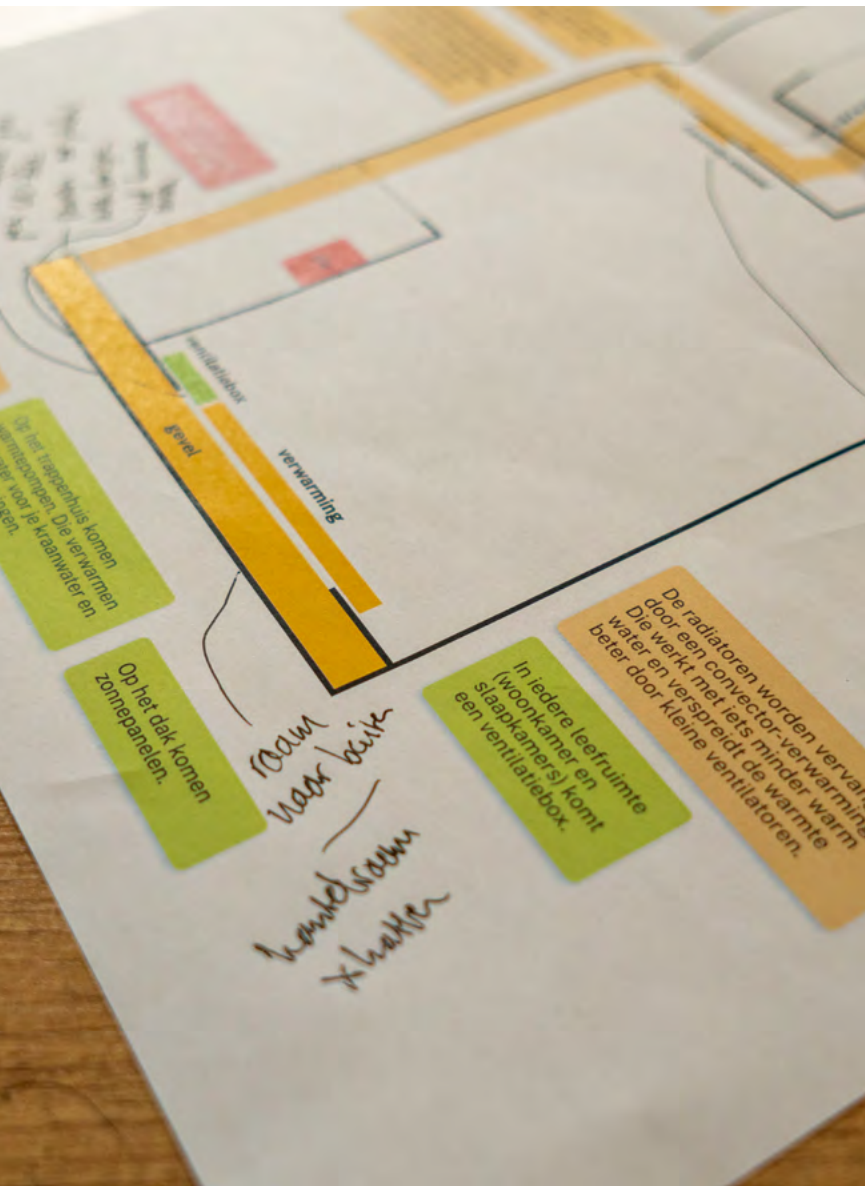
All three participants appreciated the concept of a written guide: “Totally awesome, I thought it was great” / *“Helemaal geweldig, ik vond ’m helemaal goed.”*

It was almost expected, a VvE board member said: “This looks like something I would send to the residents of this building on behalf of the board.” / *“Dit lijkt op iets wat ik naar de bewoners van dit gebouw namens ons bestuur zou willen sturen.”*

Multiple languages

Translations are definitely needed. One participant told me that Dutch would only get you so far with her neighbours, and English would be even worse. For a different neighbour, however, English would be the right fit. “It depends, English doesn’t work for them, their own language does, but Dutch only a little bit.” / *“Dat verschilt, Engels werkt voor hen niet, hun eigen taal wel, Nederlands een beetje.”*

17. Improving plans



My prototyping focussed on the renovation guide, but I also gained some insights about getting people to participate in improving the plans with the [22.3 First iteration tests](#) and [22.4 Second iteration tests](#).

17.1 Trusting input sessions

Some residents are vocal about losing their trust in participation projects. They always see the same people at input sessions – which showed them the opinions of others were ignored – and got the feeling nothing was done with their input, while instead the decisions were made by people from outside of Reigersbos “who come here with their ties and dress shoes” (Resident during [22.3 First iteration tests](#)). One resident also voiced their frustration with the feeling that input sessions were more like sales pitches, where no one actually listened. Knowing the incentives and motives of the different parties involved could help regain some trust.

17.2 Transparency about choice

The three options for the renovation felt like false options to some residents, because they assumed nobody would want another renovation before 2030, and they feared the proper permits wouldn't be granted if the project didn't also phase out natural gas. However, it might be possible that these options are important for the VvE boards. Regardless, it should be clear what space there is to change the plans

Figure 36: Feedback from residents can be used to improve the renovation plans.

17.3 Involvement from the beginning

Residents also recommended starting the process with a questionnaire and a meeting to understand the current problems, which is mirrored by Knoop & Slauerhoff (2020) and Glumac, Reuvekamp, Han, & Schaefer (2013). It should be moderated and reported by an independent third party — which the municipality isn't, since they demand the phasing out of gas — and include not just home owners and landlords, but also social and private tenants. The third party could then stand up for the residents throughout the rest of the project. In line with my concept, this could also be used to better explain the changes in the renovation guide.

17.4 Too good

On the other side of the spectrum are residents who only see the positive of the renovation plans. Two participants of my [22.4 Second iteration tests](#) had difficulty coming up with improvements; the plans represented such a large improvement compared to their current situation, that it was hard to imagine what could be even better. However, focussing on their doubts and worries (for themselves or for their neighbours) did help to come up with some improvements. Moreover, this was the case when talking with residents individually. I expect that doing this activity with multiple residents also leads to the satisfied residents building on the remarks of more critical people.

17.5 Timing

For the [22.5 Third iteration tests](#), I also tried to organise a co-creation session. However, several factors led to a lack of residents: only one person wanted and was able to join. From the feedback I got, I learned this mostly had to do with the timing. First, the session was planned halfway July, which proved to be a time when many residents were on holiday. Secondly, I would only be able to organise one session, which meant that two residents who were interested but had other obligations, could not join a session at another time.

18. Stakeholder activation



The previous chapters explain why the interventions are desirable and why they are shaped this way. However, the other stakeholders need to ensure these changes are actually implemented in the process ([3 Implementation](#)). From the [22.5 Third iteration tests](#), I gathered that the parties are willing to implement the changes to the process, but there are some doubts which require [24.1 Further research](#).

18.1 Reception

Rethinking the process

The interventions feel logical and even simple, but thanks to the nuance and detailing, they do help the stakeholders to rethink their approaches and implement (some of) the changes. For example, the focus on the experience is new for parties like Stadgenoot and the municipality, but it does make sense for Klimaatmissie and them to have that focus. Often, the priority for residents and other parties seems to be first on the financial side, then on what changes technically, and the experience is the last thing to consider. These interventions shift that focus by adding steps to the existing processes.

Benefits and worries about sessions

Involving a diverse group of residents with the survey and co-creation sessions seems wise, because they can build upon each others' questions and remarks. The municipality also expects residents to rather assume something from their neighbours than from a civil servant. However, for the housing association it remains a little vague what those sessions would look like, and there are

Figure 37: The Stoperas, the townhall: home of one of the main stakeholders (Martin Alberts, Stadsarchief Amsterdam, 2005)

worries that differences in technical understanding might lead to some participants not being able to follow along, or others feeling annoyed by a lack of understanding.

The sessions themselves also communicate that the residents are interested and as such indicate the willingness to ‘buy’ the renovation to Klimaatmissie.

Extra benefits renovation guide

The guide is also seen as something which can be used for other purposes. In the intended context, it can also have the effect of keeping the conversation alive, which is seen as necessary to move the project forward. It also reassures residents about the possibility to exert influence on the plans and it makes the explanation more scalable, since someone from Klimaatmissie has to have fewer face-to-face conversations to explain the renovation. On the larger scale of renovating the whole of Amsterdam Zuidoost ([7.2 Zuidoost](#)), it could also be repurposed to activate people to think about renovating and make the higher aims of the energy transition more tangible and personal. That would also help to scale up the phasing out of natural gas and accelerate the transition.

Impact

However, despite the positive reception of the focus on the experience, there is still some doubt about the necessity for involving residents. Stadgenoot and Klimaatmissie wonder whether the changes will actually have a big impact, since the installations and designs are based on earlier projects and research, anyway.

Tone and effect renovation guide

There is also a fear that the neutrality of the renovation guide might demotivate some residents who might otherwise be activated, or that residents reject solutions because the learning curve is a little steep, but the solution would be usable after a short introduction period.

18.2 Roles and implementation

The focus on the design of the plans of these interventions made it clear the renovating party would be responsible for much of the implementation, especially with regards to creating the renovation guide. Since they are already used to making an overview of what the technical changes are, this seemed like a feasible addition to the process. However, a template (and possibly a checklist of what to think about) would make the creation of the renovation guide easier.

For the municipality, it seems clear that they play multiple roles, such as bringing in knowledge about sustainability, setting up these processes and providing process managers, keeping an eye on the costs for the residents, and stimulating these approaches while sharing the learnings between different renovations. Especially the process manager would play a role, by facilitating the sessions.

For a housing association, the role in a project with mixed tenure is slightly limited and mostly surfaces in the communication to their residents. However, if it concerns a building which is completely their property, they are likely to be the initiators and project managers, which means they might need to facilitate the survey and co-creation sessions, or hire someone to do that.

Lastly, !WOON is seen as a party which can just fulfil their primary goal, to support residents, by helping them check the plans from Klimaatmissie on a technical and financial level.

Considering the changes required and the roles to be played by the different stakeholders, the interventions both seem to be viable and feasible.

Section 5

Approach

My project approach could be separated into two phases: research leading up to a design direction and then three prototyping and testing iterations of my concept. I focussed on the diversity of the neighbourhood and the power balance, to ensure an inclusive end result. To get a grasp of how mismatches originate, I used practice theory to deconstruct behaviour into meaning, material and competences. Through interviews with residents, observations at the demo apartment, and expert and stakeholder interviews, I have gathered insights about those mismatches. After coming up with a design direction, I created and tested solutions. This led to the five intervention.

19. Project overview

19.1 Two projects

In order to look at the approach, it's good to separate my graduation from the renovation. They are both design projects, so comments about inclusion and approach could apply to both. This chapter is about the graduation project, the renovation project is described in [9 Gevelaanpak Reigersbos](#).

19.2 First diamond

The overviews in [Figure 39](#) and [Figure 40](#) provide an overview of my activities, how I approached them, who participated, and what the outcomes were. The first part of the process resembles the Discover and Define diamond of the Double Diamond (Design Council, 2019): I did research into the context and problems, to be able to define a direction for what I would set out to design. The interviews and observations provided me with insights to then decide on what problems were most pressing and what opportunities were most promising: a form of research for design (RfD) (Stappers & Giaccardi, 2015).

19.3 Three iterations

The second part of the process consists of three iterations of the intervention: defining research questions, making a prototype, testing it, and mapping the insights. This can be seen as a combination of research through design (RtD) and research for design (Stappers & Giaccardi, 2015). The prototyping and testing created new knowledge, which is communicated in this report (RtD), and that knowledge was also used to create a better, new prototype (RfD).

		February 2021				
		21	22	23	24	25
Name	Type					
Stakeholder interview	Activity	Stakeholder interviews				
Designer/domain expert	Activity	Designer/domain expert interviews				
Evaluation current design	Activity	Evaluation current design				
Contextmapping form	Activity	Contextmapping form				
Contextmapping Reigersbos	Activity	Contextmapping Reigersbos				
Create stakeholder map	Deliverable	Create stakeholder map				
Define inclusion	Activity	Define inclusion				
Presentation energy	Activity	Presentation energy				
Desk research	Activity					
Create InDesign template	Activity					
Defining problem area	Activity					
Idea generation ideal	Activity					
Midterm report & evaluation	Deliverable					
Map	Deliverable					
Midterm	Deadline/event					
Update energy lab	Activity					
Prototype v1	Activity					
Validation v1	Activity					
Documentation v1	Activity					
Activity	Activity					

Figure 38: Part of my planning for this project.

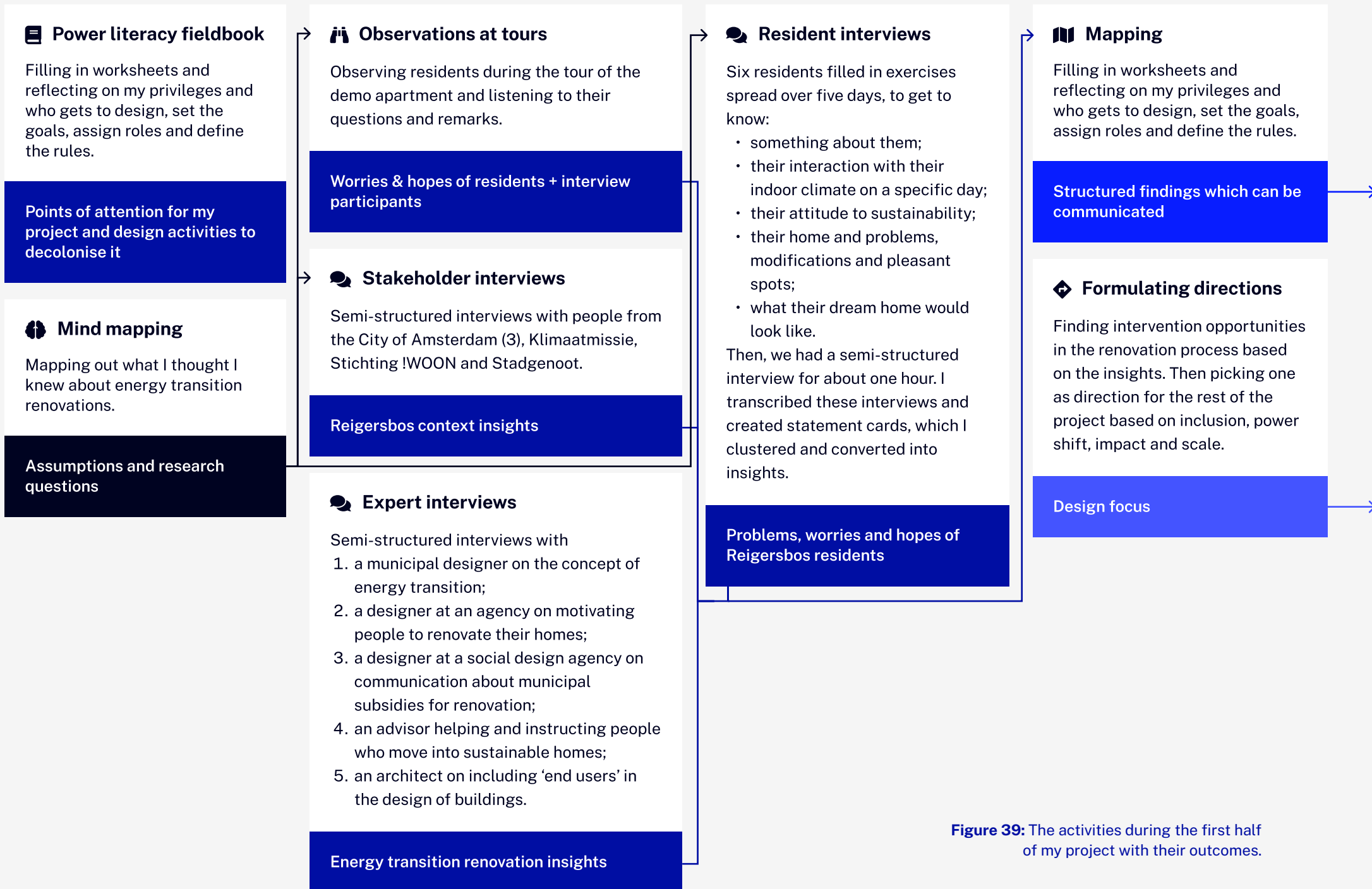


Figure 39: The activities during the first half of my project with their outcomes.

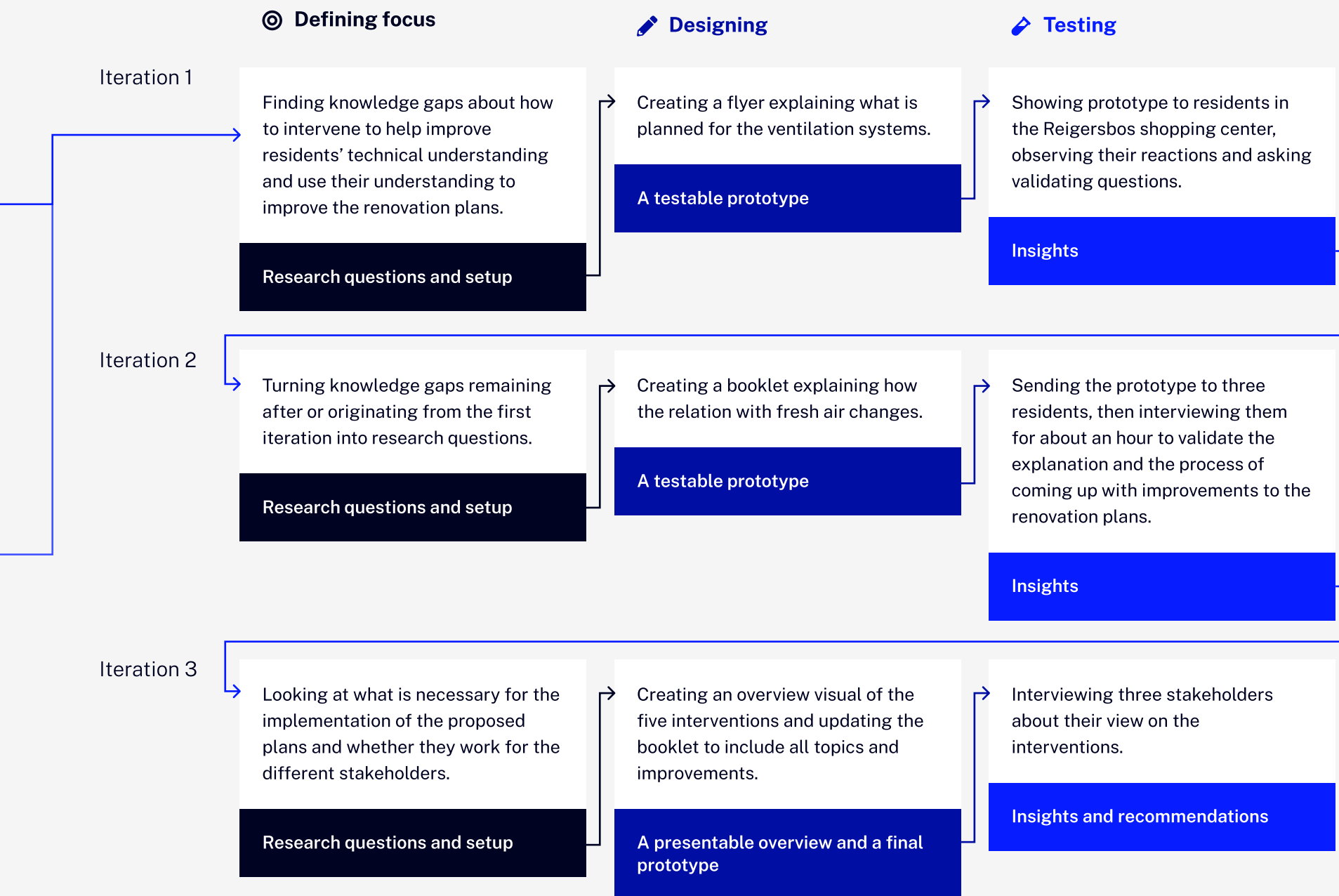


Figure 40: The second half of my project consisted of three iterations on the concept in a specified direction,

20. Inclusion



I think inclusion is important in a design process, especially since my design should make the renovation process more inclusive, as mentioned in [Problem and opportunity](#). But what makes a design project and renovation inclusive? You could imagine every activity, group or product having a circle ([Figure 42](#), Holmes, 2018). Within that circle, people are included who can participate, while the people outside of it cannot. The circle is a representation of the obstacle that excludes those people. That could be rules (you can only view a play after purchasing a ticket) or more tangible properties (you can't view the play in Rotterdam if you're in Amsterdam). Inclusion is about widening the circle to allow more people to participate (making the tickets free or streaming the play online.)

Access through buying a ticket allows performers to make money and sustain their art. That is a clear benefit. However, wealth is not distributed equally, so people are not just excluded for *having a ticket*, but also for *not having enough wealth*. Those measures help some people, while setting back others. This might be an unintended side-effect. Other exclusionary obstacles, however, might be intended; think of laws excluding people based on the colour of their skin. Not just policy can be exclusive, a design process and its outcome can be made more inclusive, too.

Figure 41: Curb cuts are a nice example of inclusive public design. Level curbs might be an even better solution: everyone can cross the street in any location.

Inclusion

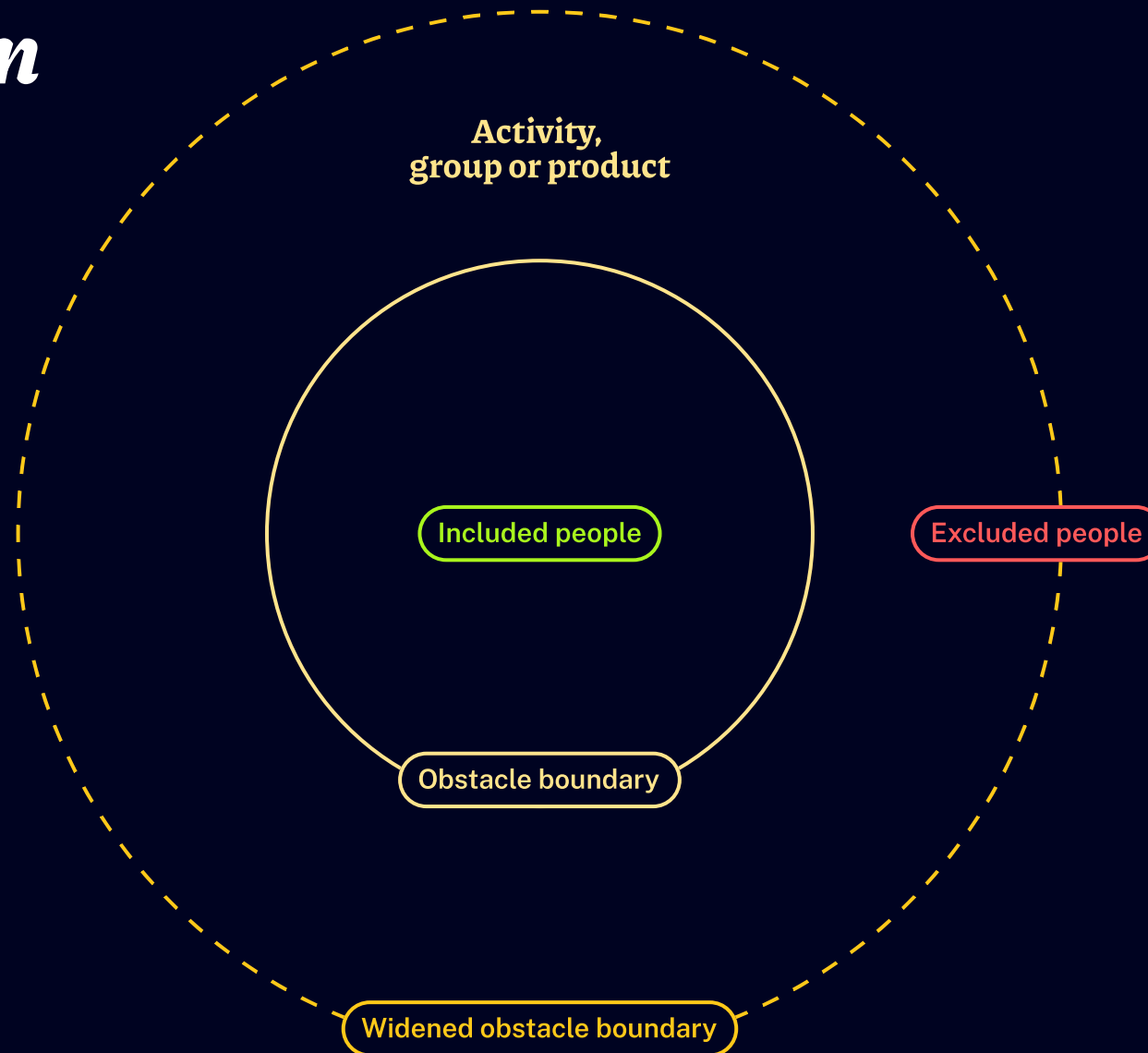


Figure 42: An activity, group or product can be represented as having a boundary, which can be widened to include more people, by removing obstacles.

20.1 Inclusive design

The Dutch project *Inclusie* by *Gebruiker Centraal* defines designing inclusively as:

“making sure all humans can participate in society, regardless of their diversity in physical, cognitive (including lingual) and psychosocial capabilities, and the circumstances under which they live.” – translated from Dutch from *Gebruiker Centraal*, 2019b

I like this definition, except for the word *all*. As in the examples above: exclusion “isn’t inherently negative, but it should at least be an intentional choice rather than an accidental harm” (Holmes, 2018).

For this project, I would like to define inclusion as being conscious of the way people could be excluded from the renovation project, my design process or (the systems in) the renovated homes.

20.2 Equality, equity and justice

Some concepts which are related to inclusion are *equality*, *equity* and *justice*. I like using inclusive design as an umbrella term to also talk about these concepts, since designing an inclusive society should lead to more justice.

- *Equality* is about having access to the same tools to profit from opportunities. On a national scale this might mean everyone is able to request subsidies to renovate and insulate their home to reduce the CO2 footprint and increase the comfort of their homes.
- *Equity* is about having access to tools which are adjusted to the individual or situation. This might mean having income-adjusted subsidies.
- *Justice* is about changing the system so there is not just equal access to tools, but also to opportunities. This might mean raising the minimum income and/or directly funding all renovations to phase out natural gas.

It’s also possible to create a *justice* frame to look at the energy transition: instead of widening the gap between the privileged and the marginalised, it should help close that gap.

20.3 Important diversity

The identities, abilities and circumstances as mentioned in *Gebruiker Centraal*’s definition are an important part of inclusive design. As a designer, I need to be aware of them to be able to design a fitting solution.

Literacy and poverty

There are some abilities and circumstances which might exclude residents from the design process or their own homes if they're not properly taken into account. Especially low literacy for Dutch, low digital literacy, or lack of a technical background can clash with the methods of communication or installations in the homes. Low disposable income can prevent people from fully participating, too. Either through energy poverty – which decreases the possible savings from the renovation, making it too expensive – or economic stress (Gebruiker Centraal, 2019a).

In Reigersbos, these abilities and circumstances are more prevalent than in the whole of Amsterdam or The Netherlands (de Grip & Booi, 2019; Tjin, 2020). Although it is always important to make sure people with these abilities and circumstances are represented in the participants of research and design activities, this is even more important in the case of this region compared to others.

Culture, tenure and household composition

Someone's culture, housing tenure and household composition can also influence their practices at home as part of their meaning. The diversity should be represented as accurately as possible in the participants, too.

Achieving diversity

In addition to using quota sampling throughout my project ([22 Research setup](#)), I also tried to make my research materials accessible, to include as many people as possible. For the physical materials, this meant using short sentences, simple vocabulary, and visuals, as recommended in the guide from Stichting Lezen en Schrijven (2020). Additionally, I made sure to provide both a Dutch and an English translation of the texts.

For the interviews, this meant that I let the participant decide on a location where they felt comfortable. This also meant I came to them, instead of the other way around (Goodwill, 2020). Additionally, I made sure to reward participants of the first interviews and the second iteration tests for their time and effort with a voucher for a local store (Goodwill, 2020).

20.4 Power

Another frame which can be used to look at inclusion, is that of power. Goodwill (2020) presents five sources of power: privilege, access, goal, role and rule. I used her field guide to find several points of attention.

Privilege

I enjoy all of the mentioned privileges ([Figure 43](#)), as well as being (digitally) literate and having a relatively high

dispensable income. This means that for all those categories, I might have biases and blind spots concerning the accompanying oppression.

Access

Practically, I held all the access power in my graduation project: I got to decide who was included in the design process. Which residents I invited and the shape of the invitations were in my control, as far as the time and resource limits of graduation permitted me.

Goal

I didn't initiate the project, but the exact framing, "defining the desired outcome and structuring the design process" (Goodwill, 2020) were all in my hands. Ideally, I would have involved residents in setting this goal, but this proved to be difficult, time wise. Instead, I explicitly asked what the residents thought of my goal during the second iteration tests.

Role

The role of designer traditionally lies with the graduation student, as they have to prove their design abilities. Similarly to the goal power, it would have been great to give the role of designer to the residents, but this proved to be difficult for my graduation

project. However, this principle is at the basis of my concept, which shifts the designer role from *Klimaatmissie* to include residents, too.

20.5 Power balance

A more simplified way to look at the power balance is the one proposed by Tomasini (2020): Imagine an axis from 'ego-designer', where the residents are not involved, to 'participant', where the residents have complete control over the process ([Figure 44](#)). The place I take on this axis might depend on the activity: while goal setting should ideally be on the *participant* side, creating an interactive prototype, which requires specific software skills, could very well be in the role of *ego designer*.

20.6 Inclusion in project

Overall, my inclusive approach showed itself in trying to make the concept accessible ([2 Renovation guide](#)), including a diverse group of residents through accessible materials and quota sampling ([22 Research setup](#)) and by working towards a goal which is focused on making the renovation more equitable ([Problem and opportunity](#)).

Furthermore, it came back in the criteria I used for myself to make decisions about the scope and direction (see appendix J):

Inclusion

The way in which it includes people, or what the cause is of exclusion right now.

Power shift

As I applied the idea of a power balance between the designer and resident to my graduation ([20.4 Power](#)), I could also apply it to the whole renovation project. Opportunities which give residents more power to design their own apartment had my preference.

Impact on

It's hard to determine the impact of a direction beforehand. However, I could specify what I hoped to impact and what limits there are.

Scale

While my graduation project focussed on Reigersbos, ideally, it can be extended to other projects. The more projects this can be extended to, the better.

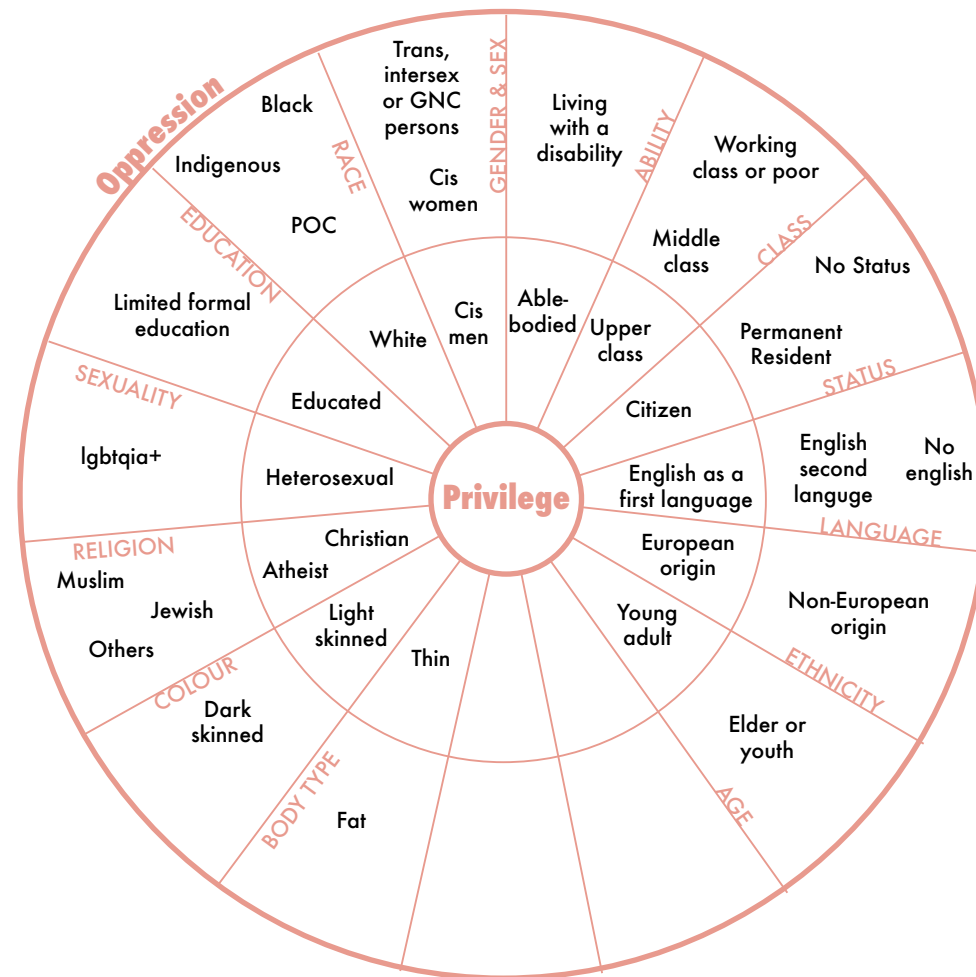


Figure 43: The visualisation of privileges and oppression in the field guide by Goodwill (2020).

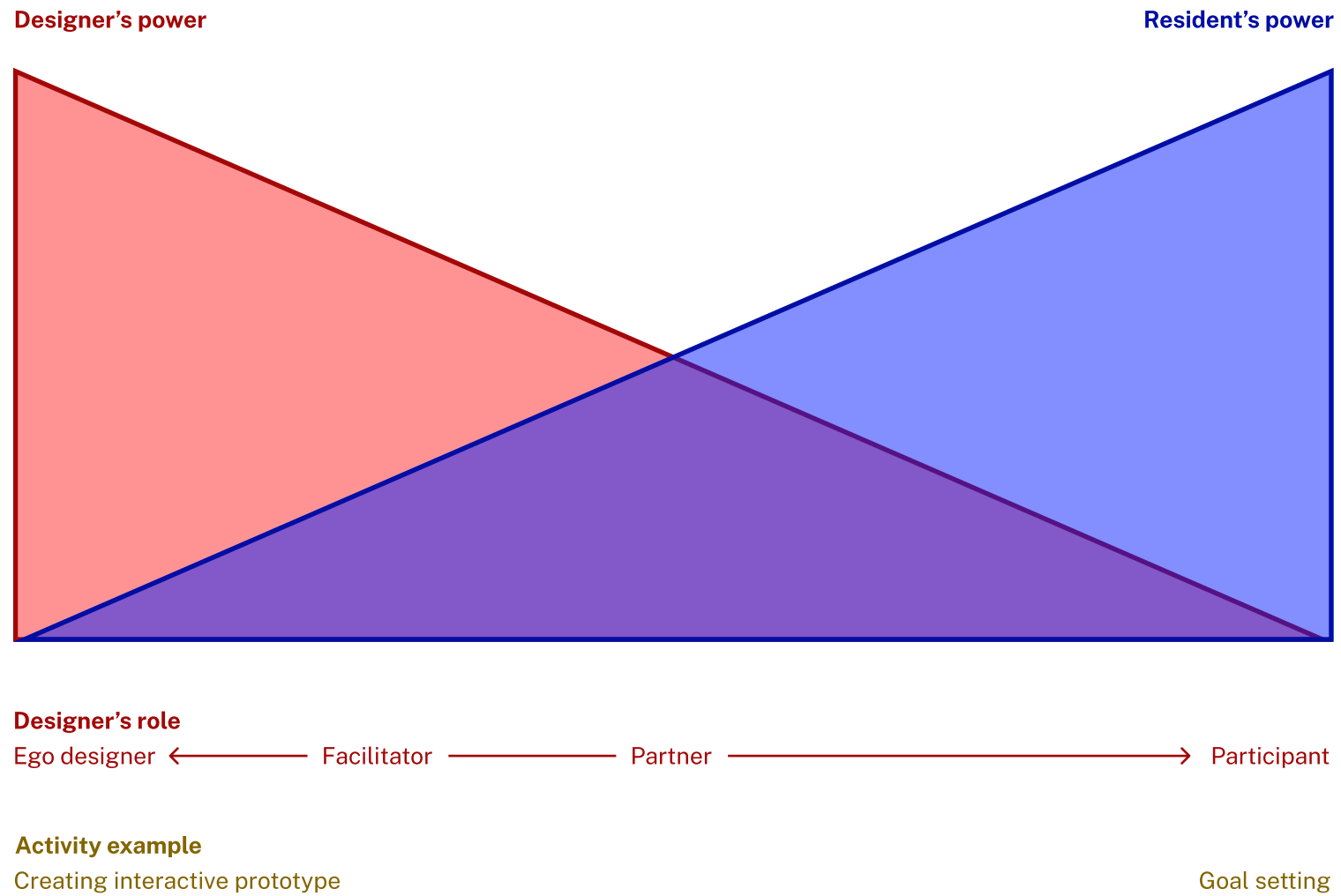


Figure 44: The balance between the power of the designer and resident, adapted from Tomasini (2020)

21. Practices



To understand the mechanics of mismatches, we need to understand their behaviour and the interaction with the apartment, which I try to do with practice theory. At the center of it are practices, a “routinized type of behaviour” (Reckwitz, 2002), influenced by three factors as shown in [Figure 46](#) (Shove, Pantzar, & Watson, 2012):

- *Material*: “objects, infrastructures, tools, hardware and the body itself”
- *Meaning*: “mental activities, emotion and motivational knowledge”, which is (partly) shared among social groups
- *Competence*: “understanding and practical knowledgeability”

For example, our bodies require some heat to stay alive. A heater (material), powered by natural gas, can provide this heat. Natural gas had the image of being cheap, abundant, and cleaner than burning coal indoors (meaning). If someone knows how to turn up the heating (competence), they are likely to do that when they feel cold (practice). However, the meaning around natural gas has changed: while it’s cheap and clean compared to other energy sources, it is still expensive and harmful to the environment compared to, for example, putting on a sweater. So for those who adopted the meaning of natural gas being dirty or expensive, they might put on a sweater when it’s cold, changing the practice.

To make it a bit broader: the installations are an important part of the material. They are changed through the renovation which is influenced by the initiation and evaluation processes. The competences and meanings have to be updated to fit with this new material, which is achieved with instructions. At the same

Figure 45: The contextmapping booklet with sticker sheets and pen.

time, experiences, media, and stories from friends or family will also influence the meaning and competences.

With this in mind, looking at practices can help us understand how to improve the end result by changing the material, meaning and competences.

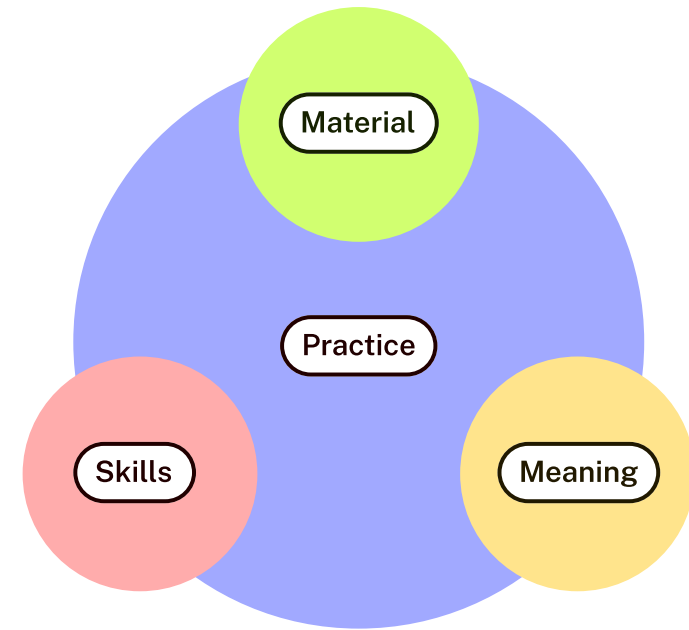


Figure 46: The three elements that make up a practice.

22. Research setup



22.1 Expert and stakeholder interviews

To get insight into the energy transition, renovations, and the Reigersbos project, I conducted semi structured interviews with experts and stakeholders. The experts were people I knew who had relevant experience in this field, so this was a form of convenience sampling (Henry, 1990). The stakeholders were recruited through other stakeholders: snowball sampling (Henry, 1990). For each interview, my research questions were different, depending on their role or expertise. Appendix B shows the interview scripts.

22.2 Resident interviews

Recruitment at demo apartment tours

To get a good understanding of the residents' interactions with their homes, I applied a simple form of contextmapping (Visser, Stappers, van der Lugt, & Sanders, 2005) by sensitising and then interviewing participants. I recruited participants after tours of the demo apartment (convenience sampling; Henry, 1990) where I also observed about 50 people taking the tour. I provided them with a flyer ([Figure 48](#)) about the research. If the participant liked planning ahead, I also wrote down the details of the appointment on the flyer.

Understanding mismatches and renovation process

I needed to know where mismatches come from and where I can solve them, as well as where I can integrate the residents' perspective in the renovation process. Based on the process map ([Figure 21](#)) and a preliminary system map ([Figure 49](#)), I set out with the research questions:

Figure 47: I tested my first iteration in the main street of the Reigersbos neighbourhood.

Research: Living and renovations



With this research I want to get to know you, your home and your experiences.



Soon, you'll get a booklet in your letterbox.



In the booklet are five activities, spread over five days.



Afterwards, I'll interview you for about an hour. The booklet will help with that.



Everything in this research will stay anonymous. I will share my insights with others, but without your name.



Questions? Send me a message:
06 811 896 84
f.m.jansen-1@student.tudelft.nl

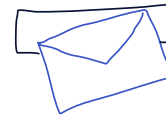
Thanks for helping me with my research! Your home might be renovated sometime soon. That means your home will change. That can be nice, but it could also be a hassle. How do we make sure your home becomes more comfortable? That's what I want to know.

This research is a part of my graduation. In it, I look at renovations as part of the energy transition, together with the city of Amsterdam, Klimaatmissie Nederland and !WOON.

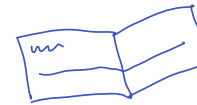
Speak to you soon!

Floris Jansen

Research: Living and renovations



Booklet in letterbox
soon



Activities in booklet
5 days, 10 minutes



Interview
1 hour

Date, time and location interview:



Figure 48: I gave participants a flyer (Dutch or English) with explanation about the research and, if we already made an appointment, the time and location for our interview.

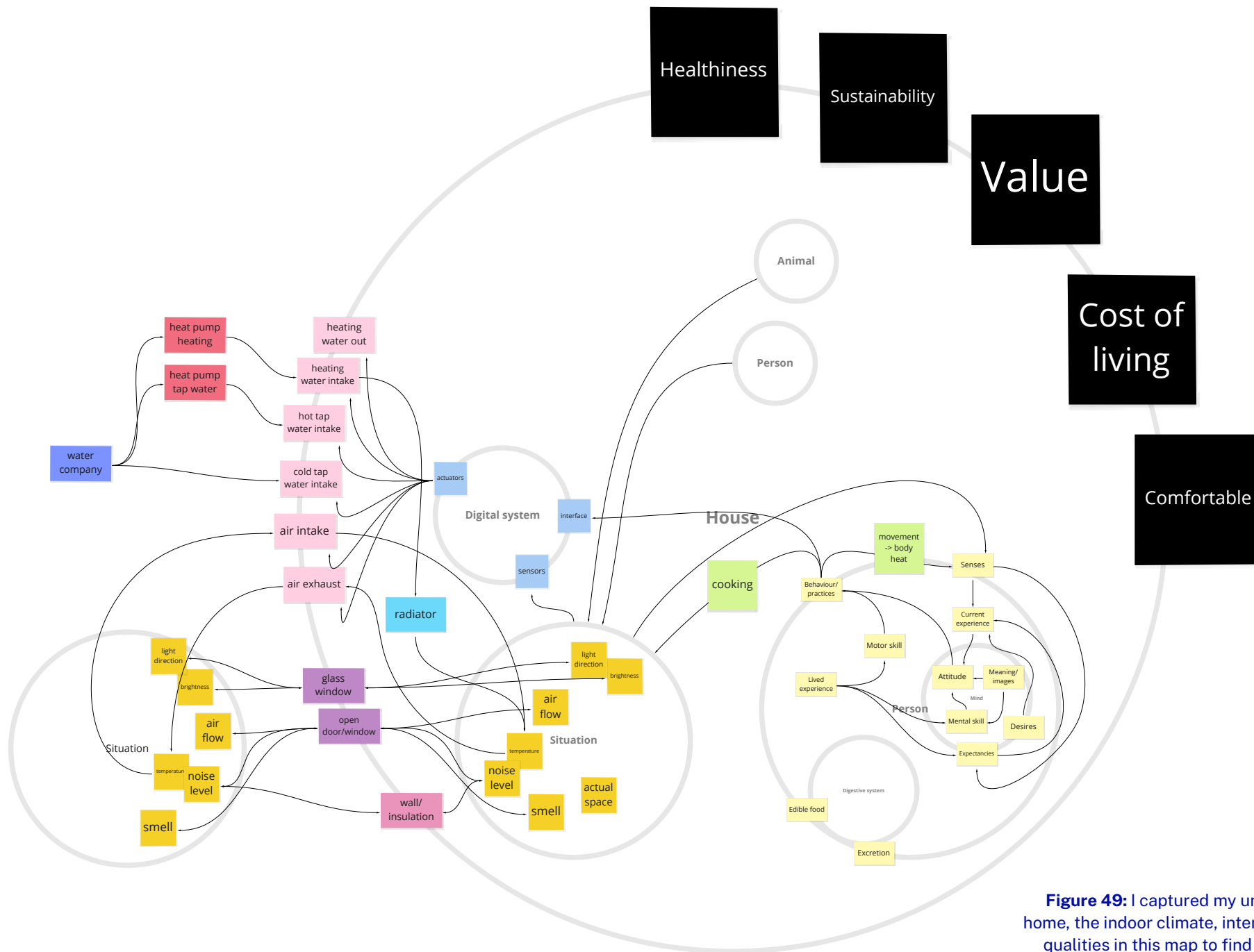


Figure 49: I captured my understanding of a home, the indoor climate, interactions and their qualities in this map to find knowledge gaps.

- Where do mismatches originate?
 - What is experienced as comfort? What causes discomfort?
- What are locations for intervention? Where are the initiation, evaluation and instruction processes (not) working?
 - What is (not) picked up as a problem?
 - What are residents (not) thinking about? What should they be thinking about to influence the renovation?
 - What are residents (not) learning? What should residents be learning to increase their comfort?
- Where are the installations working, where are they lacking?

Based on these research questions, I set up the sensitising booklet ([Figure 50](#), appendix C) and interview script (appendix D). I pilot tested the booklet with two students, with Dutch as their first and second language, respectively, to see if I would get the desired kind of results and if it was clear enough.

Generating for tacit and latent knowledge

Contextmapping traditionally involves generating something in a session to get to deeper knowledge (Visser, Stappers, van der Lugt, & Sanders, 2005). However, as I tried to be flexible in the location of the interview, this would pose a logistical challenge. Instead, I let the participants generate a view of their dream home. I did apply experience domain principles: starting the

booklet and interview with the current moment, shifting to the past and then moving on to the future. This helped participants to “construct a view on the context” (Visser, Stappers, van der Lugt, & Sanders, 2005), making it possible to reach the deeper levels of tacit and latent knowledge.

Afterwards, I transcribed all interviews, created statement cards (Stappers, 2012) and clustered those to generate the insights reported in [10 Process perspectives](#) through [13 Worries & hopes](#).

22.3 First iteration tests

Street testing

The recruitment method of the resident interviews had a limiting factor: I was only able to recruit people who were already interested enough to visit the demo apartment. In this group, home owners seemed to be over represented. To reach tenants and quickly recruit participants, I did my first prototype test in the main street between the Reigersbos buildings ([Figure 47](#)) during three half days. Once again, this was convenience sampling (Henry, 1990). However, since this sampling was done within a different group of people to achieve diversity among the participants in my research activities ([20.3 Important diversity](#)), the overall approach was quota sampling (Henry, 1990).

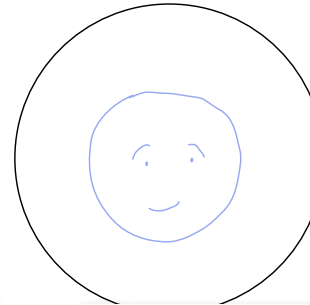
My house and me

Day 1: Who am I?

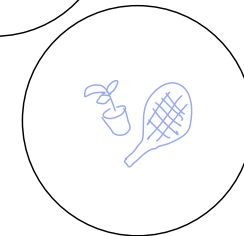
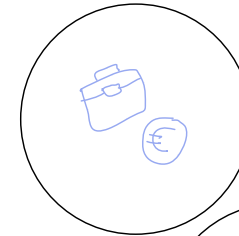
Draw yourself and draw or describe your work, hobbies, favourite music, food, etc.



Self portrait



Work



Hobbies

Day 2: My day

1. Draw or write on the timeline what you've done today. Think of meals, work, contact with friends or family, hobbies, household, etc.

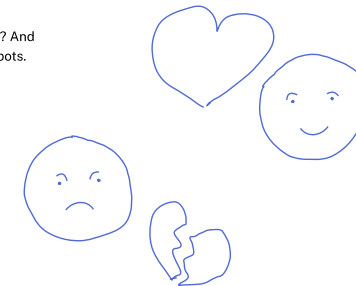


2. What did you do for the temperature or air quality? Draw or write what you did with the heating, windows, ventilation, air fresheners, etc.



morning

2. What are your favourite spots in your home? And the least pleasant? Make a picture of those spots.



3. Send me the photos with some explanation.

WhatsApp: 06 811 896 84

Email: f.m.jansen-1@student.tudelft.nl



Figure 50: Four pages of the sensitising booklet.

As the street is also part of the shopping center and features the entry and exit of the metro station, many passerby did not live in the project apartments. However, most people came from the surrounding boroughs, so they had similar experiences, as the demographics and building types are quite similar (Tjin, 2020).

Where, when, who, what and how of the concept

To specify the concept, I needed answers to the following questions:

- How can I communicate the workings of the future/new installations?
 - How do residents communicate about how their homes work?
 - How do residents imagine their apartment? What kind of mental picture do they have?
 - What are fitting mediums for communication about the plans?
 - From whom do residents expect this information?
- How can I stimulate giving feedback about the installations and expected experience?
 - What makes people want to give feedback?

With those answers, I could specify the medium (where and when), structure and language (how), and sender (who)

for the extra information (what). I also looked ahead at the third intervention, looking into how I can use the increased understanding to actually improve the plans through feedback.

Prototype test, drawing apartment and explaining temperature

I created a prototype for testing and two other activities to test on the street of Reigersbos with about 25 residents:

- I asked people to take a look at the prototype ([Figure 51](#), appendix E), tell me what stood out to them, and explain what they thought it communicated. Then, I explained the goal and asked how they would want to receive this kind of information. If the person seemed to be in a hurry, I only asked this last question.
- I asked six people to draw their apartment. Most people explained what they were drawing (one person didn't draw, but just explained it) and some mentioned what they thought was weird about their apartment (e.g. doors in a strange location, annoying neighbours or problems with mould).
- I asked people to explain how they made sure their apartment had a comfortable temperature.

The results served as input for improving the concept ([2 Renovation guide](#)) and extra information about the context.

Problem

Broken vents

The vents break easily. That means you have less control over the temperature and fresh air.

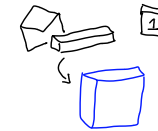
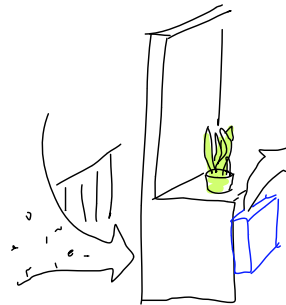


“Those vents, I never opened them or closed them, because they’re stuck (...) sometimes you just wanted to close it for a short while, but that wasn’t possible.”

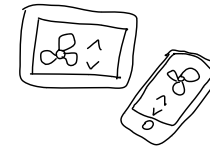
Solution

Ventilation

The new facade does not have vents. Instead, a device takes air from the outside, cleans it, and blows it into your apartment.



Every year, you should replace the filter. The new filter is automatically sent to you.



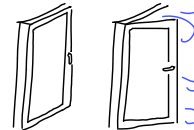
You can configure the ventilation with an app or the control panel.



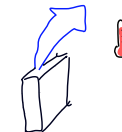
Do you suffer from asthma or hay fever? A special filter can keep pollen and dust outside.



When cooking or showering or if you have visitors, the device will work harder to provide you with more fresh air.



The windows can still be opened. However, that is not required for fresh air, which could be pleasant when it's cold or raining.



The filtered air is just as hot or cold as the air from the vents.

Figure 51: My first prototype explained how ventilation would change, using illustrations.

22.4 Second iteration tests

Invitations and involved residents

For my second test, I wanted to dive deeper into the concept, so I wanted to schedule interviews again. I recruited people by depositing notes ([Figure 52](#)) in the mailboxes of one building, to reach both tenants and owners (convenience sampling; Henry, 1990). This only resulted in one participant joining my research, so I supplemented it by approaching an involved resident through Stichting !WOON (snowball sampling; Henry, 1990) and another participant from a demo apartment tour.

Prototype test and generating improvements

This second test served to validate the changes made based on the previous test, but also to dive deeper into collecting feedback from residents after receiving the renovation guide ([Figure 53](#), appendix F). Similarly to the contextmapping booklet, I deposited the renovation guide in the participants' post boxes, together with an explanation about the research (appendix G).

During the interview (script in appendix H), I let participants explain the planned changes, both for a topic I provided extra information for (fresh air) and one where I did not (heating). This helped me understand whether the guide improved their understanding, combined with questions about how they handled the guide, what they thought of it and what role it could

play in interactions with neighbours ([16.2 Explaining changes](#)). Then, I moved onto generating improvements to the plans, using a printed floor plan with the changes highlighted ([17 Improving plans](#)).

22.5 Third iteration tests

With the last test I hoped to test the setup of the co-creation session, so I asked previous participants to join or suggest neighbours. Sadly, this only resulted in one possible participant (see [17.5 Timing](#)), so instead, I focussed on validating the concept with other stakeholders.

Stakeholder interviews

I explained the concept of the five interventions to representatives of Klimaatmissie, Stadgenoot and the City of Amsterdam, as I imagined them having the biggest roles in the implementation ([3.3 Roles](#)). Then, I asked them about their first impression, how it could help them, what they needed to make it work, what role they could play, what might obstruct the implementation, and how they thought other stakeholders would think about it and act. This led to the conclusions in [18. Stakeholder activation](#). In parallel, I made the final version of the renovation guide.

Hello Reigersbos residents,

Would you like to participate in my research?



I'm Floris, a student at the TU Delft, and I do research into the experiences of residents with regards to renovations.



The research consists of going over some documentation about the facade renovation.



Afterwards, I'll interview you for about an hour.



I would like to do the interview around half June.



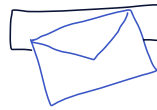
For this research, I'm looking for participants: people who live in an apartment above Winkelcentrum Reigersbos.



We help to improve the renovation even further.



Would you like to join? Call, text, app or mail:
06 811 896 84
f.m.jansen-1@student.tudelft.nl
...or leave a note in the letter box of Reigersbos 70



Documentation in letterbox



Go over documentation



Interview
1 hour

About this research:

Your home might be renovated sometime soon. That means your home will change. That can be nice, but it could also be a hassle. How do we make sure your home becomes more comfortable? That's what I want to know, specifically for Zuidooost.

For my research, I want to speak with people about the communication surrounding such a renovation.

This research is a part of my graduation. In it, I look at renovations as part of the energy transition, together with the city of Amsterdam, Klimaatmissie Nederland and IWOON.

I will use the results of this research to improve the communication. Hopefully, the end result also improves, through that.

Figure 52: I dropped this note (with a Dutch translation on the other side) through the mailboxes of one building to recruit participants.



Frisse lucht

Nu



Als je frisse lucht wil, kun je nu het rooster open zetten. Daarna blijft het rooster op die stand staan, tot je er weer wat aan doet.

Straks



Straks kun je met een app de ventilatie harder zetten. Na 8 uur gaat het systeem weer terug naar de automatische stand. Als je de ventilatie uit had gezet, gaat deze dus weer aan.



Het rooster laat nu buitenlucht direct binnen. Deze lucht is dus net zo koud of warm als buiten. Soms zorgt dit ervoor dat het nóg kouder wordt binnen.



De nieuwe gevel heeft geen roosters meer. In plaats daarvan maakt een apparaat buitenlucht schoon en blaast dat naar binnen. De lucht is wel nog steeds net zo koud of warm als buiten.

Een buur zei:
"Vrachtwagens hiervoor als ze komen laden en lossen, die zijn nogal luid zeg maar."



Nu komt er geluid binnen via de roosters en open ramen of deuren. Door de ramen en deuren kunnen er ook insecten binnenkomen. Je kunt dus niet goed ventileren zonder geluid van buiten te horen en misschien zelfs insecten binnen te krijgen.



Straks krijg je genoeg frisse lucht, ook als je deuren en ramen dicht zijn. Zo kun je geluid en insecten buiten houden.

Meer zien?

Zoek op YouTube naar

Klimaatmissie frisse lucht

Aantekeningen

Is er iets onduidelijk? Of kan er iets beter? Schrijf het alvast op!

Figure 53: In my second prototype, I explained the changes around the topic of ‘fresh air’ with before/after photos and arrows showing interactions.

Section 6

Conclusion

The outcome of this project is a combination of applicable tools, a way to introduce stakeholders to resident involvement on an experiential level and knowledge about mismatches in apartments and communication about renovations. It does have limitations, however, because I missed some stakeholders in the research, because I focussed on one context, and because the interventions were only partly validated. This creates room for further research in addition to some unexplored design directions. For both Reigersbos and future renovations, I propose some next steps. Lastly, I reflect on my process and thank the people who helped me along the way.

23. Conclusion



23.1 Contributions

As said in [Room for tools](#), there is room for tools to shape participation processes surrounding sustainable renovations (Boess, 2020). The design outcome of this project is a set of five interventions, of which one is detailed and tested. This has practical uses — the renovation guide can be applied in the Reigersbos and future renovations, the other steps can be worked out and applied simultaneously — and organisational uses — by presenting these concrete steps, stakeholders can be easily introduced to the idea of involving residents in the design of a renovation.

In this report, I've also presented insights about *how* and *what kind of* mismatches can originate between a resident and their apartment ([11 Current problems](#), [15 Mechanics](#)). This further supports the findings of Boess, Keizer, & Verlaan (2016). [13 Worries & hopes](#) provides insight into what residents need and want to know concerning a renovation process, which can be used to further adjust and improve the communication from the different stakeholders.

The research on the content and shape of the renovation guide further contributes to the knowledge about communicating renovation plans. It should be in print, focussed on the changes in experience, visual with simple texts, supported by quotes from neighbours, translated in the languages relevant to the neighbourhood, put in context with regards to other projects and sent by the housing association and VvE board. Those attributes and circumstances seem to be most likely to lead to residents consuming and understanding the content.

Figure 54: This project should improve renovations, both in Reigersbos and in the future.

In total, this project led to new knowledge, a practical approach, and a way to convince stakeholders to act, all leading to a more inclusive sustainable renovation process.

23.2 Limitations

This project led to some useful outcomes, but it had its limitations. Firstly, the groups of participants were limited in their size. Especially for the second iteration test, the sample only consisted of three residents. This inherently leads to a limited amount of diversity, which means I might have missed relevant issues.

Other situations might have also led to an inaccurate representation of the neighbourhood, especially with regards to the willingness to participate. Because of the way of recruiting participants ([22 Research setup](#)), residents who are uninterested in the renovation probably ignored the different kinds of invitations. This means that the interventions have not been validated with people who are already unlikely to participate in such processes, even though they, too, will live in the renovated apartments.

Another group of stakeholders was also left out of my research: private landlords. Although they do not (necessarily) experience the changes in the apartment, they do need to agree with the renovation plans. This might mean it helps to include them in the

participation process, but I have not looked into the shape that should take.

Then, there are the limitations due to the context: my research and testing is mostly based on the Reigersbos project. Even though I used literature and interviewed experts about other and more general contexts, the specific situation of this neighbourhood has effects on the shape of the renovation process. The attitude and skills of the stakeholders (such as Stadgenoot, !WOON and Klimaatmissie), the legal requirements in Amsterdam, the mix of owners and tenants split over multiple VvEs, and the backgrounds of the residents all shaped the requirements for the interventions. In other contexts, the involvement of residents might have conflicting legal requirements, the residents themselves might have different physical or cognitive needs, or the process might be more simple because the project only involves social tenants renting from one housing association. This strengthens the need to adjust the outcomes to the specific context of other renovations.

Lastly, four of the five interventions are based on my insights from earlier research and literature, but have not been tested. Furthermore, the long-term effects, such as the expected benefits in predictable energy efficiency, are only based on literature, and have not been validated due to the limited runtime of this graduation project.

24. Next steps

There are several things I would do if I were to continue with this project, split between further research and the practical implementation and improvement of renovation processes.

24.1 Further research

The limitations of my project already indicate some opportunities for further research: research into how to involve residents who are not naturally drawn to participation processes, involvement of private landlords, the validity of my results and design in other contexts and the validation of the long-term effects. In addition to looking at the expected benefits of energy efficiency, health, comfort, it is also important to check what kinds of mismatches still go unnoticed, and whether residents can actually imagine the future experience with the renovation guide and experience tour.

Especially for the survey and co-creation sessions, further design research is needed into how to shape these sessions. For the survey session, using ethnographic probes to collect more information (such as 20.2 Resident interviews; Boess, Silvester, de Wal, & de Wal, 2018) might improve the results even further. For the co-creation session, important questions remain about what residents need to be able to successfully come up with suggestions for changes ([17 Improving plans](#)) and how residents with and without a technical background can work together without losing the interest of one of the groups. For sceptical stakeholders, real-life examples of changes and their impact might be needed to accelerate the implementation ([Benefits and worries about sessions](#)).



Figure 55: The door of the demo apartment next to the old facade.

For the renovation guide, further research into the nuances of the neutrality is possible, to figure out if people might be demotivated ([Tone and effect renovation guide](#)). On the other side, a similar approach could be used to activate people whose buildings are not yet planned to be renovated and make the energy transition more tangible ([Extra benefits renovation guide](#)).

There are also some unexplored design directions (appendix J). Some of the directions are touched upon by my concept (stimulating sharing, improving the inventarisation), but two specific directions remain critical: helping residents understand what the changes mean specifically for their individual situation (e.g. if they have a different floor plan, or had their own renovation), and creating space for reflection about the experience while the logistics and finances seem to be more pressing and important.

24.2 Reigersbos

The process

The renovation in Reigersbos is already a few steps into the renovation process. However, the renovation guide and following steps could still be put to use. I can imagine Klimaatmissie would want to check the contents of the renovation guide once more with the suppliers, adjust it to their branding and do a final check with a few residents before the VvEs and Stadgenoot send it out

to their members and tenants. This would also mean that the residents who have not yet visited the demo apartment could get the tour more focussed on the experience. The co-creation session could be difficult to realise due to the current corona measures, but might fit nicely with the sessions Stadgenoot still has to organise when they start the *kaderafspraken* process.

The renovation plans

Naturally, I have also talked with residents about the renovation plans and what might be improved. Some take-aways:

- The door to the terrace/balcony appears to be smaller in the demo apartment. Ideally, this should stay the same width. The height of the step is also seen as a possible problem, especially for people with reduced mobility.
- A common desire seems to be (a mounting system for) sun screens, in addition to or as a replacement of the UV foil in the sun facing window. This improves the amount of control over the amount of sunlight entering the windows, so people can let in more light in winter, while blocking the sun even more in summer.
- The app and control panel are seen as undesirable by some and possibly inaccessible to others. Both adding translations to the interfaces for people who don't speak Dutch as well as providing an analog alternative for digitally illiterate people could be good improvements.

Moreover, the worries ([13 Worries & hopes](#)) provide insight into what might need more attention when finalising the renovation plans.

24.3 Future renovations

For future renovations, all five interventions can be implemented, taking the process changes, roles and other points of attention mentioned in [3 Implementation](#) into consideration. For the renovation guide, this means a template could be made to speed up the process ([18.2 Roles and implementation](#)).

Based on literature, listening to the residents throughout the entire process (Boess, Silvester, de Wal, & de Wal, 2018) and taking common problems and their solutions into account (10 Expected problems, Boess, Keizer, & Verlaan, 2016) are of course also advisable.

Lastly, the teams working on renovations could benefit from more diversity. For example, in Reigersbos it would make sense to hire someone with a Surinamese background, since about 30% of the neighbourhood has a Surinamese background, making it the largest group in the neighbourhood (OIS, 2021b). This means that more diverse experiences are already integrated in the team.

25. Reflection



This was a complex and difficult but definitely rewarding project. I don't think I could have wished for a more ideal context for what I wanted to get from graduation: a project with many stakeholders (who also happily contributed to my project), centred around the topics of sustainability and inclusion linked to a real context with residents who, hopefully, will actually benefit from the end result. Sure, I had my share of weeks where I felt I didn't accomplish anything and the loneliness of doing a graduation project individually, at home, during a pandemic, hit a little hard. There is also lots of unexplored directions, which means I had to remind myself often that 100 working days is not *that* much. With those circumstances in mind, I am quite proud of myself and the outcome. However, I also have some learnings for the future.

25.1 Research approach

I focussed a lot on diversity, for example by involving people with different tenures, cultural backgrounds and attitudes towards the renovation in my research activities. However, I missed people who are unlikely to participate in these kinds of processes ([23.2 Limitations](#)) and often had fewer participants than I would like to have. This is due to a lot of factors outside of my control, but in a future project I would try recruiting people continuously and apply snowball recruiting from the start. Additionally, I would do street interviews earlier on to get a better general feeling for the neighbourhood and recruit people at the same time.

Figure 56: My first afternoon of street interviews was a little miserable, but the other days I made it work.

Two other small things:

- Street interviews ([Figure 56](#)) require a different attitude and approach from scheduled interviews. I experimented a little and figured out that a fun activity works really well to get people to join and to start talking. However, I would want to learn more methods to make different kinds of interviews work well.
- My contextmapping booklet was considered too childish by one participant. Apparently, that is not uncommon, but it showed me that I missed way to exclude someone from my research.

25.2 Productivity

Thanks to several pre-scheduled meetings with stakeholders and experts, I hit the ground running. This was great because I got very far in the first few weeks, but it also proved to be a unrealistic tempo for the rest of the project. So, my productivity went down throughout the project with spikes before hand-in moments. Not because of stress, but because documenting is really concrete work. I think that for future projects, breaking up activities in even smaller chunks might work to stay more productive by making use of that same principle.

However, in the low productivity periods I also noticed that having unplanned ‘off days’ is fine, especially if you’re able to

accept it in the moment. That helps to refocus on something fun, which might even open up the possibility to get back to work later on. At the same time, it can nicely serve as reflection time — next to the already great benefit of having some down time.

25.3 Planning

I started this project thinking that I was quite solid at planning, and I still think I am. I missed some of my planned activities (such as interviewing residents of already renovated homes), but still got the results I needed by replacing them with alternatives (like interview transcripts, expert interviews and literature). Together with time boxing and adding buffers, I could comfortably finish my deadlines on time, which was great. So, this seems like a great approach for future projects, too.

25.4 Supervisors

For the meetings with my supervisors, I tried to prepare a set of questions. Throughout the project, I started experimenting with that format, since it lacked room for unexpected feedback.

Twice, I also got the feedback that I could (and perhaps should) ask more from my supervisors. In the moment, I didn’t know what to use that extra time for, but looking back, I think I could have used more time to elicit that unexpected feedback while still leaving time to answer prepared questions.

Additionally, I tried to reflect on my progress every week, but especially when reflecting on things like my biases, I would have benefited from a different perspective.

At the same time, more meetings require more time for preparation and digesting the outcomes. I do think that at some point that would not outweigh the benefits, but I might not have reached that point, yet, even though I already set more and longer meetings after hearing it the first time.

25.5 Being a good designer

At some point, I struggled with ‘being a good designer’, which at that moment felt like needing to do everything perfectly. Of course, perfection is unachievable, so this was an unrealistic goal. Even worse, it conflicted with how I wanted to approach the project: by learning things, having fun, taking good care of myself, and through that getting the best results. By trying to reframe mistakes as something good (because I learn from it) and reframing the aim for perfection as problematic, I am slowly internalising a new view of what it means to ‘be a good designer’, but it will probably need active work for quite a while.

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Section 7

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