Creating warmth:
The effect of climate change perception and political trust on the willingness to adopt energy efficient technologies.

Martijn Verduin, 7572522
Utrecht University
Department of Sociology
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Thesis supervisor
 Prof. Dr. ir. V.W. Buskens

Internship supervisor
 Dr. P.T. Schneider

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Abstract

The adoption of energy efficient technologies (EETs) is becoming more important for limiting the use of natural gas. This study looks at the effects of climate change perception and political trust among homeowners on their willingness to adopt two types of EETs. Two datasets were used in this study. First, a dataset from the LISS panel regarding boiler replacements (N = 1156) was used to represent the Dutch population. Next, a survey was sent out in two neighbourhoods in Haarlem using identical questions that were asked to the LISS panel with one exception. We created a proxy scale to measure the willingness to adopt insulation measures rather than natural gas-free boiler replacements. This survey was sent out via mail. Fieldwork was also conducted by visiting these neighbourhoods and speaking with residents who were part of the population. This led to N = 282 respondents used for the regression analysis. For the LISS dataset significant effects were found for climate change perception and political trust on the willingness to adopt EETs. However, no significant effect was found for political trust functioning as a moderator for the effect of climate change perception on the willingness to adopt EETs. For Haarlem, no significant effects of political trust or climate change perception was found. Results were therefore mixed regarding the effect of political trust and climate change perception on the willingness to adopt EETs. These mixed results could be due to four reasons. An actual existing difference within the populations, a difference due to time and place, a difference due to the sample size or a difference due to the difference in type of EET measured. Policy advice includes noting that the results show the importance of local data to create effective policy, instead of relying only on national data.

Keywords: political trust; climate change; energy efficient technology; Protection Motivation Theory

Ethical statement

This research has been approved by the Ethical Board of Utrecht University (reference number 24-0521 and reference number 24-0876).

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Introduction

Large floods happened in Western Europe in July of 2021, killing at least 195 people in Germany and the Netherlands (Kottasová & Krever, 2021). These floods are part of a larger pattern of more extreme weather phenomena in Europe and the rest of the world. According to the European Environment Agency (2024), extreme weather events like the aforementioned flood has led to between 85.000 and 145.000 deaths across Europe in the past 40 years. Extreme weather events not only include floods, but also storms and heatwaves. The costs of these extreme weather events reached around half a trillion euro in damage in Europe in the past 40 years (European Environment Agency, 2024). These extreme weather events are becoming more common because of the effect of climate change.

To mitigate the effects of climate change the Dutch government has set the goal to limit the carbon emissions by 55% in 2030 compared to the total amount of emissions in 1990 (Ministerie van Infrastructuur en Waterstaat, 2023). This is with the future goal of a 95% reduction of emissions in 2050 in mind (Ministerie van Economische Zaken en Klimaat, 2022). Certain social problems arise not only from the effects of climate change, but also from the way policy is designed to limit the carbon emissions in the Netherlands. One of these challenges is the affordability of the energy transition. The Dutch ministry of Economic Affairs and Climate Policy wrote that it is important to distribute the burden and costs of the energy crisis in a fair way. This is to ensure that the transition is affordable, both for households and small and medium sized enterprises (Ministerie van Economische Zaken en Klimaat, 2022).

One important way to lower the emissions is by making homes in the Netherlands free from the use of natural gas. The goal of the Netherlands is to be natural gas-free by 2050 by getting homes off natural gas and on sustainable energy sources (Rijksdienst voor Ondernemend Nederland, 2018). For this, homeowners that live in older houses need to adopt many energy efficient technologies (EETs). This could be in the form of heat pumps instead of gas boilers, but also the insulation of their homes. Insulation is technically not an EET as EETs are technologies that achieve the same services and performance while using less energy (Hesselink & Chappin, 2019). However, insulation serves the same function as it is a method to reduce energy use while keeping buildings warm. Therefore this study will consider the underlying mechanisms comparable between insulation and EETs. In the case of

insulation, the national government has decided in their national insulation program (NIP) that by 2030 2.5 million homes need to be insulated. This program will start with a focus on homes that are badly insulated (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024).

In this study we investigate what influences the adoption of EETs influences on both a national level and in two neighbourhoods in the city of Haarlem. This paper has been written in collaboration with the municipality of Haarlem to get more insight into what motivates people's adoption of insulation measures. The municipality of Haarlem has set its own goal to be natural gas-free by 2040 (Gemeente Haarlem, n.d.). Therefore with the help of the municipality of Haarlem, a survey was sent out in these neighbourhoods to research what influences the adoption of EETs. This data will be compared with national data collected by the LISS panel. The LISS panel is a Dutch panel based on a true probability sample of Dutch households drawn from the population register by Statistics Netherlands (Mulder & Das, 2023).

One aspect that might influence the adoption of EETs by homeowners is their perception of climate change. Perception of the risks of climate change leads individuals to support policies that tackle climate change (Smith & Mayer, 2018). However, these studies talk about broader climate change policies such as a CO_2 tax, for example. The unique aspect of EET adoption is that it has a strong direct influence on the living situation of the homeowner, as it involves changes to their house. The danger of climate change can influence threat perception which would motivate people to act on ways to limit climate change (Kothe et al., 2019). People who perceive climate change as a problem could therefore see the adoption of different kinds of EETs like heat pumps or insulation as a solution to this problem.

Another aspect that could influence the adoption rate of EETs is the trust the individual has in the political system. The adoption of EETs rarely goes without the influence of politics. For example, the Dutch government has subsidies for making homes more sustainable. With a lack of political trust individuals might not be willing to engage in adopting EET as it involves dealing with a government that is less trusted. Research by Davidovic & Harring (2020) has shown that in a country where political trust is low, people are less likely to engage in climate action or comply with policy instruments.

Political trust could also influence the relationship between climate change perception and the adoption of EETs. This could be because climate change and its solutions have become a political topic. The aforementioned decision to subsidise sustainable changes to an individual's house is political. Even though an individual might perceive climate change as an important issue, their lack of trust could function as a 'cognitive shortcut' to oppose climate change measures (Lim & Moon, 2020). This could lead to a reduction in EET adoption even though climate change is perceived as a threat.

By measuring two types of EETs this study will hope to add to the body of scientific literature related to the adoption of EETs. The measurement of two EETs will also help to measure potential differences in the effects of political trust and climate change perception on different types of EETs. To gain knowledge about the relationship between trust in the government, perception on climate change impact and the individuals willingness to adopt energy efficient technologies three research questions have been formulated.

1. To what extent are people willing to adopt energy efficient technologies in their homes?

2. To what extent does political trust influence the willingness to adopt energy efficient technologies?

3. To what extent does climate change perception influence the willingness to adopt energy efficient technologies, and is this effect moderated by political trust?

These questions try to find an explanation as to why people might be or not be interested in natural gas-free alternatives. The final research question regards the potential policy implications of this study:

4. What steps can municipalities take to improve the adoption of energy efficient technologies by homeowners?

Theory

Climate change perception and adopting energy efficient technology.

Most scientists (Lynas et al., 2021) and EU citizens (European Comission, 2021) believe the climate is changing and that it is a threat, though there are individuals who are sceptical about this. Fairbrother et al. (2019) talks about three types of climate sceptics. Trend sceptics, who deny that the climate is changing at all, attribution sceptics who reject the anthropogenic nature of climate change, and impact sceptics who do not believe that anthropogenic climate change will be costly. This research will focus on the perception of people about how severe the effects of climate change are. The way people perceive the existence and severity of climate change could influence the action taken to tackle it. If climate change is not perceived as an issue, there would be no reason to mitigate it (Fairbrother et al., 2019). Therefore, it is important to understand how climate change perception influences the pro-environmental stances and behaviours like the decision of homeowners to adopt energy efficient technologies in their homes.

Protection Motivation Theory

The Protection Motivation Theory (PMT) could explain the link between climate change perception and the adoption of EETs. PMT, initially designed to address health issues, has been broadly applied to various fields and disciplines, including pro-environmental behaviour (Floyd et al., 2000). PMT assumes that people balance different risks and benefits when making choices (Bočkarjova & Steg, 2014). It also states that individuals will engage in protective behaviour if the perceived severity of the outcome is high and their perceived personal vulnerability is high, regarding the potential outcome. This occurs in the face of threatening events where, without acting, the individual would be threatened themselves (Kothe et al., 2019). Engaging in protective behaviour would thus lessen the potential threat that an individual experiences.

In PMT two processes influence behaviour in people (Kothe et al., 2019). The first process is the threat appraisal. An individual's threat appraisal is the degree in which they believe that they are facing a threatening event. If no action is taken against this threatening event, the event would pose a threat to the individual themselves (Kothe et al., 2019). This study examines the threat appraisal of climate change, a form of a slow-onset risk. PMT can

be used to measure both acute risks as well as slow-onset risks, though it is more commonly used to measure acute risks. Bočkarjova and Steg (2014) also studied climate change as a form of slow-onset risk. In their study they regard threat appraisal as "the current product or practice that is the source of environmental risks or gives rise to hazardous side-effects." Within the PMT three aspects measure threat appraisal: severity, susceptibility and maladaptive response rewards. This study will specifically use severity as a way to measure threat appraisal. Severity is the perception of the seriousness of problems, and the degree to which this problem exists because of current behaviours (Bočkarjova & Steg, 2014). In the context of a homeowner purchasing EETs for in their home this would be how serious they perceive the risks of climate change. Severity can act as a way to measure threat appraisal because when a person is evaluating whether or not to adapt behaviour, such as the adoption of EETs, they consider the seriousness of climate change (Kothe et al., 2019). If climate change is seen as a serious problem that could cause a threat to the individual, they are more likely to adopt measures to limit the extent to which climate change will cause problems for themselves and the wider environment.

The second process within PMT that influences behaviour is coping appraisal. Coping appraisal is the process of considering the perceived ability to decrease the risk and the total costs of trying to decrease this risk (Bočkarjova & Steg, 2014). Coping appraisal is measured by three aspects: self-efficacy, perceived response efficacy and perceived costs of protective action. It relates to the individuals' perception of their ability to limit the risk they are facing (Kothe et al., 2019). When an individual does not believe that action will help avoid or decrease a threat that they are facing, action will not be taken.

The goal of this study is to measure the effect of threat appraisal on the adoption of EETs. To properly do that the coping appraisal has to be considered. Therefore, the effects of climate change perception will be controlled for the person's perceived financial situation. This is because the financial cost of trying to avoid the risk is also part of the coping appraisal (Bočkarjova & Steg, 2014). Measuring how easily people can afford their expenses, informs us about their income level and the relative upfront costs of adopting EETs. Research has been done on the coping effects of insulation costs. According to Friege (2016), homeowners' income does not play a decisive role in their decision to insulate their homes. People with a higher income would be able to pay the upfront costs of investing in an EET more easily. However, the relative upfront costs seem to not have an influence on insulating

their home. This coping effect seems to not have an effect (in the case of a homeowner insulating their home) on the adoption of EETs.

In summary, Protection Motivation Theory can be used to explain that the perception of climate change influences the behaviour of a homeowner to adopt EETs. When climate change is perceived as an issue, people will take steps to prevent it. The adoption of EETs is one possible measure. This is in line with the meta-analysis of Kothe et al. (2020) a majority of studies found a positive effect between severity and different types of pro-environmental behaviours. Therefore, the following hypothesis is formed:

H1: Climate change perception is positively related to homeowners' willingness to adopt energy efficient technologies.

Political trust

Next, this study will examine how political trust can influence the relationship between climate change and the adoption of EETs. Political trust relates to citizens' perceptions of institutions and governing actors acting in their best interest, even when unsupervised (Devine et al., 2024). When an individual trusts that the government works for them, their political trust is higher. Lim and Moon (2020) explain that government trust is based on citizens' trust in the performance of the government, the effectiveness of the political system and the integrity and transparency of the government.

Political trust could directly influence the adoption of EETs. In a country where the political trust is low due to a perceived lack of government integrity, people are less likely to engage in climate action or comply with policy instruments (Davidovic & Harring, 2020). Taniguchi and Marshall (2018) found that institutional trust, which includes political trust, is positively linked with the willingness to make an economic sacrifice for the climate. Their study related to increased taxes, not EET adoption. However, the adoption of EETs could be perceived as an economic sacrifice because the upfront costs are higher compared to options that use natural gas.

In situations where political trust is lower, the support for different types of pro-environmental policies varies. According to Kulin & Sevä (2020), policies based on tax

increases receive less public support because they involve increasing government funds and trusting that these funds will be used effectively. Moreover, policies designed to subsidise certain behaviour is a better alternative in situations where political trust is lower. This is because political trust is less strongly related to support for subsidies. This could be because subsidies are a form of pull instruments, which aim to incentivize the public to change their behaviour, unlike push instruments that try to impose constraints to the choices that people make (Davidovic & Harring, 2020). One example of a push instrument is the government's decision to impose a CO_2 tax. Davidovic and Harring (2020) also found that political support is linked to support for taxes, subsidies, and support for certain bans. They also found that political trust is more strongly linked to support for extra taxes than support for subsidies and bans. This is because people are more accepting of being regulated by a government that they trust. Another aspect that Davidovic and Harring (2020) mention is that political trust is not only relevant because of the degree to which people accept regulations, but also because the government handles financial transactions regarding taxation and subsidies. This means that citizens have to trust that the government handles the money correctly.

Political trust can be linked to the adoption of EETs because it is a form of pro-environmental behaviour that may include an economic sacrifice. Also, in the context of the Netherlands, many EETs are subsidised (Rijksdienst voor Ondernemend Nederland, 2024). Therefore, because political trust is linked with support for subsidies, those with higher trust might also use these subsidies more, though no research has been found that confirms this. In line with these findings the following hypothesis is formed:

H2: Political trust is positively related to the adoption of energy efficient technologies.

Political trust as a moderator

Political trust can moderate the relationship between climate change perception and the adoption of EETs because political trust often functions as a decision-making tool regarding government matters (Lim, 2023). Political issues like the switch to a natural gas-free environment can be complex and require lots of time, information and resources to form an opinion on. When faced with the decision of whether to adopt a heat pump instead of a gas boiler individuals might not have the time, information or resources to make a decision (Lim

2023). While this research was conducted the Dutch government had been incentivizing the adoption of certain EETs among homeowners. For example, heat pumps were going to be mandatory starting in 2026 (Ministerie van Algemene Zaken, 2023). This policy decision has turned the adoption of heat pumps into a political issue. However, after the data was collected, the new coalition announced that they are no longer making the adoption of heat pumps mandatory (PVV et al., 2024). Because EET adoption has turned into a political issue political trust may function as a 'cognitive shortcut' to moderate the effect of climate change perception on the willingness to adopt EETs (Lim & Moon, 2020).

This 'cognitive shortcut' is formed because individuals base their ideas and opinions on pre-existing knowledge and values (Huber et al., 2021). This has been found in regard to people's trust in scientists. Trust in scientists positively affects the belief that global warming is real (Hmielowski et al., 2013). This is one example of the use of cognitive shortcuts to form one's opinion on complicated issues. Lim & Moon (2020) found this same process, but with the use of trust in politicians or the political system instead of trust in scientists. The credibility of the messenger is used to determine whether or not climate change is an issue and if replacing a boiler with a heat pump is a good decision (Brewer & Ley, 2012). The cognitive shortcut influences the effect of climate change perception on the willingness to adopt EETs because individuals with lower political trust will be less likely to act on adopting EETs because it involves actions regarding the government. If they have little trust in the government, they would be less willing to go through with the process of adopting EETs even if they believe that climate change poses a risk to them or their environment.

Previous research has addressed the moderating effects of political trust. Fairbrother et al. (2019) considered the interaction effect between climate change beliefs and political trust on people's support for many different kinds of government policies relating to climate change. Lim (2023) found that political trust moderates the relationship between an individuals' perceived climate risk and their attitudes for political spending has a positive effect.

Overall, it is reasonable to expect that political trust moderates the effect between climate change perception and support for governmental policy. Political trust may function as a decision making tool that influences how people formulate ideas or positions. The degree to which an individual finds the source of information credible influences their ideas and

decisions. Because of this, political trust can influence the relationship on topics that the political system often communicates about, like climate change and the need for energy efficient technologies. This effect has been found by Lim (2023) and Fairbrother et al. (2019). Based on this, the following hypothesis is formed:

H3: For individuals who have higher levels of political trust, the positive effect of climate change perception on the adoption of energy efficient technologies is stronger.

The following conceptual model can be formed related to the 3 hypothesis:
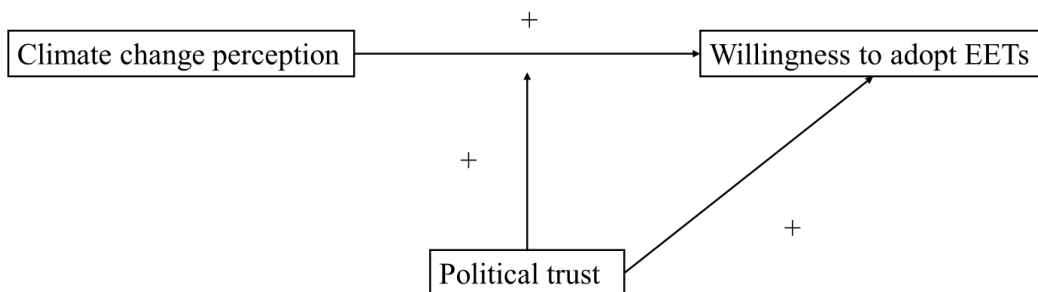
Figure 1: Conceptual model

Data and Method

This research will use two different datasets to answer the research questions. In this study we make use of data from the LISS panel (Longitudinal Internet studies for the Social Sciences) managed by the non-profit research institute Centerdata (Tilburg University, the Netherlands). This is a sample that is representative of the whole Dutch population. On top of that, this study will use a survey set out in collaboration with the municipality of Haarlem to compare the data from a sample representing the whole Dutch population with one representing two neighbourhoods in the city of Haarlem.

Participants and research methods

LISS

For this research a single wave study of the LISS panel called "The energy transition from a citizen's perspective" was used (De Kluizenaar & De Wilde, 2022). The LISS panel is based on a true probability sample of Dutch households drawn from the population register by Statistics Netherlands. It is not possible to self-register for this panel. Households that would otherwise be unable to participate are provided with a computer and internet connection (Mulder & Das, 2023). All participants filled in an informed consent form (see Appendix A). In this survey Dutch citizens were asked about their perspective on the energy transition (De Kluizenaar & De Wilde, 2022). The data was collected over a span of 3 weeks in May of 2019.

The sample consists of 3533 panel members between the ages of 18 and 95. In this sample only 1 person per household was included. 1018 members did not respond and 35 members did not finish the survey. This means that the sample contained 2480 complete responses which leads to a response rate of 70.2%. After filtering out people who are not homeowners and any missing values on the used items for all variables and control variables., the sample that was used contained N = 1156 respondents.

Haarlem

A survey was conducted in collaboration with the municipality of Haarlem to compare the local data in neighbourhoods in the city with the broader Dutch context. In total 1498 letters were sent out and a total of N = 310 responses were recorded; this is a 20.1% response rate. The survey was sent out to addresses that fulfilled four criteria. First of all, it had to be a

privately owned home. This was to prevent sending the letter to renters who are not in the position to make the decision on EET adoption. Next, the homes had to have a low energy label. This is label G, F, E, D or an unknown label. The houses also had to have a property value of under 514.000 euro, the average property value in the municipality. This is done because most subsidies will be available to homeowners with homes under this threshold. Finally, the address had to be in either the Vogelenwijk or the Indische wijk neighbourhoods in the north of the municipality. These neighbourhoods were selected as this was the area with the most homes that fell under the previous categories. This means that these addresses selected are homes that are not very energy efficient and most likely have not adopted many EETs or other ways to limit the use of natural gas.

The letter contained information about the survey and a link and QR-code to the survey. For the full letter, see appendix B. The survey also contained a raffle for three 500 euro vouchers to be spent on insulating their home with the aim of motivating people to fill in the survey and increase the response rate. A week after sending out the letters, a total of 226 responses were recorded. After which fieldwork was conducted to increase the response rate as well as gain more insight by talking to the population. We visited 1010 homes over the following two weeks. Out of these 1010 addresses we spoke with the residents of 400 homes. After the fieldwork, the total respondents reached N = 310, after which we ended the fieldwork and stopped actively looking for more respondents. In the conversations during the fieldwork we asked residents if they had filled in the survey yet, and if not if they were willing to fill it in. We also asked if people wanted to share their opinion face-to-face regarding the topic. We asked if they had anything else to add regarding the topic of insulation, what they have done and what struggles they face while trying to insulate their homes.

To increase the number of responses used for the analysis, missing values on the control variables were set to the mean of the sample. This was done for age, and financial situation. Respondents who did not answer that they were either male or female were put in a third gender category called 'other.' Respondents were included in the analysis if they answered at least one item on every scale. This led to a total of N = 282 respondents used in the Haarlem analysis.

Variables

Willingness to adopt EETs (DV)

The willingness to adopt EETs is operationalised in different ways for the survey conducted in Haarlem and the survey conducted by the LISS panel. We look at two different types of EETs for the two different surveys to get a better idea on if there is a difference in the adoption rate of different types of EETs. Both the adoption of natural gas-free alternatives to a gas heater or central heating boiler, for the LISS panel, and the adoption of insulation, for the survey in Haarlem, is considered.

Natural gas-free alternatives for heating

In total, four questions were asked in the LISS survey regarding the adoption of natural gas-free alternatives to a central heating boiler or gas heater. These four questions were used to create a reliable sum scale with a Cronbach's alpha of .665. One of the questions used to measure natural gas-free alternatives was the following: "I find it difficult to determine what would be a good natural gas-free alternative for my central heating boiler and/ or my gas heater." For the full list of questions used for the analysis, see the appendix C. Responses on these items were given on a seven-point Likert scale with options ranging from Completely disagree to Completely agree, also including Don't know / No opinion as an option.

Insulation

To keep the responses between the Haarlem survey and the LISS panel as comparable as possible, a proxy scale was designed for the survey in Haarlem based on the questions used in the LISS panel for natural gas-free alternatives to heating homes. When asked about an alternative for central heating or the gas heater it was replaced with insulation. For example: "I find it difficult to determine what good insulation measures I can take." The full list of questions used for this proxy scale can be found in Appendix C as well. The items had the same seven-point Likert scale answer options as in the LISS panel ranging from Completely disagree to Completely agree, also including a Don't Know/ No opinion option. These questions together formed a scale using the mean score. This scale had a Cronbach's alpha of .625. This could increase to .753 when removing the question "If I have my home renovated, I will also consider applying insulation measures." However, it was decided not to remove this question to keep parity between this scale and the scale used for the LISS dataset. A separate analysis has been done with the three item scale and can be found in Appendix E for LISS and Appendix F for Haarlem.

Climate change perception (IV)

In the LISS-Panel many questions were asked regarding climate change. At first five questions were considered to be included in the scale. However, due to the low reliability of the scale, two items were deleted. Climate change perception is therefore operationalised by using the same three items in both surveys. One of the items is the following: Humanity must take action to prevent climate change as soon as possible, or it will be too late. The scale is reliable with a Cronbach's alpha of .786 from the LISS dataset and a Cronbach's alpha of .813 from the Haarlem dataset. Responses on the three items were given on a seven-point Likert scale ranging from Completely disagree to Completely agree, also including the option to answer Don't know / No opinion.

Political trust (M)

To measure political trust, the following question was asked about the municipality and the government: "How much confidence do you currently have in the following bodies in the Netherlands?" Here, respondents could answer these items on a scale of 1 (no confidence at all) to 10 (complete confidence). These items combined have a Cronbach's alpha of .899 from the LISS dataset and .815 from the survey set out in Haarlem.

Control variables

Four control variables will be used in this study. Firstly, age. The LISS dataset calculated age based on birth year while in the survey for Haarlem the question "How old are you?" was asked. Next, gender is used as a control variable. In LISS, there were only two options: Male and Female, whereas the survey in Haarlem included four options: Male, Female, Non-binary/different, Prefer not to answer. For the LISS analysis one dummy variable called Female was used. For Haarlem two dummy variables were constructed. Firstly a variable called Female which is the same dummy variable as in the LISS dataset. Secondly, a variable called Gender Other was constructed, which measured if a respondent either did not answer the question, or if they answered that they were Non-binary/ different, or if they answered that they would prefer not to answer. Next, a question regarding the financial situation of the respondent was included. The item was formulated as followed: "A question about your financial situation: how easy or difficult is it at this time for you (or your household) to make ends meet with your total net household income, i.e. to pay for the usual necessary expenses?" This was measured on a five-point Likert scale with the following options: Very difficult, Difficult, Neither easy nor difficult, Easy, Very easy, Don't know. Lastly, for the

Haarlem analysis, a new variable called "Fieldwork" was created. This is a dummy variable that measures if the response was recorded before or after the fieldwork to collect more respondents started. This is to measure the potential effect of gathering respondents in a different way.

Data analysis

The data will be analysed with the help of IBM SPSS Statistics Version 29. First, the assumptions of linearity, homoscedasticity, independence of errors, normality, and independence of the dependent variable were checked. No assumptions were violated. Some outliers found on the adoption of EETs scale. These outliers were kept in the dataset. The variables of climate change perception, political trust were centred. For each dataset three models will be constructed. Model I will show the control variables. Model II will address the effect of climate change perception and political trust on the adoption of EETs with the control variables included. Model III will test for the interaction effect of climate change perception and political trust including the direct effects and control variables.

Results

LISS data

Table 1 shows the descriptive statistics relating to the variables used in the analyses after all the missing values had been filtered out. The average respondent in the LISS-dataset was 58.61 years old with the youngest respondent being 18 years old and the oldest being 93 years old. 56% of the respondents (N = 652) were male, and 44% (N = 504) of the respondents were female. Regarding the financial situation of the respondents, they had a mean score of 3.89 (SD .891) on a scale of 1 to 5. This means that on average the respondents score between neither 'easy nor difficult' and 'easy' when asked how easily they could make ends meet.

The climate change perception scale ranged from 1 to 7. The mean score of climate change perception was 4.81 (SD 1.44). This means that on average climate change is perceived as somewhat of an issue. The mean of political trust was 5.06 (SD 2.12) on a scale of 0 to 10. This means that trust in politics is not very high, but it is not low either. Interestingly, on the scale of willingness to adopt EETs, the mean score was only 3.14 on a scale ranging from 1 to 7. This relatively low score indicates that, on average, people are not that willing to adopt a gas-free alternative to a gas heater or central heating boiler.

Table 1. Descriptive statistics LISS-dataset. (N =1156)

Factor	Min	Max	Mean	SD
Climate change perception	1	7	4.81	1.44
Political trust	0	10	5.06	2.12
Willingness to adopt EETs	1	7	3.14	1.11
Age	18	93	58.61	15.50
Gender (reference = male)	0	1	.44	-
Financial situation	1	5	3.89	.891

Table 2. Regression analyses with all independent, control and moderation variables relating to the willingness to adopt EETs for LISS-dataset. (N = 1156)

Model	I		II		III	
Constant	3.364**	(.196)	3.642**	(.209)	3.638**	(.281)
Climate change perception			.173**	(.022)	.175**	(.023)
Political trust			.075**	(.015)	.076**	(.016)
Age	-.012**	(.002)	-.011**	(.002)	-.011**	(.002)
Female	.132*	(.065)	.047	(.063)	.048	(.063)
Financial situation	.112*	(.036)	.034	(.036)	.034	(.036)
Climate change perception * Political trust.	-		-		.004	(.009)
R^2-change	.042		.082		.000	
F-change	16.76**		53.46**		.199	

Note: Main entries are unstandardized regression coefficients and entries in parentheses are standard errors; * $p < .05$, ** $p < 0.001$.

Table 2 shows the three models used for the moderation analysis. Model I is significant (F $(3,1152) = 16.76$, $p < .001$) and accounts for 4.2% of the total variance. The effect of age is negative and significant in this model (B = -.012, $p < .001$) this means that younger people are more willing to adopt EETs. Regarding gender, female respondents are significantly more willing to adopt EETs (B = .132, $p = .042$). Finally, the effects of someone's financial situation was also significant in this model (B = .112, $p = .002$)

When adding control variables in model II, the model is a significant improvement (F-change $(5,1150) = 53.46$, $p < .001$). Model II now also explains more of the total variance with an R^2 of .123. The effect of climate change perception on the willingness to adopt EETs is significant (B = .173, $p < .001$). This means that H1: *'Climate change perception is positively related to homeowners' willingness to adopt energy efficient technologies'* is not rejected based on the LISS data. The effect of political trust is also significant (B = .075, $p < .001$) when including the control variables. H2: *'Political trust is positively related to the adoption of energy efficient technologies'* is therefore also not rejected. The only control variable that had a significant effect in this model was age (B = -.011, $p < .001$). No significant effect was found for gender (B = .047, $p = .461$) or financial situation (B = .034, $p = .335$). These results indicate a complete mediation effect of climate change perception and political trust on gender and financial situation since these control variables were significant in model I but not in model II.

Model III including the interaction effect was not a significant improvement (F-change $(6,1149) = .199$, $p = .656$). The total explained variance did not increase, staying at 12.3%. In this model the effects of climate change perception (B = .175, $p < .001$) stays significant just like political trust (B = .076, $p < .001$). Regarding the control variables, age stays significant (B = -.011, $p < .001$) while gender (B = .048, $p = .453$) and financial situation (B = .034, $p = .337$) stay non-significant. The interaction effect of climate change perception and political trust was also non-significant (B = .004, $p = .656$) meaning that political trust does not moderate the effect of climate change perception on the willingness to adopt EETs. When political trust increases, the effect of climate change perception on the willingness to adopt EETs does not change significantly. Because of this *H3: 'For individuals who have higher levels of political trust, the positive effect of climate change perception on the adoption of energy efficient technologies is stronger'* is not confirmed based on the LISS data.
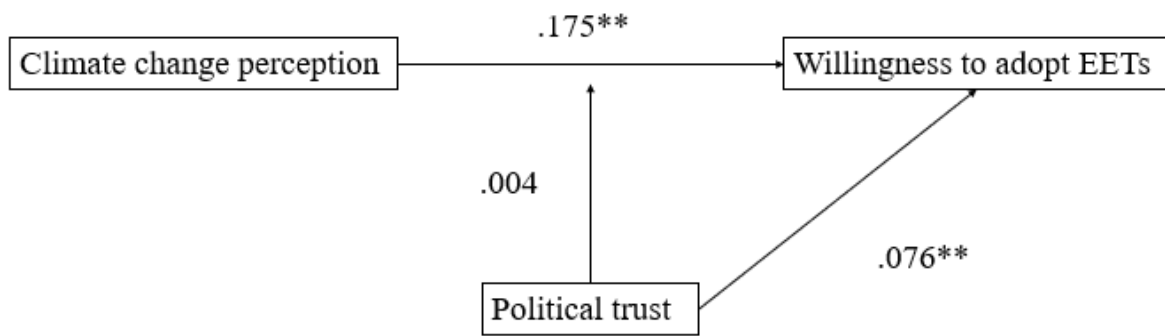
Figure 2: Model including results of the LISS data. * p < .05, ** p < .001

Haarlem

Table 3 shows the descriptive statistics relating to the variables used in the analyses after all the missing values had been filtered out. This means that all analysis have been done on N = 282 responses The average respondent in the Haarlem dataset was 51.24 years old with ages ranging from 24 to 83 years old in the dataset. 53.5% of the respondents (N = 151) were male, 42.9% (N = 121) of the respondents were female and 3.5% (N =10) of the respondents did not answer that they were male or female. When asked about their financial situation, respondents scored a mean of 3.71 (SD .926) on a scale of 1 to 5. This average is very close to the average on the LISS dataset meaning that in Haarlem people also score between neither 'easy nor difficult' and 'easy' when asked how easily they could make ends meet.

The climate change perception scale ranged from 1 to 7. The mean score of climate change perception was 5.21 (SD 1.60). So on average, climate change is perceived as a bigger issue in the two neighbourhoods in Haarlem North compared to what was found with the data from LISS. The mean of political trust was 4.47 (SD 2.04) on a scale of 0 to 10. This means that trust in politics is also not very high in Haarlem North. However, the average score is higher than was found with the LISS data. The mean score for willingness to adopt EETs 4.32 (SD 1.33) on a scale ranging from 1 to 7. This is a lot higher compared to what was found in the LISS dataset.

Table 3. Descriptive statistics Haarlem dataset. (N =282)

Factor	Min	Max	Mean	SD
Climate change perception	1	7	5.21	1.60
Political trust	0	9	4.47	2.04
Willingness to adopt EETs	1	7	4.32	1.33
Age	24	83	51.24	13.47
Female	0	1	.43	-
Gender other	0	1	.04	-
Financial situation	1	5	3.71	.926
Fieldwork	0	1	.28	.448

Table 4. Regression analyses with all independent, control and moderation variables relating to the willingness to adopt EETs for Haarlem dataset. (N = 282)

Model	I		II		III	
Constant	4.900**	(.444)	4.935**	(.444)	4.933**	(.446)
Climate change perception			.047	(.053)	.045	(.093)
Political trust			.034	(.040)	.033	(.110)
Age	-.025**	(.006)	-.024**	(.006)	-.023**	(.006)
Female	-.400*	(.157)	-.422*	(.159)	-.423*	(.159)
Gender Other	-.577	(.415)	-.567	(.415)	-.566	(.417)
Financial situation	.243*	(.082)	.216*	(.084)	.217*	(.084)
Fieldwork (reference = no)	-.018	(.169)	-.032	(.170)	-.031	(.170)
Climate change perception * Political trust.					-.002	(.021)
R^2-change	.105		.007		.000	
F-change	6.46**		1.13		.007	

Note: Main entries are unstandardized regression coefficients and entries in parentheses are standard errors; * $p < .05$, ** $p < 0.001$.

For the analysis of the Haarlem data, model I is significant (F (5,276) = 6.461, p < .001.) and explains 10.5% of the total variance. The control variable age is negative and significant in this model (B = -.025, p < .001) The effect of gender means that female respondents score significantly lower on willingness to adopt EETs compared to men (B = -.400. p = .011) Financial situation was also positive and significant (B = .243, p = .003). The variable Fieldwork was not significant (B = -.018, p = .916). This means that there is no significant difference between the respondents collected before and after the beginning of the fieldwork..

When adding the independent variables in model II, the model will not significantly improve (F Change (7,274) = 1.133, p = .324). Model II now explains 11.2% of the total variance. The effect of climate change perception on the willingness to adopt EETs is non-significant (B = .047, p = .374). This means that H1: *'Climate change perception is positively related to homeowners' willingness to adopt energy efficient technologies'* is rejected based on the Haarlem data. The effect of political trust is also non-significant (B = .034, p = .400) when including the control variables. This means that unlike the results from LISS there does not seem to be a mediating effect for Haarlem. With this H2: *'Political trust is positively related to the adoption of energy efficient technologies'* is not confirmed. Just like in the LISS dataset age is negative and significant (B = -.024, p < .001). This means that younger people are significantly more willing to adopt EETs compared to older people. The effect for female respondents is also significant (B = -.422, p = .008) which is different from the LISS dataset, which found no significant effect. Financial situation is positive and significant (B = .216, p = .011). This means that people who can easily make ends meet are more willing to adopt EETs. The effect of fieldwork stays non-significant (B = -.032, p = .852)

Model III including the interaction effect is not significantly better than model II (F change (8,273) = .007, p = .932). The total explained variance did not increase, staying at 11.2%. In this model the effects of climate change perception (B = .045, p = .415) and political trust (B = .033, p = .415) remain non-significant. Regarding the control variables, age (B = -.023, p < .001), gender (B = -.423, p = .008) and financial situation (B = .217, p = .011) all stay significant. The effect of fieldwork stays non-significant (B = -.031, p = .858). The interaction effect of climate change perception and political trust was also non-significant (B = -.002, p = .932). This means that just like in the LISS dataset, the effect of climate change perception on the willingness to adopt EET is not moderated by political trust. Therefore, *H3: 'For individuals who have higher levels of political trust, the positive effect of*

climate change perception on the adoption of energy efficient technologies is stronger' is also rejected based on the data from Haarlem.
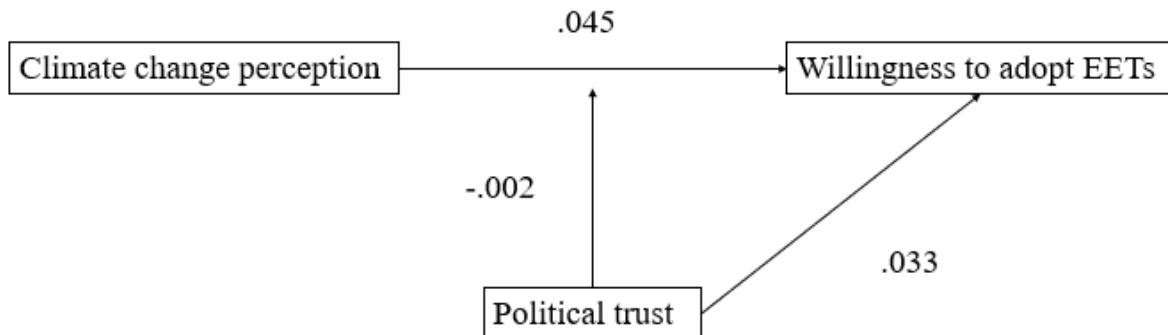

*Figure 3: model including results of the Haarlem data; * p < .05, ** p < .001.*

Insights from the fieldwork

When talking to residents of Haarlem North, certain topics regarding the adoption of EET came up. Since most conversations were in Dutch, the quotes were translated. The decision had been made to include the findings from these conversations because it added context to the regression analyses done for the Haarlem dataset.

Government distrust

A lack of trust in the government was something that came up in some of the conversations we had. One person was very negative regarding insulation because it is something that is being forced upon people by the government. For him the goal of the municipality to become natural gas-free and the government making it mandatory to buy a heat pump starting in 2026 made him less eager to adopt EETs.

One resident said: "It's such a hassle, it makes me so tired. Then there is another parking problem, then this, then that. Just leave it alone. Rutte has screwed up and I don't feel like it anymore." A lack of trust in the government has led her to be more resistant. Trust in the national government also plays a role as she mentioned Rutte, the (caretaker) prime minister. Finally, another resident mentioned that he finds the municipality a corrupt gang and did not want to talk about insulation. From these conversations it has become clear that a small minority of residents were not willing to adopt insulation because of a lack of trust in the government. This would be contrary to the results found by the survey, as no effect of

political trust was found there. This could indicate that willingness to adopt EETs is lower for people with extremely little political trust. These respondents were only a small group and did not reflect the general opinion of the residents in general.

Costs

Another theme that came up multiple times is the cost and return on investment of insulation. For example, one respondent said the following:

> "Look, I understand that it has to be done, but it costs too much and why should I have to do it? It now feels as if some measures are only for the rich."

Here, the resident is willing to adopt different measures of EETs, but the costs are perceived to be too high. This is in line with the finding that the control variable financial situation was significant. This person claims that they do not have the money to make their home more sustainable, but that they are in theory open to adopting EETs. The perception that costs are too high was heard more often during the fieldwork and also came back in the survey. Most respondents answered that they wanted more subsidies when asked what the municipality could do more to help them insulate their homes. At the same time, 50.8% of respondents said that they were not aware of the existence of any of the available loans and subsidies offered by the government.

Elderly

It became clear that there was a significant number of elderly living in these neighbourhoods. Many of them had often not filled in the online survey. This could mean that the results presented skews younger than the actual population of these neighbourhoods. Almost all of these elderly residents said that they were not very willing to adopt EETs in their homes. One resident said: "I'm too old, why should I still bother to do this? I see the date 2040 [the year in which the municipality wants to be natural gas-free], what am I supposed to do with that?" another older resident said "Boys, I am sitting my time out and I will leave it [insulation] to the next resident, I am too old for this." For these people investing in EETs is not worth the effort or costs, hearing the deadline set by the municipality of 2040 is too far away for them to feel any urgency to change. These findings are in line with what was found in the survey as age had a significant and negative effect on the willingness to adopt EETs. Meaning that younger people are more willing to insulate their homes compared to older people.

Conclusion

This study examines the effects of climate change perception and political trust on the willingness to adopt energy efficient technologies. The energy efficient technologies this study looked at were a natural gas-free replacement for gas boilers or central heating boilers, like a heat pump, and the insulation of homes. This is done with the use of two different datasets, a national dataset from the LISS panel and data collected via a survey in Haarlem. Protection Motivation Theory could explain the relationship between climate change perception and the willingness to adopt EETs (Kothe et al., 2019). Political trust was also expected to influence the willingness to adopt EETs because research has shown that in countries with lower political trust the people are less willing to take climate action (Davidovic & Harring, 2020). In this study three research questions and one policy question was formulated. The research questions were formulated as follows:

1. To what extent are people willing to adopt energy efficient technologies in their homes?

2. To what extent does political trust influence the willingness to adopt energy efficient technologies?

3. To what extent does climate change perception influence the willingness to adopt energy efficient technologies, and is this effect moderated by political trust?

The results of this study were mixed. There was a difference in effects found between the LISS survey about natural gas-free alternatives to gas boilers or central heating boilers and the Haarlem survey regarding the adoption of insulation measures. Firstly, for the LISS data, a significant effect was found for both political trust and climate change perception. This suggests that an individual with higher levels of political trust or an increase in the threat perception of climate change is more willing to adopt a heat pump, or other natural gas-free alternatives. These findings are in line with the Protection Motivation Theory, because climate change is seen as a dangerous problem, people will take steps to limit the effects of it (Bočkarjova & Steg, 2014; Kothe et al., 2019).

Political trust however did not moderate the effect of climate change perception on the willingness to adopt an EET. This means that the degree to which someone trusts politics does not influence the relationship between climate change perception and the willingness to

adopt EETs. This means that no support has been found that political trust functions as a cognitive shortcut in this situation as expected based on earlier findings by Fairbrother et al. (2019) and Lim (2023). This could indicate that the cognitive heuristic plays a role in the effect on general environmental spending by the government, but not for environmental spending that influences the homeowner more directly, like their personal adoption of EETs.

The results of Haarlem and LISS differed in many ways. Firstly no effect was found for either political trust or climate change perception. This means that unlike for a natural gas-free alternative to a boiler, the willingness to adopt insulation measures is not affected by political trust or climate change perception. For Haarlem, no moderation effect of political trust was found either. These differing results that political trust and climate change perception could influence the willingness to adopt EETs in some circumstances.

The extent to which people are willing to adopt energy efficient technologies differed between the two samples too. Regarding the LISS data about natural gas-free alternatives to gas boilers, respondents on average disagreed a little with statements asking them about their willingness to adopt this EET. So, people on average were not very willing to adopt energy efficient technologies in the national sample. The results found in Haarlem were different. When asking respondents about their willingness to adopt insulation measures, respondents on average neither agreed nor disagreed with the statements. Overall, they scored higher on the willingness to adopt EETs compared to the LISS dataset.

Many differences in results were found between the LISS dataset and the Haarlem dataset. This could be because of four reasons. First, it could mean that there is an actual measured difference in what motivates people to adopt EETs. In Haarlem, it could be that political trust and climate change perception actually does not have an effect unlike in the country as a whole. Secondly, it could be the case that the effect of climate change perception and political trust on the willingness to adopt EETs differs depending on the type of EET. This would highlight the importance of researching the effects on every form of EET separately as the motivations seemingly do not necessarily align. For example, natural gas-free alternatives for heating, like the heat pump, are a more political topic which could explain why political trust had a significant effect for the LISS data. Insulation, however, is politically not as big of an issue. Therefore, the effects of political trust are not as strong.

Third, the difference could be explained by the timing of the survey. The LISS data was collected in 2019, while the Haarlem data was collected in 2024. Between these two times an energy crisis has happened in Europe which made people more aware of their energy use and their energy costs (European Comission, n.d.). This is because the costs have increased a substantial amount since 2019. Finally, the difference could also be explained by the smaller sample size collected in Haarlem. With a bigger sample size we could be more certain of the actual effect in the neighbourhoods.

Strengths and limitations

The first strength of this study is the use of two datasets compared to one. By using two different datasets that used very similar items, it became possible to measure two types of EETs compared to just one, if only existing data was used. Because of this, a new insight was found that the effects of climate change perception and political trust need not be the same for each type of EET.

Another strength of this study was the creation of a new proxy scale to measure the willingness to adopt insulation measures. The use of a proxy scale had a positive influence on this study because it allowed us to make a more reliable comparison between the new scale regarding insulation measures and the existing items from LISS regarding the adoption of natural gas-free alternatives to a gas heater or central heating boiler. This new insulation scale was comparable in reliability to the scale used for heating. This indicates that the used proxy scale is usable as a way to measure the willingness to adopt insulation measures.

Finally, a third strength of this study is the fieldwork that was conducted during the data collection. The fieldwork added to this study in two different ways. First, it helped with increasing the response rate from 14.7% to 20.1%. The fieldwork also added to this study because speaking to people living in the neighbourhoods that were studied it gave us a deeper insight to what extent people are already willing to adopt insulation measures and what their reasons were for not adopting insulation measures. For example, even though no effect of political trust was found, we did get to speak to some residents which indicated that for them their lack of trust in both local and national governments led them to not be willing to adopt insulation measures. Although broadly political trust does not seem to have an effect, it could indicate that political trust does matter for some individuals that score very low on political trust.

There were also some limitations to this study. Firstly, when conducting the fieldwork, we noticed that the elderly disproportionately did not fill in the survey. The main reason for this was that the survey was conducted online. This could indicate a potential response bias. Because of this the opinion of elderly residents might not be represented well. From conversations during the fieldwork it became clear that many of the elderly were not very willing to adopt insulation measures. This indicates that in the population the willingness to adopt EETs is lower compared to the surveyed sample.

Another limitation of this study became clear in the theory section. The theory was built on the assumption that the underlying processes that influence the willingness to adopt EETs are the same. The expectation was that the factors that influence insulation adoption also influences the adoption of heat pumps. The mixed results of this study have shown that this might not be the case as climate change perception and political trust did influence the willingness to adopt heat pumps, but not the willingness to adopt insulation measures.

A third limitation consists of the datasets used in this study. There were multiple differences between the datasets that make a one-to-one comparison not perfect. Firstly, because the scale used for the dependent variable differs, what is measured also differs between the two datasets. Directly comparing them is not ideal, however, it did give the added benefit of measuring a broader range of EETs. Another important difference regards the time of data collection between the two datasets. Between the collection of the LISS data and the collection of the data in Haarlem five years have passed in which energy prices have substantially risen due to the energy crisis and the Russian invasion of Ukraine (European Comission, n.d.). People's perspectives on energy could have changed over these years which makes a direct comparison more problematic.

Future research
Future research into the adoption of insulation will have to take the potential response bias from this survey into account. This could be done by assisting elderly respondents in filling in the survey online, or giving them the option to fill it in on paper. This could increase the response rate among the older parts of the population with the goal of getting a more representative sample. Further research into the adoption of insulation also has to look at different factors that can influence the willingness to adopt insulation. This study found no

effect for climate change perception and political trust, therefore future research should look into other factors. This could for example be factors relating to the coping appraisal side of the Protection Motivation Theory as this side was not strongly considered in this study. Finally, future research should also consider testing what aspects influence the willingness to adopt natural gas-free alternatives to heating. While this study did find a positive effect for climate change perception and political trust, the data is four years old. With recent changes in the energy prices, what motivates people to adopt natural gas-free alternatives to heating might have changed over these years. Future research could retest these factors as well as consider other aspects that could influence the willingness to adopt natural gas-free alternatives to heating.

Policy advice

This section will answer the final research question posed in the introduction: *What steps can municipalities take to improve the adoption of energy efficient technologies by homeowners?* This section will focus both on advice for Dutch municipalities in general as well as for the municipality of Haarlem in specific.

One important first step that all municipalities should make is to gain enough insight into the population. Results from the LISS data showed that in the Dutch population there is an effect of climate change perception and political trust on the willingness to adopt a certain form of energy efficient technology. These findings were in line with Protection Motivation Theory. This would suggest that because people perceive climate change as a threat, they will act in a way to limit the harmful effects of this threat (Kothe et al., 2019). However, results in Haarlem have shown that in this exact case, no effect of climate change perception or political trust was found. Therefore, this study has shown that it is important for municipalities to not only rely on nationally available data, but also consider how the effects could be different for their own population. The population of Haarlem was younger and could more easily make ends meet compared to the average household from the LISS data. These differences in population are one explanation of why the results differed between the two datasets which indicates that for municipalities it is important to collect recent data about the neighbourhoods that they want to make natural gas-free.

Based on the results from Haarlem no concrete indications were found that focussing on political trust and climate change perception would have an effect in increasing the willingness to adopt insulation measures in the Vogelenwijk and Indische wijk, the two neighbourhoods surveyed in this study. This is because in the survey no direct effect was found. It is important to note that during the fieldwork some residents showed that for them political trust did play a role as they were not trusting of the government and therefore were not willing to adopt insulation measures. Therefore, it would not be wise to write the effect of political trust off completely. However, focussing on political trust alone is not recommended based on the survey results. Instead, the municipality needs to look into other alternatives to increase the willingness of residents to adopt insulation measures. One alternative could be found from the fieldwork. One of the most common responses by the residents was that they were open to insulating their homes, but that they did not have the financial capability to do so. According to them better subsidies or loans were needed for them to insulate their

homeless. Interestingly, one question in the survey asked respondents what type of subsidies and loans that they could use to make their homes more sustainable were known to them. 50.8% of respondents said that they did not know any of the existing subsidies or loans. This could indicate that the problem does not lie with the subsidies itself, but with knowledge about the subsidies. This could be an explanation as to why the variable financial situation had a significant effect, people are not aware of the existing options to help finance insulation measures. The municipality should therefore increase residents' awareness of existing loans and subsidies that help make their homes more sustainable. This could be done in collaboration with the neighbourhood platforms as these form a bridge between the residents of the neighbourhoods and the municipalities. Spreading information through the neighbourhood platforms could prove to be effective because from the perspective of the residents, the information will come from a source closer to them as the platforms can function as peers spreading information through their network. Alternatively the municipality can take away the need for residents to know about the different types of subsidies by simplifying the process needed to make the home more sustainable. This could be done by letting the government take on the responsibility of the residents to apply for subsidies and loans on their behalf. This way residents do not need to know the best option as the government can do it for them. This however does rely on a certain level of political trust, because as shown by Davidovic and Harring (2020), political trust is relevant because citizens have to trust that the government correctly handles existing funds.

Finally, the municipality could also consider the effects that were found in this study to reach more people. A significant and negative effect for age was found which means that younger people are more willing to adopt energy efficient technologies. The results for Haarlem specifically showed that female respondents were significantly less likely to adopt insulation measured compared to male respondents. These aspects are relevant to consider when trying to promote the adoption of insulation measures. Regarding gender, the municipality could do one of two things. Either focus on their advertisement campaigns specifically to female respondents, as they are less likely to adopt energy efficient technologies with the aim of bridging the gap between genders. This way female homeowners are not left out more compared to male homeowners. This could lead to a more equal distribution of subsidy funds. However, the municipality could also consider to mainly focus on male residents in their campaign as these are the homeowners who are already more

willing to adopt insulation measures. This way more homes would get insulated in a shorter amount of time as convincing male residents to insulate will be less difficult. The municipality has the goal of being natural gas-free by 2040 which means that all homes need to be insulated by then. By focusing on male homeowners they are more likely to hit their deadlines, which would be more difficult when mainly targeting female homeowners.

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Appendix A: Informed Consent form LISS

Note: this is a translated version. You can find the original Dutch version on the second page.

Declaration of consent LISS panel participation

Please read the following information and declaration of consent carefully.

The General Data Protection Regulation (GDPR) came into effect on 25 May 2018, applying automatically to all EU member states. Centerdata complies with these legal requirements.

You are a participant of the LISS panel, which is managed by Centerdata. Centerdata collects data that is made available to researchers for scientific, policy and social research. We collect your responses every time you complete a questionnaire. We treat your data with the utmost care and always keep your contact details (name, address, telephone number and email address) separately from your responses.

Researchers working for third parties (institutions other than Centerdata) are never given access to your contact details without your prior explicit consent. It is not possible to trace the data back to you. Your privacy is and will remain fully protected. Click here for more information about how we use your personal data.

Consent
Before you can participate in the LISS panel you need to give your official consent for us to save your responses and to make these responses available for scientific, policy and social research. Your responses will not be used for commercial research. You may discontinue your participation at any time without having to give us any reasons.

☐ *I hereby give my consent to Centerdata to use my responses and to make these responses available for scientific, policy and social research. The researchers will not be able to trace my responses back to me.*

Appendix B: Information letter Haarlem

 Gemeente Haarlem

 Universiteit Utrecht

Aan de bewoners van

Beste bewoner,

Vanaf 2040 gebruiken we in Haarlem geen aardgas meer om onze woningen te verwarmen. Dat heeft gevolgen voor iedereen. De eerste stap is om uw huis zo goed mogelijk te isoleren. Daardoor wordt uw woning comfortabeler en gaan uw energiekosten omlaag.

Als eigenaar van een huis of appartement bent u zelf verantwoordelijk voor de verduurzaming van uw huis. Daar komt veel bij kijken. De gemeente heeft extra geld beschikbaar gekregen om huiseigenaren van een woning met een laag energielabel te ondersteunen. In samenwerking met studenten van de Universiteit Utrecht doen wij onderzoek naar welke ondersteuning huiseigenaren nodig hebben bij het verduurzamen van hun woning.

We vragen eigenaren van een huis of appartement in de Indischewijk en Vogelenwijk om hun mening. U bent daar een van en we hopen dat u mee wilt doen. Het invullen van de vragenlijst kost u ongeveer **10 minuten**. Om toegang te krijgen tot het onderzoek kunt u onderstaande link of QR-code gebruiken. De Universiteit Utrecht verzamelt data op een anonieme manier. De data zullen na verzameling op zo een manier worden opgeslagen dat antwoorden niet herleidbaar zijn.

Onder iedereen die meedoet met dit onderzoek verloten wij 3 vouchers ter waarde van €500 voor een isolatiemaatregel naar keuze. Ook als u meedoet blijven uw antwoorden anoniem. Wij verloten de vouchers alleen onder de bewoners die hiervoor hun email geven.

Heeft u vragen over deze brief dan kunt u terecht bij Martijn Verduin of Jeroen Bos van de Universiteit Utrecht op m.m.verduin@students.uu.nl of j.h.bos3@students.uu.nl.

Wilt u meedoen met het onderzoek gebruik dan onderstaande link of scan de QR-code
https://tinyurl.com/haarlemisolatie

Met vriendelijke groet,

Philipp Schneider
Projectmanager Gemeente Haarlem

Appendix C: Survey questions

I am considering replacing my central heating boiler and/or my gas heater] with a natural gas-free alternative as soon as it breaks.

I find it difficult to determine what would be a good natural gas-free alternative for my central heating boiler and/ or my gas heater

I (currently) do not have enough faith in the available natural gas-free alternatives for my central heating boiler and/ or my gas heater

I am waiting to see what the government says before I consider a natural gas-free alternative.

If I have my home renovated, I am also considering applying insulation measures.

I find it difficult to determine what good insulation measures I can take.

I (currently) do not have enough faith in the available options to insulate my house.

I am waiting until I get more information from the local government before I will insulate my house.

Humanity must take action to prevent climate change as soon as possible, or it will be too late.

I do not think I need to change my lifestyle to prevent climate change.

I am angry that the climate is receiving so much attention when there are more important problems.

How much confidence do you currently have in the following bodies in the Netherlands? The municipality, the national governent

How old are you

How do you identify

A question about your financial situation: how easy or difficult is it at this time for you (or your household) to make ends meet with your total net household income, i.e. to pay for the usual necessary expenses?

Are you aware of the financing options to make your home more sustainable?

What else can the municipality do to help you insulate your home?

Appendix D: Bivariate correlations

Table 5: Correlations between the dependent variables and independent variables used in the LISS analysis. N = 1156

	(1)	(2)	(3)
Climate change perception (1)	-	-	-
Political trust (2)	.255**	-	-
Willingness to adopt EETs (3)	.128**	.162**	-

Note: * p < .05 ** p < .001 Correlations were computed using the Pearson correlation.

Table 6: Correlations between the dependent variables and independent variables used in the Haarlem analysis. N = 282

	(1)	(2)	(3)
Climate change perception (1)	-	-	-
Political trust (2)	.368**	-	-
Willingness to adopt EETs (3)	.124*	.123*	-

Note: * p < .05 ** p < .001 Correlations were computed using the Pearson correlation.

Appendix E: Results table using 3 item EET scale for LISS Dataset.

Table 7. Regression analyses with all independent, control and moderation variables relating to the willingness to adopt EETs using the 3 item scale for LISS-dataset. (N = 1156)

Model	I		II		III	
Constant	3.281**	(.207)	2.768**	(.209)	2.926**	(.306)
Climate change perception			.071*	(.024)	.074	(.025)
Political trust			.069**	(.017)	.071	(.017)
Age	-.014**	(.002)	-.013**	(.002)	-.013**	(.002)
Gender (1 = female)	.037	(.069)	.001	(.069)	.002	(.069)
Financial situation	.078*	(.038)	.026*	(.039)	.026	(.039)
Climate change perception * Political trust.					.008	(.010)
R^2-change	.038		.026		.000	
F-change	15.24**		16.28**		.597	

Note: Main entries are unstandardized regression coefficients and entries in parentheses are standard errors; * $p < 0.05$, ** $p < 0.001$.

Appendix F: Results table using 3 item EET scale for Haarlem Dataset.

Table 8. Regression analyses with all independent, control and moderation variables relating to the willingness to adopt EETs for Haarlem dataset using 3 item EET scale. (N = 282)

Model	I		II		III	
Constant	4.170	(.532)	4.223**	(.613)	4.002**	(.773)
Climate change perception			-.004	(.063)	.039	(.112)
Political trust			-.008	(.048)	.050	(.133)
Age	-.026**	(.007)	-.026**	(.007)	-.026**	(.007)
Gender (reference = male)	-.554*	(.188)	-.552*	(.191)	-.556*	(.192)
Gender (reference = other)	-.718	(.497)	-718*	(.499)	-.706	(.501)
Financial situation	.342**	(.098)	.347**	(.101)	.351**	(.101)
Fieldwork (reference = no)	.016	(.203)	.019	(.204)	.025	(.205)
Climate change perception * Political trust.					-.012	(.025)
R^2-change	.107		.000		.001	
F-change	6.59**		024		.222	

Note: Main entries are unstandardized regression coefficients and entries in parentheses are standard errors; * $p < 0.05$, ** $p < 0.001$.

Appendix G: Results table for Haarlem Dataset using 4 item scale with selection made in the same way as for LISS.

Table 9. Regression analyses with all independent, control and moderation variables relating to the willingness to adopt EETs using the 4 item scale for Haarlem with respondent selection made in the same way as for LISS. without centred variables (N = 232)

Model	I		II		III	
Constant	4.823**	(.454)	4.704**	(.536)	4.556**	(.703)
Climate change perception			.013	(.058)	.040	(.103)
Political trust			.015	(.046)	.054	(.129)
Age	-.026**	(.006)	-.026**	(.006)	-.026**	(.006)
Gender (1 = female)	-.407*	(.164)	-.410*	(.166)	-.412*	(.167)
Financial situation	.292**	(.084)	.284*	(.086)	.286*	(.087)
Fieldwork	.101	(.178)	.094	(.180)	.093	(.180)
Climate change perception * Political trust.					-.008	(.024)
R^2-change	.127		.001		.000	
F-change	8.24**		.111		.106	

Note: Main entries are unstandardized regression coefficients and entries in parentheses are standard errors; * $p < 0.05$, ** $p < 0.001$.