Empowering the Energy Transition: Linking Transition Studies to Drivers and Barriers of Individual Sustainable Energy Behavior

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Abstract

Purpose: This research aims to explore how forces that set a transition into motion from the macro perspective play a role in the decision-making process of private homeowners to perform sustainable energy behavior. Current research in transition studies fails to take individual experiences, drivers, and barriers into account when elaborating on the transition process in contemporary society.

Method: By performing focus groups in which news articles are discussed that form examples of forces from the macro level, the individual experiences of the energy transition have been explored that influence their perceptions of sustainable energy behavior. To narrow down the scope of this research, the participants of the focus groups consisted of only private homeowners. A total of 5 focus groups were performed, with a total of 21 participants.

Results: From the focus groups became clear that the forces from the macro level play a role in the decision-making process of private homeowners. However, individual factors such as psychological distance, efficacy, legacy, and financial reasons impact the effect of the macro forces on the individual. These individual factors can either function as a driver or a barrier to individual sustainable energy behavior.

Conclusion: Transition literature lacks to take the individual perspective into account, while this research has shown that these individual factors significantly impact sustainable energy behavior. Future research could focus even more on this role of the individual in complex transitions. By looking at the role of stimulating factors such as legacy and financial reasons, effective communication strategies could be created that benefit the challenge of the energy transition.

Keywords: Energy transition, transition studies, Multi-Level Perspective, sustainable energy behavior, private homeowners

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1. Introduction

Recent events such as the war between Russia and Ukraine, extreme droughts, floodings of Dutch rivers, and fossil fuel shortages have put the importance of the energy transition in the spotlight. Changes need to be made to reduce greenhouse emissions that currently result in climate change problems. The war in Russia and the appearance of climate change effects have also highlighted the major reliance on the use of fossil fuels in society. In the current energy transition state the adaptation of sustainable energy behavior within society is problematized, hindering the acceleration of the energy transition (Kloosterman, 2021).

The energy transition involves the change from a fossil fuel based society to a sustainable energy based society (IRENA, 2022, May 10). The energy transition is a socio-technical transition since both technical developments and societal developments are needed to succeed the transition. Socio-technical transitions involve many aspects, such as “technologies, markets, user practices, cultural meaning, infrastructures, policies, industry structures, and supply and distribution chains" (Köhler et al., 2019, p. 3). This definition shows that transitions are a complex web of factors that each play a role in the transition to succeed. Also, the energy transition differs from other types of transitions since it does not result in immediate benefits for the individual (Geels, 2011). Other transitions mostly imply a change that makes the lives of individuals more effortless, which contrasts with the current energy transition that leaves individuals with expensive investments and a sacrifice of currently gained freedoms. The goal of the energy transition is to reach a society that entirely runs on sustainable energy, consequently leading to the preservation of the planet due to a decrease in anthropomorphic climate change effects (Geels, 2011). In the energy transition, the role of the individual is essential since an acceleration in the energy transition relies on individual behavior changes. This research aims to visualize factors that play a role in the sustainable energy behavior of private homeowners, which leads to a better understanding of the stimulation of individual energy behavior in the future.

Transition studies look at transitions from a macro perspective, which helps to outline how a transition develops. This perspective provides insights into how transitions behave in general and creates new approaches on how the energy transition and sustainability will develop (Köhler et al., 2019). In the research of Frantzeskaki and de Haan (2009), eleven forces are listed that play a role in the energy transition from a macro perspective. Since these forces are set on the macro level, they cannot typically be generalized to how individuals behave in the energy transition. It

remains unclear how macro forces play a role in individual behavior and how macro and micro levels interrelate. The energy transition is very complex since it involves many agencies that cannot simply be addressed by one perspective or discipline (Köhler et al., 2019). However, by addressing the drivers and barriers that individuals experience through the lens of transition studies, a more detailed view of the energy transition can be created.

At this moment, there is a gap in transition literature that aims to connect the drivers and barriers of transitions from a macro perspective to the drivers and barriers individuals experience in a transition in society (Köhler et al., 2019). Therefore, this research aims to create a link between transition literature and individual behavior. By using the eleven forces described by Frantzeskaki & de Haan (2009), this research will study how these forces play a role in the sustainable energy behavior of individuals, specifically homeowners. The results of this study can then be used to understand what drives the energy transition from the individual's perspective, which can contribute to an acceleration of the energy transition.

Therefore, this research aims to answer the question: "How do the forces of the energy transition on a macro level play a role in the decision-making process of private homeowners to perform sustainable energy behavior?". First, the theoretical framework will explain the basis of transition studies, together with an elaboration of the Multi-Level Perspective (Geels, 2011; Köhler et al., 2019) and the forces of the energy transition by Frantzeskaki and de Haan (2009). This section also explores the literature on previously studied individual drivers and barriers to sustainable behavior. Then, by using focus groups will be researched how private homeowners are experiencing the energy transition and how they view the eleven forces explored in the theoretical framework. This research focuses solely on private homeowners to narrow the scope of this research. Then the results of these focus groups are addressed in section 4. Finally in section 5, the discussion of findings, limitations, implications, future work, and conclusions are addressed.

2. Theoretical Framework

2.1 Exploring the Dutch energy transition

The energy transition implies the transformation from a fossil fuel-based industry to a zero-carbon emission energy sector, which needs to be finished in 2050 (IRENA, 2022, May 10). Moreover, the energy transition implies not only the change to green energy sources but also a general decrease in energy use (Steg et al., 2018).

Over the last years, the Netherlands has been working on transitioning from fossil fuels to greener forms of energy. The energy transition has been challenging since the entire energy system in the Netherlands is still reliant on gas and oil supplies. The Dutch environmental assessment agency's last climate and energy survey (*Klimaat- en Energieverkenning 2021*, 2021), it was stated that the Netherlands used a total of 2.912 petajoules on energy in 2020. The sources of this energy use were 44.6% from gas, 36.6% from oil, 5,8% from kohls, 4,1% from biomasses, 1,7 percent from wind energy, and 1% from energy from the sun (*Klimaat- en Energieverkenning 2021*, 2021). The Dutch aim is to limit emissions in several sectors such as building environment and heating, mobility, electricity, industry and agriculture, and land use (RIVM, 2022, May 10). Changing from one energy source to another is difficult since society's functioning is entirely based on the use of fossil fuels, and adjusting to another functioning based on sustainable energy often leads to resistance (Beauchampet & Walsh, 2021). The Netherlands is not known for its fast improvements in the energy transition and has been described as 'unfriendly' towards the transition to renewable energy sources (Proka et al., 2018). To succeed in the Dutch energy transition, a change in attitude from all stakeholders is necessary on sustainable energy behavior (Kloosterman, 2021).

Recently, CBS has researched the perspectives of Dutch civil society on the energy transition. The outcome of this research initiated that most of the Dutch society has a positive mindset toward the energy transition (Kloosterman, 2021). Especially women, habitants of cities, highly educated, and young people are optimistic about the energy transition (Kloosterman, 2021). However, financial reasons impact the likelihood of purchasing solar panels or changing to a new green energy provider. Even though the outcome of the CBS research is positive, perspectives on sustainable behavior are not enough to generate actual action (van der Linden, 2016). For example, people like to portray themselves as 'green' when answering questionnaires about the energy transition since it gives them a more positive image (Bolderdijk et al., 2013). Therefore, their motivations and perceptions differ from the actions they perform in their lives.

In any socio-technical transition, individual behavior is essential. Positive perceptions do not always lead to action, which is also a problem in the Dutch energy transition. From a socio-technical energy transitions perspective, which includes the interaction between innovations in sustainable energy technologies and societal structures (Geels, 2011), individual behavior plays a major role in the transition tipping over to acceleration. The sustainability transition is unique in the sense that it, unlike other transitions, needs to succeed due to climate reasons (Geels, 2011).

Besides that, the sustainability transition requires action not for immediate individual benefit but for a good cause. Lastly, it also involves 'free-rider problems and prisoner's dilemmas' (Geels, 2011, p. 25), which makes the transition extremely complex. In the Netherlands, the awareness of climate change effects and how to behave more sustainably is beginning to grow, but it has not yet reached a tipping point for the transition to move in speed (Proka et al., 2018). This is problematic since the European climate goal to decrease greenhouse gas emissions by 50% in 2030 needs to be reached in less than eight years.

2.2 Transition perspectives of a Socio-technical transition

To understand what drives energy transitions in society, it must first be established what defines transitions. Transitions are complex social changes, and transition studies try to "conceptualize and explain how radical changes can occur in the way societal functions are fulfilled" (Köhler et al., 2019, p. 2). Transition studies are mostly addressed in system literature because radical changes in society cannot simply happen by making one small change in policy or technology. They require stimulation by multiple areas, like in the example of sustainable transitions in area's as energy sources, sustainable technologies, policymaking, motivations by individuals, and many more facets (Frantzeskaki & de Haan, 2009). To understand the factors that play a role in making a transition accelerate, a multidisciplinary perspective is needed to gain an overview of complex transition processes (Köhler et al., 2019).

In sustainability transition studies, the Multi-Level Perspective (MLP) is very prominent (Köhler et al., 2019). For this research, the Dutch energy transition situation is being described according to the Multi-level Perspective because this transition theory goes further than the study of single sustainability technologies and their adaptation to society (Geels, 2011). It also emphasizes the relationship between these innovations and a majority of groups within society (e.g., consumers or policymakers), who are a part of certain social engagements maintaining particular norms and values (Geels, 2019). MLP is therefore often used to describe socio-technical transitions.

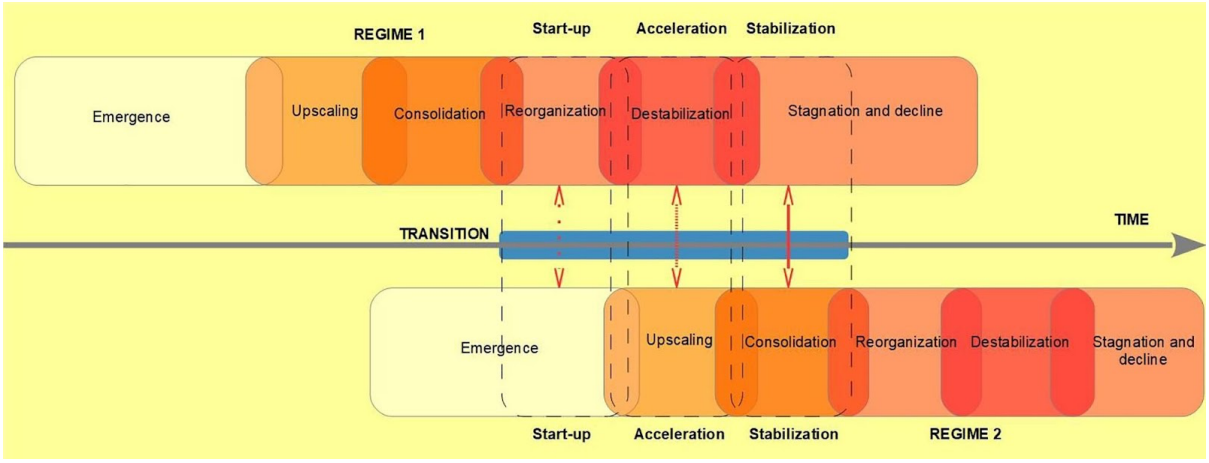
The multi-level perspective perceives transitions as a system of 3 levels: niches, socio-technical regimes, and landscape (Köhler et al., 2019). People live according to society's norms, values, and technical structures. This system of so-called 'rules' is called the regime, which means the standard way of doing things (Kanger, 2021). The regime is then again formed by the

developments happening in society. Niches are innovations that are developed according to alterations in society. These niches are created in a space outside of the mainstream world, like research facilities. Lastly, the landscape implies society's surroundings, like the environment (Köhler et al., 2019). In the case of the energy transition, climate change (landscape) pressures the fossil fuel-based society (regime) to change. New technologies that could improve climate change are being created (niche developments) and form an excellent alternative to fossil fuel technologies. This pressure from both sides makes the fossil fuel society change its norms and technologies for it to support green technologies. The regime is then transitioned to another regime.

In figure 1, the life cycle of a transition is described, which are: 1) emergence 2) upscaling 3) consolidation 4) reorganization 5) destabilization 6) stagnation and decline (see fig. 1). This lifecycle illustrates that the adoption of innovations due to regime changes exists alongside each other. The 'startup' of a transition mostly starts in the 'reorganization' stage of a current life cycle, which is the start of a new life cycle. Then the transition accelerates while the first life cycle destabilizes and the second is upscaling, and then the transition stabilizes while the first life cycle declines and the second consolidates (Frantzeskaki & de Haan, 2009; Kanger, 2021).

Figure 1

Process of transitions



Note. From *Rethinking the Multi-level Perspective for energy transitions: From regime life-cycle to explanatory typology of transition pathways,* by Kanger, 2021, p. 6.

Looking at Figure 1, several steps of transitions according to technological innovations are explained. As mentioned before, the MLP approach can be described by means of energy transitions. Climate change pressures the existing fossil fuel-based energy regime, which then changes through niche developments. The technological developments that have been made to support the transition to green energy have emerged and are upscaling. The energy transition itself in the Netherlands is accelerating, but not fast enough due to climate problems. What factors play a role in a transition breaking through, leading to a more sustainable regime?

2.3 Drivers of a transition

As seen in Figure 1, transitions often occur in the reorganization and destabilization stages of a regime, but what makes a transition accelerate from the start-up phase? In transition literature based on MLP, the factors that contribute to the change of a social system are called 'conditions for change' (Frantzeskaki & de Haan, 2009). The start of a transition often happens when so-called' mismatches' occur in the regime in society. These mismatches can happen within the regime itself or in the relationships between the regime, landscape, and niches (Frantzeskaki & de Haan, 2009). The first condition is 'tension' and implies the mismatch between the landscape and the existing regime. Changes in the landscape create tension for the existing regime, which then becomes outdated. Secondly, 'stress' means mismatches occur within the current regime itself. Lastly, 'pressure' exists when niche developments have been created that impact the current regime, which then is ought to change (Frantzeskaki & de Haan, 2009). These three 'conditions of change' then again have 'forces' that set them in motion.

Frantzeskaki and de Haan (2009) make categorizations in their research based on the characteristics of the forces (See Table 1). These categorizations are based on the direction of the force, its condition for change, and the type of force. Firstly, forces come from internal structures within the current regime, which consequently cause stress. Secondly, the direction of the force is bottom-up and includes the pressure of newly created niches. Lastly, a force can come from the top-down, creating tension between the landscape and the existing regime. These forces can also be clustered into three sections by Frantzeskaki & de Haan based on their type; formation forces which set the base for societal innovation (presence of a niche, new demand, or new functioning), support forces that increase or decrease the course of the transition (standardizations of practices,

provision of resources, and exercise of power), and triggers that 'shock' system (systemic failures, crisis or exogenous events) (Frantzeskaki & de Haan, 2009).

Table 1

Forces and their direction and condition for change

Force	Definition	Direction	Condition for change	Kind of force
Crisis	An unexpected critical change in society, such as war, from which the cause depends on multiple factors, influences a transition.	Top-down	Tension	Trigger
Exogenous event	Unexpected and uncontrollable events, such as natural disasters, impact transitions. The cause and effect are easier to comprehend for exogenous events than for crises.	Top-down	Tension	Trigger
Standardization of practices	The standard routines in society which are difficult to change, have an impact on transitions	Top-down	Tension	Support force
Provision of resources	The scarcity of resources has an impact on transitions.	Top-down	Tension	Support force
Exercise of power	The external source of power protects the social system, which impacts transitions.	Top-down	Tension	Support force
Imposition of new functioning	The obligation from external sources to change to a new functioning.	Top-down	Tension	-
Systemic failures	The failure of not keeping up with societal demands creates stress, which impacts transitions.	Internal	Stress	Trigger
Self-regulation of the system	The internal structure of social groups stresses the system to transition.	Internal	Stress	-
Presence of a new niche	Society is being changed by new developments, technologies, or practices. This new niche stimulates the transition	Bottom-up	Pressure	Formation force
Presence of a new functioning	A new way of operating in society can stimulate a transition in other area's	Bottom-up	Pressure	Formation force
Presence of a new demand	Within society, there is a request for an improvement of a way of life, which stimulates a transition	Bottom-up	Pressure	Formation force

Figure by Franzeskaki & de Haan, From *Transitions: Two steps from theory to policy*, 2009, p.597

The current regime occupying society, which functions are based on fossil fuels, is deeply rooted in everyday practices. However, a new regime based on sustainable energy sources is starting to emerge. Landscape factors such as climate change effects have created tension, pushing the regime to change its attitudes toward sustainable energy behavior. Newly formed niches that support a society functioning on sustainable energy sources have started to emerge. The forces described by Frantzeskaki and de Haan (2009) list the forces that generally set transition into motion, but what determines which situation functions as a breakthrough in transitions?

Transitions have a solid natural and social side (Loorbach et al., 2017). The energy transition is therefore not solely a problem of policy or technology. For the energy transition to accelerate, it requires an understanding of the social and individual aspects at stake. Transition literature lacks literature that elaborates on the connection between macro and micro perspectives. But, for the energy transition to succeed, it needs to be researched what forces set individual behavior into motion. Do the forces by Frantzeskaki & de Haan that set transition into motion on a macro level also play a role in the sustainable energy behavior of the individual? To further elaborate on this question, first needs to be established what current stimuli are of sustainable behavior.

2.4 Individual factors of sustainable energy behavior

Table 2

Individual factors

Factor	Driver or Barrier
Feeling of risk, urgency, or emergency	Driver
Awareness and attitude	Driver
Psychological distance	Barrier

2.4.1 Types of sustainable energy behavior and their drivers

Looking from the macro perspective, the energy transition implies a lot of stakeholders, such as the government, energy providers, consumers, policymakers, energy resources, companies, and many more (Steg et al., 2021). The role of the individual barriers and drivers and present in almost all of these stakeholders, which is why it is essential to study the many elements of

individual energy behavior. The stimulation of individual behavior relies on the context in which certain decisions are made (Markard, 2018), which is influenced by "economic, political, institutional, legal, technological, social, and cultural" factors (Steg et al., 2021, p. 2). The individual can make a big difference in the success of the energy transition, and that is why it is important to study individual actions in transition processes.

Sustainable energy behaviors range in the likeliness to be adopted by individuals (Steg et al., 2018). Behaviors that result in the most energy reduction are not always the easiest to apply (Steg et al., 2021). Some sustainable decisions, such as installing a sustainable technology like solar panels, require a one-time decision. With other behaviors, such as taking the train instead of the car, the decision process between the easy and the sustainable choice needs to be made repeatedly. With both one-time decisions and repeated decisions, other motivations play a role. Structural long-term behavior changes are often more difficult to generate than one-time decisions (Steg et al., 2018). This depends on the context of the behavior type that needs to be changed. There is also a difference between behaviors that can be adjusted immediately and those that take time to adjust (Steg et al., 2018), the perceived efficacy of a particular behavior (Cojuharenco et al., 2016), or the distinction between the effects of direct and indirect energy use (Steg et al., 2021).

In the current research on the stimulation of sustainable behavior, awareness and attitude are highlighted as a cause for action. Also, feelings of risk, urgency, or emergency often cause breakthroughs in individual behavior. Feelings of risk are mental constructs that depend on a person's perceptions and background (Van der Linden, 2015). Risk perceptions are often much higher in developing countries contrary to western countries, where people perceive less risk. Even though the "awareness" and "concern" in general have increased over the years, the problems of climate change have still not reached feelings of urgency (Lorenzoni & Pidgeon, 2006), unlike other world problems such as the economy or terrorism. Changing towards more sustainable behaviors has not been perceived as urgent since climate change is often difficult to grasp because its effects lie in the future (Weber, 2010). The problem is complex & complicated to confirm, and confidence in the government and science is needed from the individual to make changes (Kellstedt et al., 2008)

Van der Linden (2015) describes that most of the perceptions of risk are explained in the psychometric paradigm and "refers to a research approach used in explaining how laypeople (nonexperts) perceive various hazards" (Siegrist, 2010). However, it should be noted that many

human risk perceptions are based on emotion and not solely on people's thoughts about certain situations (Slovic, 2000). Individual emotions, thought processes, society's worldviews, and structures affect risk perceptions (Dake, 1992). In the Climate Change Risk Perception Model (CCRPM) described by Van der Linden (2015), he combines these risk studies in four factors that play a role when perceiving risk concerning climate change: cognitive factors such as knowledge, experiential processing like emotions, and personal experience, social-cultural influences as social norms and value orientations, and socio-demographic characteristics.

The current war in Ukraine could be an example of how risk perceptions affect a transition on the individual level. The war itself functions as a force that influences the energy transition process. The individual, in this case, perceives more risk due to the impact of the war on their emotions. People commonly have an altruistic worldview and are less biospheric (Snelgar, 2006). The war in Ukraine could play into these altruistic feelings of helping each other out, resulting in choosing other energy sources than Russian gas. Over the last decades, Western countries have lost their connection with nature and failed to see it as something that should be protected (Nisbet et al., 2009). Therefore, the war in Ukraine could have been more of a risk factor for European countries to choose other forms of energy than the climate issue itself. A war is visible and understandable, while the climate issue is more difficult to graph (Kellstedt et al., 2008).

Risk feelings could be connected to the previously described forces in transition literature, especially when a new landscape creates tension with the regime. This tension could be from crises and exogenous events, which are often associated with risk feelings for the individual. Individuals tend to act quicker when their situation is ought to change, and the general forces in transition literature play a role as well.

2.4.2 Barriers of sustainable energy behavior

In social-technical transitions, some individual factors tend to lead to resistance. The system that society has created over time initially tries to prevent change. However, newly developed niches tend to lead to opposition from the public but do not always lead to a permanent aversion (Frantzeskaki & de Haan, 2009). Pressure from niches or stress within a regime does not always mean that every individual experiences it the same way. Some new developments bring benefits for one group but disadvantages for the other. In the case of the energy transition, resistance primarily results from the work that needs to be done by all stakeholders to generate

change actively. As mentioned, the sustainability transition differs from other transitions since it does not necessarily have immediate personal benefits. Also, do personal changes in sustainable behavior not lead to clear perspectives of improvements in the future (Geels, 2019).

Climate change is one of the most urgent problems of our time, but it still feels for a lot of people that it is something that is far away. This phenomenon is called "psychological distance", which includes the mental representation in a person's mind of how urgent a certain problem is in terms of distance (Spence et al., 2012). Psychological distance is a huge barrier for individuals in the energy transition. Psychological distance can be divided into spatial distance, temporal distance, social distance, and hypotheticality (uncertainty) (Liberman & Trope, 2008), which all reflect the problem of climate change.

The climate change problem is often perceived as something that shows its effects in geographically distant places, which leads to the absence of action to do something about it (Spence & Pidgeon, 2010). This is because it is easier for people to imagine the effects of climate change in their own surroundings if the place where the effects are showing is close to home. Geographical closeness also makes the problems also seem more personal, which also triggers to act and make a change in behavior (Spence & Pidgeon, 2010). On the contrary, people tend to divide risk perceptions into personal and societal, where societal problems are perceived as more severe than personal risks. This results in less change in behavior on a local level since those actions are seen as less significant in perspective to the entire problem of climate change (Spence & Pidgeon, 2010).

On the macro level, transitions have general forces that set the transition into acceleration. However, individuals experience other barriers and drivers regarding their sustainable energy behavior, such as feelings of risk and psychological distance. The forces on the macro level do not take these individual factors into account. An overview of how both micro (individual) factors and macro level forces of the energy transition interrelate would result in a deeper understanding of transitions in general and be beneficial to stimulating sustainable energy behavior in the future.

3. Method

3.1 Research design

This research has focused on the perceptions of private homeowners on how they experience the energy transition. Using qualitative methods, homeowners have elaborated on the drivers and

barriers they experience when performing sustainable energy behavior. Qualitative research methods work well in describing complex phenomena from the eyes of a variety of groups. However, unlike quantitative studies, qualitative methods provide more room for exploring individual interpretations and experiences (Sofaer, 1999). This is necessary to understand the position of private homeowners in the energy transition.

This research used online focus groups via the online streaming platform Microsoft Teams to conduct information about the forces that play a role in individual sustainable energy behavior. Focus groups are a well-known research method for pointing out unforeseen views on a social phenomenon (Acocella, 2012). Also, doing focus groups enables room for discussion, and the likelihood that details come up that did not seem relevant to the researcher or individual is increased (Acocella, 2012). Since this research is exploratory, focus groups are a useful method to address barriers and drivers that the participants encounter when making sustainable energy choices or behavior changes. The discussions held in focus groups make it possible for the researcher to spot the friction points and dilemmas that the participants encounter considering the energy transition. The Ethics committee of the University of Twente approved this research method.

3.2 Research instrument

The goal of the focus group was to see how forces of the energy transition on a macro level play a role in the sustainable energy behavior of private homeowners. The focus groups aimed to discuss how the eleven forces described by Frantzeskaki & de Haan (2009) played a role in the decision-making process of private homeowners. Therefore, news articles were used to stimulate a discussion on perceptions of the energy transition of the participants (see Appendix A).

The news articles addressed three topics, each functioning as an example of one force described by Frantzeskaki and de Haan (2009). The first article was about the war between Russia and Ukraine and its impact on Dutch gas prices. The article indicates that the war between Russia and Ukraine has a speeding effect on the Dutch energy transition. Therefore, this news article is chosen as an example of the force “crisis”. The second article discussed the floodings in the south of the Netherlands that took place in the mid of 2021 and functioned as an example of the force “exogenous event”. The article explained that research has confirmed that the floodings happened due to climate change. The third article contained a calling from the new minister of housing and

spatial planning of the Netherlands, which implied that all homeowners should be working on making their homes more sustainable as part of the energy transition. This last article indicated an example of the force “exercise of power”.

These three news articles were chosen as examples of the forces that have been addressed by Frantzeskaki and de Haan (2009). These three topics were selected because they often generate strong opinions and are well-known topics among homeowners. The news articles were accompanied by the question of how this situation influenced the sustainable energy behavior of the participant personally. This question retrieved information about the various perspectives on the energy transition of the participants. Besides the personal view of the private homeowners, the participants were also asked to predict how the situation described in the news article would influence private homeowners in general. The overall layout of the focus groups can be found in Appendix A.

Before the first focus group, the setup of the focus group was tested with 2 participants to spot unclarities. After this pre-test, some minor details in the spelling and layout of the focus group were changed.

3.3 Procedure

In total, five focus groups were performed with four to five participants. Each focus group took approximately 60 minutes and were performed with the online conferencing tool Microsoft Teams. The participants received an invitation via email to enter the conference. All focus groups were done between the 11th and 20th of July 2022. All participants in the focus groups held Dutch nationality. Therefore, the focus groups were being held in Dutch, also the researcher's mother tongue. Before the focus group, the participants filled out an informed consent form that ensured their privacy (see Appendix B). In this form, the participants provided their consent for recording the focus group and using their data. After the transcription, the recordings of the focus groups were deleted, and the transcriptions were anonymized. Besides a consent form, the participants were also asked to fill in a small survey containing a few additional questions about the participants' demographic information (See Appendix B).

The researcher guided the focus group by means of a priorly created layout. After a short introduction of the researcher and the research subject, the participants introduced themselves, explained their previous experience or knowledge of the energy transition, and discussed their

personal associations with it. Then the structure of the focus group was shown to the participants. The researcher explained how the news articles were used and what behavior counts as sustainable energy behavior. Since the decision to perform sustainable energy behavior can depend on personal factors, such as education level, economic status, or random personal life events, the participant has been instructed not to focus on personal circumstances that are irrelevant to the other participants or the research itself. Also, they were asked to focus on their role as private homeowners and speak their opinion from the perspective of that role. This was done to ensure that the participants did not talk too much from a macro perspective.

The focus group then covered the three news articles one by one. During the discussion between the participants, the researcher guided the conversation with open-ended questions to generate the correct information from the participants that was needed to answer the research question. However, the moderator has not interfered with the focus group with other questions if it was not necessary. Lastly, before closing the session, the researcher asked the participants if any other sustainable energy-related behaviors, drivers or barriers were not mentioned in the focus group to ensure all opinions were covered.

3.4 Participants

The target group of this research was private homeowners. This group can make their own decisions concerning the energy transition on their property. Since they do not rent a house, they have more freedom to make sustainable adjustments. Also, since they own a house, they mostly have experience with the options in terms of energy providers, sources of energy, or energy-saving tactics. This allows them to have a more elaborate opinion on why they perform certain sustainable energy behavior or not.

To retrieve private homeowners for this study, the non-probability sampling procedure was used using purposive sampling (Boeije, 2009). The participants were all retrieved via the social groups of the researcher since this research does not have the budget or time to retrieve participants randomly. Most of the homeowners in the social group of the researcher have had an interest in the energy transition or have already made sustainable behavior changes, which means that the researcher has selected the participants that were available at the times of the focus groups. A selection of homeowners was asked via email or WhatsApp if they would be interested in participating in this research, from which 21 responded that they would be interested. They were

contacted with a priorly created email that contained information about the study, its contents, the practicalities of the focus group, and the consent form. Five focus groups have been formed from this group based on the participants' availabilities.

The demographic information of the participants is listed in Table 3. As shown in Table 3, all the participants are highly educated and have an average knowledge of the energy transition. 71.4% of the participants were female, and most were over 50 years old.

Table 3

Demographic information

		Focus group						
		1	2	3	4	5	Total N	Total %
Gender	Women	4	2	4	3	2	15	71
	Man	1	2	0	1	2	6	29
Age	60+	0	1	0	2	0	3	24
	Between 40-60	4	3	3	1	4	13	62
	Under 40	1	0	1	1	0	5	14
Nationality	Dutch	5	4	4	4	4	21	100
Education level	HBO Bachelor	1		1			2	10
	WO Bachelor			1		1	2	10
	HBO Master		1		1		2	10
	WO Master	4	3	2	3	3	15	71
Living situation	With partner	2	2	2	2	2	10	45
	With family	2	2	1	1	1	7	30
	Alone				1	1	2	10
	With roommate	1		1			2	5
Living surroundings	Rural	2		2	1		5	24
	City	3	3	1	2	3	12	57
	Other		1	1	1	1	4	20
Knowledge energy transition	Below average		1	1			2	10
	Average	2	3	2	3	3	13	62
	Above average	3		1	1	1	5	24
	High						1	5
Total number of participants		5	4	4	4	4	21	100

3.5 Data processing and analysis

After the focus groups were performed, the recordings were transcribed. Microsoft Teams automatically transcribes recordings, so afterward the researcher manually fixed unclarities in these transcriptions. The entire coding process was being done using the coding software Atlas.Ti.

In the coding process, inductive and deductive coding methods were used since this research aims to spot the differences or similarities between the forces that set transitions in motions on a macro and micro level. Therefore, the eleven forces on the macro level were first added to de codebook. After that, other codes were added during the coding process that were outside the eleven forces. The summary of the codebook can be seen in Table 4, and the full version is available in Appendix C.

Table 4

Summary of the codebook

Category	Code	Definition
Involvement in the energy transition	Actively involved	Level of involvement in the energy transition is high
	Moderately involved	Level of involvement in the energy transition is moderate
	Not involved	Level of involvement in the energy transition is low
Types of sustainable energy behavior	Structural sustainable behavior changes	The private homeowner perceives sustainable energy behavior as actual behavioral patterns
	Practical sustainable home renovations	The private homeowner perceives sustainable energy behavior practical sustainable home renovations
	Limiting energy use	The private homeowner perceives sustainable energy behavior as limiting energy use
	Transition to other sources of energy	The private homeowner perceives sustainable energy behavior as the transition to greener forms of energy.
Forces	Crisis	The role of crisis situations in sustainable energy behavior of private homeowners
	Exercise of power	The impact of external sources of power on the sustainable energy behavior of private homeowners
	Exogenous events	The impact of exogenous events on the sustainable energy behavior of private homeowners

	Imposition of a new functioning	The impact of an imposed societal functioning on the sustainable energy behavior of private homeowners
	Presence of a new demand	The impact of the presence of a new demand on the sustainable energy behavior of private homeowners
	Presence of a new functioning	The impact of the presence of a new functioning on the sustainable energy behavior of private homeowners
	Presence of a new niche	The impact of the presence of a new niche on the sustainable energy behavior of private homeowners
	Provision of resources	The impact of the scarcity of resources (fossil fuels) on the sustainable energy behavior of private homeowners
	Self-regulation of the system	The impact of own initiatives within the group of private homeowners on the sustainable energy behavior of other private homeowners
	Standardization of practices	The impact of the standardization of daily practices on the sustainable energy behavior of private homeowners
	Systemic failures	The impact of systemic failures on the sustainable energy behavior of private homeowners
Individual factors	Efficacy	The impact of feelings of efficacy on the sustainable energy behavior of the private homeowner
	Psychological distance	The impact of the psychological representation of distance of a certain phenomenon in the mind of the private homeowner on their sustainable energy behavior
	Looks of sustainable energy technologies	The impact of looks of sustainable energy technologies on the sustainable energy behavior of private homeowners
	Knowledge	The impact of education about the energy transition on the sustainable energy behavior of the private homeowner
	World problems	The impact of the amount of world problems on sustainable energy behavior of private homeowners
	Legacy	The impact of legacy on the sustainable energy behavior of private homeowners
	Comfort	The impact of comfort on the sustainable energy behavior of private homeowners

Financial reasons	The impact of financial reasons on the sustainable energy behavior of private homeowners

Starting the coding procedure, the open coding technique was used to define the first impressions of the data of the focus group. In this stage, the coding categories “involvement in the energy transition” and “type of sustainable energy behavior” were added to the codebook. Also, many of the eleven forces on the macro level were already spotted in the discussions between the private homeowners, which fall under the category “forces”. After this round of open coding, another round of axial coding was done to thoroughly examine the transcriptions for barriers and drivers connected to the eleven forces or if any new categories could be found. During axial coding became clear that individual factors could mediate the effect of the forces on the macro level. Therefore, the category “individual factors” was added, which lists the mediating barriers and drivers on the individual level of the homeowners.

To make sure the codes were neutral and not influenced by the researcher's perspectives, a second coder was asked to make sure the codes were reliable. An independent coder was asked to code a section (10%) of the focus group transcripts. The second coder was provided with the codebook created by the researcher and independently coded the two sections. The intercoder reliability was calculated using Cohen’s Kappa (Table 5) for the code categories “forces” and “Individual factors”. For the code category “forces”, the Cohen’s Kappa was 0.692, and for “individual factors” the Cohen’s Kappa was 0.391. In research by McHugh (2012) was established that a Cohen’s Kappa above 0.6 indicates a sufficient strength of the codes, which means that the codes provided by the researcher for the category “forces” were appropriate. However, the category “individual factors” was not yet sufficient. After discussing the differences with the second coder, the researcher and second coder agreed that the code “Feeling that the energy transition is somebody else's problem” and “psychological distance” imply the same content. Therefore these two codes merged into the code “psychological distance”, which resulted in a Cohen’s Kappa of 0.714, which is sufficient. The minor differences in codes between the researcher and second coder were discussed, and as a result, the code “Lack of knowledge on the topic” was changed to “Knowledge”. The differences in the codes provided concerning these codes were with this fixed. The full intercoder reliability matrix is visible in Appendix D.

Table 5

Intercoder reliability calculated with Cohen's Kappa

	Measure of Agreement: Kappa	N of valid cases
Category: "Forces"	0.69	27
Category: "Individual factors"	0.71	16

4. Results

This chapter will present the results from the focus groups. The discussion on the news articles presented in the focus groups demonstrated that the macro-level forces play a role in the decision-making process of private homeowners. However, individual factors also play an essential role in the impact of these societal events. These individual factors impact the macro forces, where they either make the connection stronger or function as a barrier to the sustainable energy behavior of private homeowners. Based on these results, the codes in the codebook are divided into the category's "forces" and "individual factors" that each impact sustainable energy behavior. The participants in the focus groups also rated their involvement in the energy transition and defined their perceptions of sustainable energy behavior. These are coded in the categories "involvement in the energy transition" and "types of sustainable energy behavior.

In 4.1 is elaborated on how the participants make sense of the energy transition and sustainable energy behavior. Then, 4.2 explores how the forces from the macro level play a role in the focus groups during the discussion of the news articles and how they are affecting the decision-making process of private homeowners. Lastly, in section 4.3, individual factors that impact the effect of macro forces are discussed.

4.1 Sense-making of the energy transition

In the focus groups, the participants were asked what the energy transition means to them and what their perspectives are on sustainable energy behavior. For the participants, the energy transition is mainly connected to specific actions such as structural behavior changes, practical

home renovations, limitation of energy use, and the transfer to green energy suppliers. However, the participants also found it challenging to provide a specific evaluation of the energy transition since it is such a complex process of actions that each can be related to another. The participants generally did have some knowledge of the energy transition and associated practices but mentioned that they have trouble adjusting to sustainable energy behaviors. They understand the importance of the energy transition and related behavior but are not finding it enjoyable or easy to participate in sustainable energy behavior. An example:

"I do have the feeling that I know a lot about it, and I have made changes, but I simply do not like it and would rather not be participating in it" [Focus group 1, participant 3]

Besides the likability of the energy transition, the participants do not have many feelings, negative or positive, towards the energy transition since they see it more in a practical sense. The participants, in general, do know the various options available in sustainable technologies or types of energy behavior and mention that they have, for example, placed solar panels, adjusted their shower time, turned down the thermostat, or isolated their homes. These behaviors can also happen simultaneously since the change in energy provider can occur together with a purchase of sustainable technologies. Structural behavior changes, which indicates a behavior that is structurally changed, such as taking shorter showers, are named most over the focus groups as behavior that the participants perform. The quote below indicates how behavior is a crucial element of the energy transition. When it comes to homeowners, even small changes in behavior can make an impact.

"Behavior is a big part of the transition. It is the small adjustments you make in behavior such as shorter shower times, leaving the heating off as much as possible that can make a difference" [Focus group 3, participant 3]

4.2 Forces

In the focus groups, the participants discussed three news articles that represented different societal forces: crisis (war in Ukraine), exogenous events (floodings in the Netherlands), and exercise of power (calling from the government to make sustainable home renovations). During

the discussion of the news articles, participants also referred to other macro forces that were initiated in the literature. This indicates that various forces play a role for participants when considering their pro-environmental behavior (Table 6). However, some forces were more mentioned than others and came across more often during the discussion of different news articles. In line with the discussed news articles, especially "crises", "exercise of power", and "exogenous events" were mentioned as important forces in sustainable energy behavior. Furthermore, the participants often referred to "systemic failures".

Table 6

Frequency table forces

Forces	Art 1: Crisis	Art 2: Exogenous event	Art 3: Exercise of power	Outside articles	Total N
Exercise of power	3	6	40	29	75
Exogenous event	5	32	3	23	63
Crisis	34	1	2	18	55
Systemic failures	6	2	18	32	40
Self-regulation of the system	0	4	6	4	14
Presence of a new demand	4	1	4	3	12
Imposition of a new functioning	4	0	6	1	11
Standardization of practices	1	1	3	5	10
Provision of resources	6	2	1	1	10
Presence of a new functioning	1	5	0	1	7
Presence of a new niche	1	0	3	0	4
Total					287

Exercise of Power

The exercise of power is the force that is most mentioned in all focus groups (Table 6, N = 75). The third news article discussed in the focus group symbolized a call from the government that all homeowners should do their part and invest in making their homes more sustainable. The participants had different views on how this call affected their behavior. Some participants

indicated that they felt resistance against calls from the government because they had already made sufficient changes in their energy behavior and would not be stimulated to do more after such a call. Others were more positive about governmental interference and believed that if the government showed clear guidelines and suggestions for sustainable energy behavior, the public would likely adopt such behavior. Besides this, governmental callings were named in other parts of the focus groups as one of the suggestions of how to stimulate sustainable energy behavior in the future.

Besides that some answers of the participants contradicted whether governmental callings were beneficial or not, there were also some differences in the viewpoints on governmental interference across different focus groups. For example, focus group three discussed that these callings were ineffective. According to the participants, the main reason for the ineffectiveness of governmental messages was the reputation of the Dutch minister of Housing or overall resistance against governmental policies. The participants discussed that these callings made them 'tired of politics' and were unsure of their impact on other private homeowners. This resistance against the government indicates that trust in the government or the person who spreads a message is an important factor in whether governmental callings will succeed. Two examples of statements from focus group three:

"I don't think it has an impact that much. I think the majority of the private homeowners just thinks it's big talk from politics" [Focus group 3, participant 2]
"Well, I think this article confirms the gap between civilians and politics because of this bold statement. Maybe that has to do with Hugo de Jonge saying it. The picture with the helmet makes it even worse! It just doesn't work that the government says something, and we then do it" [Focus group 3, participant 1]

In focus group 2, however, the participants were much more optimistic about the effectiveness of political messaging on sustainable energy behavior. They discussed that governmental strategies are always a good stimulator for homeowners to know what needs to be done. According to them, a governmental strategy that is clear for all civilians is an effective method for stimulation. An example of a positive association is:

"I think it's always effective if the government clearly expresses what their ambitions are, that is always relevant" [Focus group 2, participant 3]
"I think it has an impact. The more attention there is to it, the more it stays on everyone's agenda. But if such a quote has a big influence, I don't know" [Focus group 5, Participant 3]

The other three focus groups had more various opinions on the matter and did not have one unified view on the exercise of power. Some participants were influenced by their negative opinion of the Dutch minister of Housing and the government in general, and others had a more positive mindset toward governmental callings.

Exogenous Events

Exogenous events were mentioned as an important factor in the participants' thought process considering sustainable energy behavior, especially when discussing the news article on floodings in the south of the Netherlands. Interestingly, there were many contradicting views when discussing the impact of this force. On the one hand, the participants mentioned that exogenous events are a considerable stimulator because they remind them that the climate is changing and that life on earth is finite if behavior changes are not made. On the other hand, did the participants indicate that these events occur quite often, resulting in a decrease in their effect. The participant acknowledged that these events were tragic and that they did play a role in their thought process to behave sustainably. Still, they did not make a significant impact on their behavior directly. However, the participant did see the overall notion of climate change as a stimulating factor to make changes. Exogenous events then work as a reminder of this phenomenon instead of the real cause of a behavior change. This can be seen in the quote below:

"Before this event happened, I was already changing my behavior, so I am not really speeding up my actions because of such an event. But think it does play a role in the awareness of the problem" [Focus group 3, participant 4]

However, the participants had some contradicting statements considering the effects of exogenous events. Even though the participants mentioned that these events do not directly impact their behavior, they do play a role in their thought processes and function as a reminder of climate

change effects. The participants only do not always see the direct relationship between exogenous events and their behavior, but they mentioned that these events make climate change problems more urgent. Below are two examples of quotes that indicate that exogenous events directly impact the participant's behavior:

"We would more likely wake up through floodings in Bangladesh or melting ice" [Focus group 3, participant 1]
"Well, we moved to 30 meters above sea level because of this event" [Focus group 1, participant 5]

The minority of the participants did not consider exogenous events to influence their behavior at all. However, the participants are more pessimistic about the effects of exogenous events on private homeowners in general than they are about the impact on their own behavior. The participants mentioned that they think the general homeowner would not be so keen to change their energy behavior after such effects because they are not involved in sustainability and lack the feeling of responsibility. They indicated a distrust in homeowners in general, mainly because the participants in their own neighborhood do not seem to let exogenous events or climate change be of impact on their behavior. The participants mentioned that they only see changes in behavior when financial aspects are involved. An example:

"I think not many people have the feeling that this has much to do with their own behavior, it is too far away, people only start to realize these effects when the prices become too high, or all gas has been used" [Focus group 5, participant 3]
"It is not going to happen, nobody takes responsibility" [Focus group 5, participant 2]

Crises

The force 'crises' played a significant role in the discussions in all focus groups. According to the participants, a crisis in society motivates private homeowners to change their behavior. The focus groups provided a news article about the War between Russia and Ukraine as an example of a crisis. Many participants indicated that such a situation plays a big part in their decision-making process since it raised their awareness of the origin of fossil fuels and increased their feelings of fear. The participants mentioned that the situation has made them act quicker when it comes to

sustainable choices, triggering them to make a change. Crises were explicitly mentioned in a way that made the participant weary of where fossil fuels come from and how much they depend on them. Crises result in feelings of fear and threat, which are stimuli for behavior change.

"The situation for me increased the feelings of urgency, and I have realized that gas supplies are limited, so maybe we have to make the world a more sustainable place." [Focus group 2, participant 1]
"This war resulted in a feeling of fear, which made me think about my behavior" [Focus group 5, participant 4]

Some participants, however, determined that this situation did not impact them to make a significant change in behavior because they either already made changes to their behavior due to other reasons or were overwhelmed by the totality of world problems. The participants indicated that they have thought about how crisis situations impact them but have not seen any significant changes in their behavior:

"Well, this eventually did not interest me that much, I do not really think about the energy transition, so I do not have thoughts about this either" [Focus group 2, participant 2]

Systemic failures

Systemic failures were mentioned as one of the most important barriers for private homeowners regarding sustainable energy behavior. Some participants mentioned that they had intentions to make their houses more sustainable, but they were hindered by a scarcity of materials available or a lack of companies that could perform sustainable house renovations. Furthermore, the participants encountered many problems with trying to attain subsidies for the purchase of sustainable technologies, which are, according to them, not arranged well by the government. This lack of facilities for sustainable energy behavior resulted, for instance, in that the participants that would be interested in buying an electric car would be demotivated because the municipality would not increase the number of charging stations in their neighborhood. As a result, these participants would have no choice but to buy a fossil fuel car instead. The lack of options available when

homeowners are already stimulated to change results in the participants feeling powerless and creates a demotivation for sustainable energy behavior altogether.

"The process just takes so long, especially for a private homeowner. Also, it is hardly reachable technically because there are a shortage of materials and people. It is just a big mess" [Focus group 3, participant 1]

The feeling of powerlessness is a big barrier for homeowners since the will to change is there, but society cannot keep up yet with those changes. The feeling of powerlessness results in frustration and makes the homeowners partially give up on transitioning. Therefore, the force 'exercise of power' and 'systemic failures' are much discussed during the discussion on news article three since the participants mostly blame the governmental actions for their frustration. An example of both exercise of power and systemic failures:

"It is weird that if I install the isolation material myself, I am not getting any subsidies due to certain laws or something. So, I have to pay someone else who is not available in these times, to do it to get the subsidy. Those are weird rules from politics, which I think demotivates homeowners. There need to be more concrete rules and subsidies" [Focus group 3, participant 2]

Self-regulation of the system

Self-regulation of the system was mentioned concerning neighborhoods that together initiated sustainable projects. Even though this force was not mentioned much, the participants indicated that its impacts are very effective. Joining neighborhood projects is tempting since, with little effort, neighbors can benefit easily from each other's sustainable energy projects. Initiatives of collective action toward sustainability increase the feeling of efficacy for homeowners towards climate issues. An example of a quote that initiates self-regulation of the system:

"If it becomes a collective project and the whole street is joining, then I would be feeling very obligated to join" [Focus group 3, participant 4]

The social group of the participants generally also has an impact on private homeowners. Below is an example of the feeling that the collective can make a change.

"I am definitely being influenced by my close friends and family and other social contacts, where it is much discussed" [Focus group 5, participant 3]

Presence of a new demand

The presence of a new demand was not discussed much during the focus groups. This force is complex since, on a macro level, a demand can stimulate the transition to accelerate. However, homeowners themselves, on the micro level, following the definition of the force, are the ones that form a demand for society to transition. Consequently, this force does not play a role on a micro level much and is hard to spot in solely individual statements from homeowners. On an individual level, this force can be compared to 'self-regulation of the system' but differs from this force because having a demand does not imply taking action, which 'self-regulation of the system' does. Nevertheless, the fact that there is a demand can be spotted in the focus group. An example:

"If I look at my own actions, I have started to change a long time ago. I have started to search for sustainable alternatives and invited quite some experts to advise me on what I could do to make my house more sustainable" [Focus group 1, participant 2]

This quote shows the individual motivation of the participant to make changes. However, the demand that the homeowners have does not stimulate their or others' behavior. The individual drive apparent from the quote above is mostly affected by other forces rather than the presence of a new demand that affects them.

Imposition of new functioning & Presence of new functioning

The difference between the imposition of new functioning and the presence of new functioning is that the first obligates society to create a new way of living, which in the case of the energy transition would be to be obligated to use green forms of energy. The second initiates that the new way of living automatically flows out of a new idea, practice, or technology. Both imposition of a new functioning and presence of new functioning were not much mentioned by

the participants. Almost all participants are currently participating in the energy transition, which indicates that they have acknowledged that there is a new way of living that they are adjusting to. However, the participants are not consciously pointing this fact out as a reason that they are changing their behavior. Other factors play a more significant role in their decision-making process to perform sustainable energy behavior.

The participants do not have the feeling that they are currently being imposed to make changes in their behavior. The closure of the gas stream to Western Europe did make some impact on their behavior. However, this closure did not make them feel obligated to make changes. Instead, it functioned as a stimulus to not want to be dependent on Russia, which was the main reason for behavior change. This force then falls not under 'imposition of new functioning' but under 'crisis'. An example:

"Putin is in charge and decides if we do or do not get more gas. This of course has an impact on if we have to use less gas in the future, or that we have to start to look for other alternatives" [Focus group 1, participant 3]

The participants see set rules for homeowners regarding sustainable energy behavior as an effective method for the energy transition to succeed.

"There used to be rules on all sorts of irrelevant things, like the height of doors and other examples. So why do they not make rules for the sake of the environment?" [Focus group 4, participant 4]

Standardization of practices

Standardization of practices implies the feeling of getting stuck in the habit of doing things, which makes change difficult. This force was mentioned as a barrier to the sustainable energy behavior of private homeowners. However, this force was not often mentioned, which might be explained by the active involvement of most participants in the energy transition.

Another reason for not mentioning the standardization of practices as a barrier to sustainable energy behavior is that people do not like to acknowledge that they prefer a habit of doing things that they are unwilling to change. However, on a macro level, this barrier is easier to

detect. This mainly occurred in the discussion of news article three (exercise of power), where the participants are aware of what standardization practices get in the way of their behavior changes. One example of standardization on an individual level was:

"Well, I will not shower less in a week, that is something that I just will not do. I will shower less long, that is the thing I can do" [Focus group 3, participant 3]

An example of standardization of practices in other sectors that one participant acknowledges is:

"One important reason for the lack of change in the business scene I am experiencing right now. I am still at the office which consists of three very large buildings where hundreds of people work. It is now approximately 1.5 hours after almost everybody has left the building, but all lights and computer screens are still on which all automatically shuts off at 7.30AM. Why? I would not know. They are on for hours for no reason." [Focus group 1, participant 3]

Provision of resources

The realization that fossil fuels are becoming scarcer is starting to dawn on the participants, especially since Russia has stopped to provide gas to many European countries. Especially in the situations described in articles one and two, the participants acknowledged that resources are scarce. However, the focus of the discussions was not particularly on the lack of resources but more on the crisis which caused it.

"It is not only the price but also the realization that we might have no resources left in the future and that we will be left in the cold." [Focus group 5, participant 3]

Presence of a new niche

The presence of a new niche was the least mentioned reason for behavior change. Almost all participants indicated that they actively use new innovations like solar panels or heat pumps, but they did not mention this as a motivation to change their behavior. Instead, they were more

focused on what functionalities sustainable technologies lack, which hinders their decision to purchase such technologies.

"I was thinking about installing a heat pump for sustainability reasons, but several people told us that it would overstimulate the electricity network if everybody had one. So now I am not sure." [Focus group 4, participant 1]

4.3 Individual factors

Besides forces on a macro level, individual factors that can only be measured on the micro level also play a role in the sustainable energy behavior of private homeowners. These individual factors include personal feelings and perspectives and often determine whether the macro force will function as a tipping point in the decision to perform sustainable energy behavior. Individual factors could either function as barriers or drivers for sustainable energy behavior. Table 7 lists the individual factors experienced in the focus groups, indicates whether they function as a barrier or driver, and mentions during which news article the individual factor was named most.

Table 7

Frequency table of the individual factors

Individual factors	Barrier/driver	Art 1: Crisis	Art 2: Exogenous event	Art 3: Exercise of power	Outside articles	Total N
Psychological distance	Barrier	2	16	0	9	27
Efficacy	Barrier	1	6	0	1	8
World problems	Barrier	0	5	0	2	7
Knowledge	Barrier	0	0	10	6	16
Looks of sustainable energy technologies	Barrier	0	0	0	2	2
Legacy	Driver	1	13	0	3	17

Comfort	Both	0	2	2	0	4
Financial reasons	Both	28	15	7	22	72
Total						153

Psychological distance

The barrier most experienced by the participants can be described as psychological distance. The phenomenon of psychological distance mentally portrays certain events in terms of distance. The feeling of urgency or severity decreases when perceiving certain events as distant. One participant saw this event of psychological distance right away after being confronted with the article about exogenous events after the first article about a crisis and mentioned:

"I think with this situation, cause and effect are more distant from each other, right?" [Focus group 5, participant 1]

This is an example that urgency feelings are limited with seeing climate change effects, due to the feelings of distance in terms of place and time. This weakens the impact of, for example, exogenous events on sustainable energy behavior because the participants feel that climate change effects will not happen to them specifically because they happen far away from them and in the future. Even though the second news article confronted them with a current exogenous event in the south of the Netherlands, they still found this event too far away. In contrast, the crisis of article 1 did not generate many feelings of psychological distance.

"I think the effects are very bound to the region in which a climate change effect took place, so the flooding in Limburg could have an impact on the people that were directly affected by it" [Focus group 3, participant 4]

Not only geographically it feels far away from them, but the participants also did not see 'private homeowners' as a group that is responsible for fixing the problem of climate change. Several homeowners mention that other sectors are more accountable and should be making changes instead of them. This also is an example of mentally positioning yourself further away from a problem, hindering behavior changes. The quote below shows that a participant did not see

that homeowners are a stakeholder in the energy transition, while most of the civilians of the Netherlands own a house.

"I notice now that you address this entire focus group as private homeowners, while I have never seen myself as a group or stakeholder of the problem" [Focus group 2, participant 1]

Efficacy

Efficacy is also an example of an individual coping mechanism, creating distance between the individual and a tragic event. The feeling of efficacy is a barrier and limits the sustainable behavior of homeowners. Efficacy is most mentioned during the discussion of news article two since cause and effect are hard to oversee with climate change effects. This leads to the fact that homeowners cannot oversee how the sustainable behaviors they perform would lead to a better future. This lack of efficacy is a barrier to their sustainable energy behavior since they do not see the direct effects. An example:

"I always was full of trust, but I experience quite some negative reactions in my surrounding which makes me get the idea that the whole thing is hopeless" [Focus group 1, participant 1]

World problems

The energy transition is a much-discussed topic in society nowadays. Especially since it is accompanied by traumatic events such as the war in Ukraine or visible climate change effects, the energy transition is sometimes overwhelming for the participants. The overload of world problems is a barrier for sustainable energy behavior because it becomes too much for the homeowner to cope with. In the focus groups was mentioned that if the participants had to improve their behavior as a result of every single world problem, it would become too much for them to handle. This is indicated by the quote below:

"There is just so much going on, if you must address everything that is not going well in the world, you just cannot live anymore! That is my in-depth analysis" [Focus group 2, participant 2]

Knowledge

The participants mentioned that even though they have sufficient knowledge of the energy transition, they still lack the correct information to make good decisions which works as a barrier to their sustainable energy behavior. They are motivated by certain forces to change their sustainable energy behavior, but the lack of knowledge on the topic limits them from acting. The topic of knowledge is most mentioned during the discussion of news article three, which indicates that there is primarily a lack of knowledge regarding governmental regulations and available sustainable technologies. The participants indicate that information provided by governmental organizations and news agencies is too overwhelming and contradictory for them to handle. This leaves homeowners indecisive, hindering their ability to change their sustainable energy behavior.

"I am having a hard time thinking about how I can make electricity more sustainable next to solar panels or a battery in the yard. How can I choose wind energy? Because now it costs more than it yields" [Focus group 3, Participant 2]

"A new messaging strategy is necessary. How can you provide everybody with the right information? Can they maybe advise you on what is available in your neighborhood? That information must be easily accessible. What kind of subsidies are out there? The government does not make it easy for us" [Focus group 4, participant 2]

Looks of sustainable technologies

Lastly, the looks of sustainable energy technologies can be a barrier to, for example, purchasing solar panels or wind turbines. The intention to behave more sustainably could be there, but the looks are eventually the barrier that lets homeowners not buy a certain technology. Although it is not mentioned much, it could play a significant role for homeowners. They have bought their own house and are therefore not very eager to decorate it with solar panels that make their home less cozy.

"I don't want them on my roof, I think they are very ugly" [Focus group 4, participant 4]

Legacy

Besides barriers to the effects of external forces on the sustainable energy behavior of homeowners, can certain individual factors also motivate their behavior A factor that was frequently discussed as a very compelling driver is the legacy of the homeowner. In all focus groups this driver was individually mentioned, especially during the discussion on news article two, without the moderator of the focus group initiating the subject. The participants indicate that they are very impacted by the thought that the world could not be the good place they have grown up in in the future, so they are motivated to change their behavior for their legacy. Not only for their own children or grandchildren this is a motivational factor. Also, the participants without children want to preserve the earth for the future. The code "legacy" could be seen as related to "general effects of climate change", but legacy was named much in the final section of the focus groups. In this section, the participants could bring up unmentioned drivers and barriers, by which many brought up legacy as an undiscussed factor.

"I really think we have to leave a better world for our children; therefore, I am willing to change my behavior" [Focus group 4, participant 4]

Legacy mediates with many external forces because it pushes homeowners over the edge to change their behavior. Besides that, it also resonates with the individual barriers. For example, the psychological distance becomes closer when homeowners think that maybe not them but their children will have to deal with climate change effects, which makes changes in their behavior more urgent.

Comfort

Individual factors could on the one hand be motivational but on the other hand also function as a barrier. A less mentioned example of this is 'comfort'. Homeowners could want to isolate their homes due to a draft, which consequently also makes their homes more sustainable. However, decreasing the temperature of their heaters could lead to discomfort and increase the temperature once again in winter.

"It was a reason of comfort to isolate the porch, not necessarily because of the climate" [Focus group 2, participant 2]

"But if gas is limited, then we are really going to feel its effects, because then it becomes colder in our house and that is quite a big thing for me" [Focus group 2, participant 1]

Financial reasons

By far the most mentioned factor that played a role in the participants' decision-making process was money (financial reasons). This reason is noted as both a driver and a barrier, 72 times over five focus groups. Financial reasons are a complicated factor since it is a significant driver and barrier for the participants. However, it can very well be that it is eventually the triggering factor in every decision to perform sustainable energy behavior.

Besides this, 'financial reasons' is also a complicated code since it can be both be a barrier or driver. For example, making behavior changes such as lowering the thermostat or taking shorter showers lowers the energy bill, and these behaviors are thus positively impacted by financial reasons. However, financial reasons can also hinder the process so that homeowners cannot invest in sustainable energy behavior because they do not have the funds, even though these investments save money over time. Two examples below:

"The fact that it just has become so expensive made me make substantial changes" [Focus group 2, participant 1]
"It is all very nice and all, but I do not have the money to make such investments" [Focus group 3, participant 2]

Financial reasons are difficult to place in a category since they can be both triggering, motivating, hindering, or not play a role at all in a situation, and they can be external or internal. Financial reasons can also be an example of systemic failures, following the definition described in the theoretical framework. However, it has been handled separately because this factor is named so many times by the participants and can play multiple roles in the homeowner's decision-making process to perform sustainable energy behavior.

5. Discussion

5.1 Discussion of main findings

Overall, it can be said that the forces that play a role on the macro level of the energy transition also function as a driver or barrier for the private homeowner in their decision to perform sustainable energy behavior. Many factors are at stake in the energy transition, and the participants acknowledge that they are in a complex web of barriers and drivers when making reasoned choices concerning sustainable energy behavior. Homeowners, however, still need a trigger that functions as a "tipping point" in their behavior, but it is hard to spot what drivers serve as a breakthrough in the energy transition (Köhler et al., 2019; Moser & Dilling, 2007).

Frantzeskaki and de Haan (2009) categorize the forces they have developed in several ways, and one of the categorizations they use groups the forces into support forces, formation forces, and triggers. The results show that the forces that generate most opinions in the focus groups are named "triggers", which are crises, exogenous events, and systemic failures. According to Frantzeskaki and de Haan (2009) these forces shock the system, which results in immediate change. Shocks result in feelings of immediacy and importance, which could be the trigger for urgency to change for the homeowners (Soluk et al., 2021). As a result, these shocks are much more considered by the homeowner when making sustainable energy decisions. These triggers could be seen as forces that often lead to tipping points in sustainable energy behavior, but this does not mean that the other forces do not play a role at all. Looking at the categorization mentioned before, the support and formation forces could have created a base for behavior change in the first place, but with the help of trigger forces the private homeowner is being pushed over the edge.

Triggers that provoke sustainable energy behavior are essential to make the energy transition succeed. Triggers can be seen as tipping points and can be defined as a "discontinuity between current and future states of a system and introduces candidate measures of when a system tips over based on changes in the probability distribution over future states" (Lamberson & Page, 2012, p. 1). In other words, it means the moment the current system radically turns (Gladwell, 2006). Tipping points can be differentiated between direct (an event directly impacts a variable) and contextual tips (an event that affects the context of a variable) (Lamberson & Page, 2012). The tipping point can go in all sorts of directions; a transition can go from one regime to another, from fragile to stable, or the other way around. When a tipping point is going to happen, is hard to predict (Lenton, 2013). However, when the tipping point has been reached, the transition

accelerates more quickly (Moser & Dilling, 2007). It is still to be established what triggers individual tipping points since it varies across many disciplines (Köhler et al., 2019; Moser & Dilling, 2007). Sometimes, the individual trigger is unrelated to the sector in which the radical change is made. Tipping points influence individual motivation and drivers and lower the barriers of individual sustainable energy behavior (Moser & Dilling, 2007). However, the characteristics of tipping points are still hard to determine.

A situation that could be considered a trigger or tipping point does not always immediately lead to a behavior change. As seen in the results, the effects of the forces are influenced by individual factors experienced by the homeowner. These individual factors often have a hindering effect on sustainable energy behavior. Individuals tend to value personal emotions highly when making decisions, which is why these individual factors make such a difference when performing sustainable energy behavior (Chu & Yang, 2019).

In the theoretical debate, psychological distance is often discussed as a barrier to sustainable behavior (Liberman & Trope, 2008; Spence & Pidgeon, 2010; Spence et al., 2012). Limiting the mental distance between environmental effects and the individual leads to more pro-environmental behaviors (Guillard et al., 2021). But as seen in the results, homeowners prefer to perceive climate change effects as distant or in the future. They also have acknowledged that they do not feel like they are part of the problem and solution. This follows the research of Guillard et al. (2021), which explores that perceiving certain problems as distant is part of the human coping mechanism. People like to victimize themselves in terms of the climate change problem, which leaves them as not the origin of the problem but the sufferer. This means they are likely to point fingers at others as the cause of the problem. This protects them from the feeling of stress and uncertainty and limits them from taking actual action (Spence et al., 2012).

Besides psychological distance, this study shows that other individual barriers also play a role, including lack of efficacy, overload of world problems, lack of knowledge, or the looks of sustainable technology. The feeling of lack of efficacy could also be one of the methods to cope with the entire problem of climate change. In research by Kellstedt et al. (2008) is argued that the lack of knowledge of climate change limits the feeling of efficacy and hinders from taking action. This also correlates with the perceptions of the homeowners in the focus groups. Homeowners also experience a barrier from the lack of education on how to perform best when it comes to the energy transition. Having too much information on climate change or other severe world problems could

also impact how people behave as a result of knowing a lot about these world problems (Loy et al., 2020). However, according to the participants having structured and instructive information about how to perform sustainable energy behavior makes it more transparent for the homeowner how to behave sustainably. This increases their feeling of efficacy regarding the energy transition (Kellstedt et al., 2008).

On the other side, the individual driver that did not come across in the focus groups is the feeling of risk. The participants did not address that they experience a sense of risk when coping with the energy transition. They did indicate that the war between Russia and Ukraine and recent climate change effects did have some impact on the feeling of fear, but this was not discussed much. Risk perceptions can function as a good motivator for sustainable behavior (Van der Linden, 2015), but in the energy transition homeowners are not feeling at risk at this moment.

The motivator that could be related partially to the feeling of risk would be the motivator 'legacy'. Since it is hard to predict the future when it comes to climate change, homeowners are afraid that not they, but their legacy will experience major effects of climate change if they are not changing their behavior for the better. People are likely to behave self-centered, meaning they will more likely perform behavior from which they benefit (Vandenbergh & Raimi, 2015). The feeling of legacy relates to this since the benefit for the future is easier being perceived by homeowners living today. Especially in the case of the energy transition, where the homeowners hardly see the immediate benefit, the perception of one's legacy can help to stimulate sustainable behavior at this moment. Social norms, such as a focus on legacy, have a significant impact on behavior (Vandenbergh & Raimi, 2015). By connecting macro forces and individual factors such as legacy, sustainable energy behavior can be stimulated and barriers can be battled more effectively in the future.

Lastly, one force that plays a big role on a macro and micro level that can be both a barrier and a driver are financial problems. Money is a complicated factor since the way it influences behavior has much to do with a person's private situation. Therefore it can function as either a triggering or a hindering force when sustainable energy behavior is needed to be influenced. People have the notion to overshadow their financial reasons with other drivers and barriers to portray themselves as a "greener" person (Bolderdijk et al., 2013). Overall, people are more likely to care about economic than biospheric concerns, which is why campaigning strategies for promoting sustainable behavior are more likely to focus on the financial benefits of sustainable behavior than

the biospheric benefits. Individuals, however, prefer to see themselves positively and will therefore highlight their reasons for sustainable behavior that have more to do with morals (Bolderdijk et al., 2013).

This could also be the case in focus groups with homeowners. The homeowners have indicated that money does play a significant role in their decision-making process, especially since the high gas prices. Still do other forces and individual factors impact the individual as well. Therefore, it can be said that money functions as a trigger or tipping point when it comes to the energy transition. Still, it is hard to tell if financial reasons are only a trigger or if they are the cause of all behavior in the energy transition.

5.2 Implications

Transition literature has a blind spot for individual factors when researching the drivers of the energy transition. Frantzeskaki and de Haan (2009) are doing a good job of defining these drivers and connecting forces of the energy transition to policy. However, individual factors in these forces lack and could further be researched. Also, as Köhler et al. (2019) mentioned, more research could be based on determining the nature of tipping points on the macro and micro levels. This research has made a start by connecting the forces and the characteristics of tipping points, but more research could be done on this topic.

As a result of the aim to fill the gap in research that makes the connection between macro and micro forces of the energy transition, the findings of this study could be used in communication strategies that aim to improve sustainable energy behavior. Also, with the war between Russia and Ukraine, it could be looked at how this situation (or similar situations) could be communicated as a triggering force to stimulate sustainable behavior. The energy transition still needs to arrive at the point of acceleration. Therefore in practice, message strategies are required that will push homeowners over the edge. Also, could it be beneficial to see if the barriers and drivers that homeowners experience also are acknowledged by other stakeholders involved in the energy transition.

Besides this, governments could look at the stimulation of sustainable energy behavior of multiple stakeholders involved in the energy transition from the perspective of transition or system literature. Governments can use this perspective to get a broad overview of the problem of cause and effect and use this to get a grip on the situation. Hopefully, efficient communication strategies

can help to combat feelings of efficacy and psychological distance, so individuals are less hindered by individual factors. Without this understanding, the energy transition will be challenging to accelerate.

5.3 Limitations and future work

This research has encountered some limitations during its process regarding the method. As a suggestion for the research method, the news articles could have been used differently. The news articles addressed during the focus groups only highlighted three of the eleven forces, which could be the cause for those three forces playing such a big part in the individual sustainable energy behavior of the homeowner in the results section of this research. The possibility is that if three other news articles were chosen, the three forces addressed in these articles would be ranked as the most important stimuli of the sustainable energy behavior of homeowners. Also, looking at the complex definitions of the forces, one force could not have been simplified by one news article. Even though it is challenging to handle all eleven forces individually in one focus group, future studies could try to imply a variety of situations in their research to see if there are differences between certain situations within one force.

The second limitation of the research method is that all participants that attended the focus groups came from the personal social group of the researcher. The reason for this was the research's limited time and recruitment possibilities. As a result, the participants lacked variety. In addition, the participants all had 'leftist' political views, meaning they were very involved with the energy transition and had positive feelings about it. Besides that, were all participants very open about having sufficient funds to make changes to make their homes more sustainable, which could have also impacted their involvement in the energy transition. Lastly, all participants were highly educated, which is also a factor that could have affected the research outcomes. The participant selection in this research resulted in the outcome that the forces played a role in their behavior, but another selection of participants could have led to other results.

In the future, having different kinds of participants that handle a variety of forces could improve the neutrality of this research. Besides adjustments on reliability and validity, it could be interesting in future research to see if the role of the eleven forces on individual behavior could be tested quantitively. Also, could other forces besides "crisis", "exogenous events" and "exercise of power" be researched more profoundly in their impact on sustainable energy behavior.

Frantzeskaki and de Haan (2009) have made an effort with their research to connect the transition forces on the macro level with policy strategies. It could be interesting to connect the forces and individual factors to fitting communication strategies that use this information to stimulate sustainable energy behavior into practice. Communication strategies could be beneficial in the battle against feelings of psychological distance and lack of efficacy that lead to discouragement. Having this knowledge could improve sustainable energy behavior in the future.

5.4 Conclusion

This study aimed to see whether forces that play a role on the macro level of the energy transition also play a role in the decision-making process of private homeowners to perform sustainable energy behavior. With the use of qualitative methods by means of focus groups, this research concluded that these forces play a role for private homeowners but do not take individual factors into account. Individual barriers such as psychological distance and lack of efficacy hinder the motivating effect of the forces since these structures make the homeowner feel less responsible for adjusting their behavior. Contrarily, individual drivers such as legacy, could work as an extra motivator for sustainable energy behavior.

It still needs to be researched if financial reasons are solely a trigger for sustainable energy behavior, or whether they form the biggest reason for the decision to perform sustainable energy behavior. Financial reasons are a complicated factor since individuals try to make themselves seem more sustainable and therefore do not indicate that their actual motivators are financial instead of climate change or other factors.

Lastly, this research has shown that it is important to look at both internal and external factors of the stakeholders involved in the energy transition. Therefore, the connection between system literature on transition must become even tighter in creating an overview of how to stimulate the energy transition. This will hopefully result in a sufficient energy transition acceleration and a start to a more sustainable future for homeowners and their legacy.

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Appendix A

Layout of the focus group

Tijd	Thema	Materialen
0-5	<u>Introductie</u> Welkom allemaal, leuk dat jullie meedoen aan deze focus groep, Heel erg bedankt daarvoor! Ik ben Bodil Leonhart en ik schrijf nu mijn master scriptie voor de master Communicatiewetenschappen aan de Universiteit Twente. Het onderzoek waar jullie aan meedoen kijkt naar welke motivaties en knelpunten komen kijken bij particuliere huiseigenaren bij het maken van duurzame energie keuzes. Wat is de energietransitie? De energietransitie is -in zijn essentie- de overgang van een energiesysteem gebaseerd op fossiele energiebronnen naar een energiesysteem gebaseerd op duurzame en CO2-neutrale energiebronnen. Ofwel de overgang van het gebruik van kolen, olie en gas naar het gebruik van zon, wind en water als bron van energie. Wat zijn duurzame energie keuzes?	o Consent form o Vragenlijst demografische informatie en steekwoorden o Opname tool
5-10	<u>Wat is een focus groep?</u> In deze focus groep zullen we de motivaties en knelpunten bespreken die meespelen in het keuzeproces om duurzame energie keuzes te maken. Dit doen wij doormiddel van nieuws berichten die een rol kunnen spelen in het keuzeproces van duurzame energie keuzes. Het principe van een focus groep is dat de participanten in discussie kunnen gaan over hoe de volgende nieuwsberichten een rol spelen in hun eigen keuzeproces.	

	<u>Uitleg van het doel van de focus groep</u> Het verkrijgen van informatie over het standpunt van individuele personen ten aanzien van de energie transitie. o Focus groep duurt 1-1,5 uur o Consentformulier (privacy) o Bij deze zet ik de recording aan o Vragenlijst demographische informatie & steekwoorden	
10-15	<u>Introductie participanten</u> o Even voorstellen: Naam (mag anoniem) o Wat is je leefsituatie? (huis, appartement, gezin, partner, huisgenoten)	Slide met de vragen
15-25	<u>Begin focus groep</u> o Wat betekent de energietransitie voor jou? Deze vraag is al beantwoord in de vragenlijst in steekwoorden. Elke participant kort hun steekwoorden laten toelichten. Individueel betoog laten doen. o Wat versta jullie onder duurzaam energie-gedrag? o Wat is jullie ervaring met een energie transitie gerelateerde aankoop/keuze?	Woorden uit de qualtrics
25-35	Nieuwsbericht 1 Oorlog Oekraïne/Crisis force https://www.rtl.nl/rtl-nieuws/artikel/5299876/helpt-oorlog-oekraine-de-energietransitie  	Scenario 1 op slide

	○ Hoe speelt deze situatie een rol in het keuzeproces om duurzame energie gedragsveranderingen door te voeren bij particuliere huiseigenaren in het algemeen? ○ Hoe speelt deze situatie voor jouzelf een rol?	
35-45	Nieuwsbericht 2 Effecten klimaatverandering /Exogenous events force https://nos.nl/collectie/13871/artikel/2394918-onderzoek-bevestigt-link-klimaat-en-watersnood-door-regen-in-juli **Onderzoek bevestigt link klimaat en watersnood door regen in juli**  Overstromingen in Valkenburg in juli ANP Heleen Ekker redacteur Klimaat en Energie Extreme regenval zoals bij de overstromingen in Limburg, België en Duitsland deze zomer komt nu vaker voor als gevolg van klimaatverandering. Ook de hoeveelheid neerslag tijdens dit soort hevige regenval is door het veranderende klimaat toegenomen, met 3 tot 19 procent. Dat blijkt uit een internationaal onderzoek, waar ook Nederlandse klimaatwetenschappers aan hebben meegewerkt. ○ Hoe speelt deze situatie een rol in het keuzeproces om duurzame energie gedragsveranderingen door te voeren bij particuliere huiseigenaren in het algemeen? ○ Hoe speelt deze situatie voor jouzelf een rol?	Scenario 2 op slide
45-55	Nieuws bericht 3 Wet en regelgeving omtrent energietransitie/Exercise of power force https://www.nrc.nl/nieuws/2022/06/01/hugo-de-jonge-iedereen-moet-aan-de-slag-met-de-verduurzaming-van-zijn-huis-a4131189	Scenario 3 op slide

	Hugo de Jonge: 'Iedereen moet aan de slag met de verduurzaming van zijn huis' **Hugo de Jonge | minister van Volkshuisvesting** De minister van wonen presenteert woensdag zijn plannen om de woningmarkt duurzamer te maken. Hij heeft hoge ambities, maar voor het groener maken van miljoenen huizen ziet hij volop draagvlak. Zeker met de huidige hoge energieprijzen. „Doe je het niet voor 'Parijs', dan wel voor je eigen portemonnee." ○ Hoe speelt deze situatie een rol in het keuzeproces om duurzame energie gedragsveranderingen door te voeren bij particuliere huiseigenaren in het algemeen? ○ Hoe speelt deze situatie voor jouzelf een rol?	
55-65	Welk van deze 3 nieuwsartikelen speelt de grootste rol voor jullie in de keuze voor duurzaam energiegedrag? Is er een onderwerp/motivatie/hinder niet voorgekomen in deze focus groep die wel belangrijk is om nog te noemen? Zijn er nog vragen?	
65-75	Bedankt voor het participeren	Einde opname

Appendix B

Consent form and demographics survey

Beste participant,

Je bent uitgenodigd om mee te werken aan een onderzoek over de motivatie en knelpunten van particuliere huiseigenaren die meespelen in keuzes gerelateerd aan de energietransitie. Dit onderzoek wordt uitgevoerd door Bodil Leonhart met als doel het schrijven van een master scriptie voor de master Communicatiewetenschappen aan de Universiteit Twente. De focus groepen zullen worden gehouden via Microsoft Teams, en de participanten zullen worden uitgenodigd via een gast link.

DOEL:

Het doel van dit onderzoek is om door middel van focus groepen (https://www.scribbr.nl/onderzoeksmethoden/focusgroep/) de motivatie en knelpunten in kaart te brengen die meespelen in het keuzeproces van particuliere huiseigenaren om duurzame energiekeuzes te maken. Het kijken naar hoe een particuliere huiseigenaar zich gedraagt in een energie transitie zou nuttig kunnen zijn om in de toekomst het gedrag van individuelen te kunnen voorspellen en manieren te bedenken over hoe mensen gestimuleerd kunnen worden tot het maken van duurzame energie keuzes.

HOE:

De focus groep zal plaatsvinden via de online streaming tool Microsoft Teams en duurt tussen de 60 en 90 minuten. In een focus groep zullen 4-6 participanten aanwezig zijn (excl. de onderzoeker). Het meedoen aan dit onderzoek is geheel vrijwillig en er kan elk moment ervoor gekozen worden om je deelname terug te trekken zonder daar een reden voor te geven.

PRIVACY:

Er zijn geen risico's verbonden aan het meedoen aan dit onderzoek. De onderzoeker zal ervoor zorgen dat alle informatie die voortkomt uit dit onderzoek wordt behandeld met in acht neming van de privacy van de participant. De focus groepen zullen worden opgenomen, en de opname zal na het transcriberen meteen weer worden verwijderd. De transcripties worden (geanonimiseerd) bewaard en alleen gedeeld voor andere onderwijsdoelen als de participant daar toestemming voor heeft gegeven. Tot slot is dit onderzoek beoordeeld en goedgekeurd door de ethische commissie van de faculteit BMS (domain Humanities & Social Sciences).

Door dit toestemmingsformulier te ondertekenen erken ik het volgende:
1. Ik ben voldoende geïnformeerd over het onderzoek doormiddel van bovenstaande informatie. Ik heb de informatie gelezen en heb daarna de mogelijkheid gehad vragen te kunnen stellen. Deze vragen zijn voldoende beantwoord.
2. Ik neem vrijwillig deel aan dit onderzoek. Er is geen expliciete of impliciete dwang voor mij om aan dit onderzoek deel te nemen. Het is mij duidelijk dat ik deelname aan het onderzoek op elk moment, zonder opgaaf van reden, kan beëindigen. Ik hoef een vraag niet te beantwoorden als ik dat niet wil.

Mijn naam is:
Ik geef hiervoor toestemming (Ja/Nee)
Naast het bovenstaande is het hieronder mogelijk voor verschillende onderdelen van het onderzoek specifiek toestemming te geven. U kunt er per onderdeel voor kiezen wel of geen toestemming te geven.

	Ja	Nee
Ik geef toestemming om de gegevens die gedurende het onderzoek bij mij worden verzameld te verwerken zoals is opgenomen in bovenstaande informatie. Deze toestemming ziet dus ook op het verwerken van gegevens betreffende mijn woonsituatie.	Ja	Nee
Ik geef toestemming om tijdens de focus groep opnames (geluid / beeld) te maken en mijn antwoorden uit te werken in een transcript.	Ja	Nee
Ik geef toestemming om mijn antwoorden te gebruiken voor quotes in de onderzoek publicaties.	Ja	Nee
Ik geef toestemming om mijn echte naam te vermelden bij de hierboven bedoelde quotes.	Ja	Nee
Ik geef toestemming om de bij mij verzamelde onderzoeksdata geanonimiseerd te bewaren en te gebruiken voor toekomstig onderzoek en voor onderwijsdoeleinden.	Ja	Nee

Onderstaande informatie wordt gevraagd omdat in een masterscriptie de onderzoeksgroep moet worden omschreven. Deze informatie zal nooit aan een naam worden verbonden. De participant is niet verplicht om onderstaande velden in te vullen.

Mijn leeftijd is...

Ik ben een..

- _ Vrouw
- _ Man
- _ Non-binair/third gender
- _ Zeg ik liever niet
- _ Anders, namelijk..

Wat is uw hoogst behaalde diploma?

- _ Middelbare school
- _ MBO Bachelor
- _ HBO Bachelor
- _ WO Bachelor
- _ HBO Master
- _ WO Master
- _ Anders, namelijk

Wat is uw nationaliteit?

- _ Nederlands(e)
- _ Anders, namelijk

Wat is uw leefsituatie?

- _ Alleen wonend
- _ Met partner
- _ Met familie
- _ Met huisgenoot
- _ Anders, namelijk

Vink aan wat voor u van toepassing is (meerdere antwoorden mogelijk)

- _ Ik ben in langer dan 3 jaar in bezit van een koophuis
- _ Ik ben korter dan 3 jaar in bezit van een koophuis
- _ Ik woon in mijn eerste koophuis
- _ Ik ben niet in bezit van een koophuis
- _ Anders, namelijk

In wat voor omgeving woont u?

- _ Stedelijke omgeving
- _ Landelijke omgeving
- _ Anders, namelijk

Mijn kennis over de energietransitie is..

- _ Laag

- Ondergemiddel
- Gemiddeld
- Bovengemiddeld
- Hoog

Als ik aan de energietransitie denk, dan komen de volgende steekwoorden in mij op…

Appendix C

Codebook

Category	Code	Definition	Example
Involvement in the energy transition	Actively involved	Level of involvement in the energy transition is high	"Nou als ik naar mezelf kijk, ik ben al veel langer geleden begonnen met alles uitzoeken over de energietransitie, en allerlei mensen over de vloer gehad om te kijken hoe ik mijn huis kan verduurzamen."
	Moderately involved	Level of involvement in the energy transition is moderate	"Ik heb er niet hele sterke emoties bij, maar ik heb wel het gevoel dat dat het goed is om wel mee te gaan."
	Not involved	Level of involvement in the energy transition is low	"Maar ikzelf onttrek me er helemaal volledig aan."
Types of sustainable energy behavior	Actual sustainable behavior change	The private homeowner perceives sustainable energy behavior as actual behavioral patterns	"Dus in gedrag, daar zit hem wel. Nou ja, dat soort acties in van korter douchen als het even kan. De verwarming zo lang mogelijk uitlaten, die staat dan op zo'n thermostaat klok, zodat je op tijd uitgaat. Als het kouder wordt weer op tijd aan gaat en dat hij niet meteen enorm hoeft te loeien."
	Practical sustainable home renovations	The private homeowner perceives sustainable energy behavior practical sustainable home renovations	"Isoleren nog extra panelen, zonneboilers, allemaal dat soort dingen bekijken van wat, wat is dan mogelijk en ook wel een beetje haalbaar en aantrekkelijk voor mij dan."
	Limiting energy use	The private homeowner perceives sustainable energy behavior as limiting energy use	"Maar ik draag nu ook wel mijn steentje bij om lager gas en elektra te gebruiken."
	Transition to other sources of energy	The private homeowner perceives sustainable energy behavior as the transition to greener forms of energy.	"Dat je meer gebruik maakt van niet fossiele brandstoffen."
Forces	**Crisis**	The role of crisis situations in sustainable energy behavior of private homeowners	"Ja deze crisis interesseerde mij dus toch uiteindelijk te weinig, ik denk hier verder niet over na, dus ik heb hier geen gedachtes dan over en nu ook niet." "Zoiets is het meer, en voor mij was de oorlog in Oekraïne echt

			een enorme drive om te zorgen dat we [Poetin] niet al te veel geld geven." "Vandaar dat die oorlog wel opeens een soort angst opleverde."
	Exercise of power	The impact of external sources of power on the sustainable energy behavior of private homeowners	"Nee, Ik denk dat het merendeel van de huiseigenaren echt iets heeft van nou leuke praatjes." "Nou, daarvoor worden ze wel door aangesproken. Ik denk dat het wel veel Nederlanders wel een beetje het heeft gewerkt."
	Exogenous events	The impact of exogenous events on the sustainable energy behavior of private homeowners	"Nee, dan denk ik dat dit ook niet te veel invloed heeft op het gedrag van huiseigenaren rond hun inrichting van hun huis." "Nou, ik denk dat ik denk dat we niet kunnen ontkennen dat heel veel mensen toch wat ongemakkelijk gevoel krijgen als ze dichtbij huis bepaalde dingen zien die in zekere zin indirect het gevolg zijn, hè? Van klimaatverandering, hier zie je dan een foto erbij, maar je kunt ook overstromingen, andere landen of zielige ijsberen zien die verdrinken in een zee, hè? Maar allemaal van dat soort dingen, dus ik denk dat we denk ik wel veel mensen inclusief ikzelf daar enigszins ongemakkelijk gevoel van krijgt" "Niet omdat ik een beter mens wil worden of zo. Dat is daar niet de aanleiding voor." "Nee, daarvoor was het al gaande, dus het is niet per se dat dit nou ineens in een versneld tempo dan verder gaat. Het speelt wel mee in de bewustwording daarvan."

	Imposition of a new functioning	The impact of an imposed societal functioning on the sustainable energy behavior of private homeowners	"Dan word je dus inderdaad door die situatie gedwongen om andere keuzes te maken" "Ons als bewoners kunnen ze wel zeggen: we gaan zijn geen cv-ketels meer verkopen. Ja dat kan. Dat maakt natuurlijk wel uit"
	Presence of a new demand	The impact of the presence of a new demand on the sustainable energy behavior of private homeowners	"Maar dat zou ik sowieso ook wel hebben gedaan. Gewoon vanuit eigen motivatie om, op duurzame energie over te gaan." "Maar voel jij dat dan een beetje als een moreel appèl? Wij zijn huiseigenaren. Wij hebben de mogelijkheid om een stukje te doen."
	Presence of a new functioning	The impact of the presence of a new functioning on the sustainable energy behavior of private homeowners	"Pas later kwam ik besef van ja, misschien moeten we eigenlijk toch wel sneller veranderen dan we denken." "Dat ik het ook niet erg vindt, ik ben geen koploper. Daarvoor interesseert me net niet genoeg. Maar ik probeer wel de koplopers te volgen"
	Presence of a new niche	The impact of the presence of a new niche on the sustainable energy behavior of private homeowners	"Ik denk dat het een ding wat voor mij wel speelt is toen wij gingen spelen met het idee van een warmtepomp dat wij van een paar mensen te horen kregen dat het helemaal niet handig was om er een te nemen omdat als iedereen er eentje heeft, het elektriciteitsnet overbelast raakt." "Zo'n duurzame technologie hoeft van mij niet altijd helemaal super te renderen hè? Als je het gevoel hebt dat het best oké is verder dan vind ik het ook prima. Dan hoef ik ook niet de laatste cent eraan te verdienen, dat zeker ook niet hoor."

	Provision of resources	The impact of the scarcity of resources (fossil fuels) on the sustainable energy behavior of private homeowners	"Ik denk dat ik dat wel steeds meer begin te voelen. Op een gegeven moment zijn natuurlijk de fossiele brandstoffen op" "Omdat er schaarste ontstaat en dat daardoor mensen wel een soort van gedwongen worden om andere keuzes te gaan maken"
	Self-regulation of the system	The impact of own initiatives within the group of private homeowners on the sustainable energy behavior of other private homeowners	"Ik word meer beïnvloed door mijn directe kring en vriendenkring en de sociale contacten waarin dit eigenlijk. Ja orde van de dag is." "En dus die moet je gewoon zeggen, We gaan het oplossen en we willen het zo en zo gaan doen en dan kan je daar commitment op krijgen of niet? En dan komen er vanzelf Mensen die alternatieven gaan aandragen. Kijk naar de boeren, die komen ook met allemaal alternatieven voor het stikstofprobleem."
	Standardization of practices	The impact of the standardization of daily practices on the sustainable energy behavior of private homeowners	"Eigenlijk omdat de energietransitie echt iets is dat buiten mijn huis plaatsvindt en niet in mijn huis, dus dat moet eigenlijk zijn." "Nou ja minder douchen, die concessie doe ik niet, maar wel korter douchen dus inderdaad in gedrag en daar zijn wij wel bewuster mee bezig"
	Systemic failures	The impact of systemic failures on the sustainable energy behavior of private homeowners	"Nou, Ik was aan het bellen over dubbel glas of ze er eentje konden leveren. Maar het bedrijf zei dat ze volgend jaar voorjaar starten met de nieuwe opdrachten, want ze maken eerst af wat ze nu in hun portfolio hebben. Ik zei, is iedereen met corona geveld ofzo? Nee, ze kunnen het gewoon niet aan."

			"Nou ja, wat voor mij belangrijk is, is gewoon de onmogelijkheid vaak om dingen te veranderen. Ik ben al 4 jaar lang probeer ik extra zonnepanelen te kopen, Maar dat kan niet bij de zonnepanelen boer waar ik zit. Nou, dat vind ik heel erg jammer, dat zou ik heel graag willen aanschaffen en ik moet in november een nieuwe auto. Ik zou heel graag elektrisch willen gaan rijden, maar eigenlijk maakt de gemeente met onmogelijk voor mij om een elektrische auto aan te schaffen. Dus ja."
Individual factors	**Efficacy**	The impact of feelings of efficacy on the sustainable energy behavior of the private homeowner	"Ik was altijd vol vertrouwen, maar ik merk dat ik gewoon dat mijn reacties om me heen dat ik echt een beetje het idee beginnen te hebben dat een beetje hopeloos is" "Er heerst een beetje machteloosheid bij mensen. Wat kunnen ze daar in hun eentje aan het doen?'
	Psychological distance	The impact of the psychological representation of distance of a certain phenomenon in the mind of the private homeowner on their sustainable energy behavior	"Dat klimaatproblemen te ver weg lijken in het algemeen voor de mens, want ik denk al jaren, we staan aan de rand en waarom doen we niks?" "Ja dat dat ze het gevoel hebben dat dit met heel veel dingen te maken heeft en weinig met hun eigen gedrag, het voelt inderdaad te ver weg. Mensen gaan pas nadenken als ze hun huis niet meer kunnen verwarmen omdat het gas op is. Of als de rekening echt te hoog wordt." "Eigenlijk omdat de energietransitie echt iets is dat buiten mijn huis plaatsvindt en niet in mijn huis, dus dat moet eigenlijk zijn."

			"Het zou meer naar farbieken enzo moeten gaan. Aan grote fabrieken en industriële uitstoot. De co2, dat soort dingen en niet persé aan mijn eigen gedrag, dat daar dan van invloed op zou kunnen zijn."
	Looks of sustainable energy technologies	The impact of looks of sustainable energy technologies on the sustainable energy behavior of private homeowners	"Op het dak niet, dat vind ik wel heel lelijk." "Naast dat ik ze heel lelijk vind"
	Education	The impact of education about the energy transition on the sustainable energy behavior of the private homeowner	"Ik vind het zelf ook moeilijk om te bedenken hoe ik elektriciteit duurzamer kan maken naast zonnepanelen of een batterij in de tuin. Hoe kan je kiezen voor windenergie? Bijvoorbeeld. Dat kost nog altijd meer dat nu oplevert, dus Ik denk dat dat ja wel iets nog een puntje van aandacht verdient." "Ik denk dat dat het ook een beetje onduidelijk is wat zijn wat heeft nou de meeste invloed? Wat kan je nou zelf doen? Wat echt een verschil gaat maken? Dus inderdaad dan wel een beetje ja, educatie training."
	World problems	The impact of the amount of world problems on sustainable energy behavior of private homeowners	"Nou, maar weet je, er is ook wel ontzettend veel gaande hè? Als je over alles wat niet goed gaat en wat naar is je helemaal moet inzetten. Nou, dan kan je gewoon niet leven. Is mijn diepte analyse." "Het is misschien ook veel. Het is overweldigend en je wordt er misschien meer door geslagen."
	Legacy	The impact of legacy on the sustainable energy behavior of private homeowners	"Misschien ook wel voor de kinderen, hè. Af en toe denk ik echt wel van, jeetje. Je wilt wel dat het nog minstens 100 jaar goed gaat, toch?" "Ja, ik snap dat helemaal, er is ook heel veel aan de hand maar

			ik denk altijd aan de kinderen. Wat moeten die eigenlijk nu allemaal verstouwen? Maar ik voel wel urgentie, begon ik ook. Ik heb wel het gevoel van ik, ik moet wel zorgen dat we hier kunnen blijven functioneren en daardoor denk ik wel aan maatregelen"
	Comfort	The impact of comfort on the sustainable energy behavior of private homeowners	"Maar als we aan gas gaan zitten dan ga je het echt voelen, want dan wordt het kouder in huis en dat vind ik nog wel best wel een hele sprong." "Het was vanwege comfort redenen om de poort isoleren en niet vanwege het milieu."
	Financial reasons	The impact of financial reasons on the sustainable energy behavior of private homeowners	"Maar voor ons was wel een driver dat het je in de portemonnee raakt." "Dus, wij zijn allemaal solidair. Maar het feit dat het gewoon enorm duur is geworden, maakte het omslagpunt."

Appendix D

Intercoder reliability matrixes

Intercoder reliability matrix: Forces

Second coder

First coder	Crisis	Exogenous event	Exercidse of power	Presence of new functioning	Imposition of new functioning	Presence of new niche	Presence of new demand	Systemic failures	Self-regulation of the system	Standardization of Practises	Provision of resources	
Crisis	6											7
Exogenous event		8					1					9
Exercise of power			4									4
Presence of new functioning				0								0
Imposition of new functioning			1		0							1
Presence of new niche						0						1
Presence of new demand		1					0					0
Systemic failures								4				4
Self-regulation of the system		1	1						0			2
Standardization of practices										0		0
Provision of resources											0	0
	6	10	6	0	0	0	1	4	0	0	0	

	Measure of Agreement: Kappa	N of valid cases
Category: 'Forces'	0.69	27

Intercoder reliability matrix: Individual Factors before code removal

Second coder

First coder	Efficacy	Pscyhological distance	World problems	Financial reasons	Denial	
Efficacy	0	1				1
Psychological distance		0				0
World problems	1	1	1		1	4
Financial reasons				8		8
Denial		3			0	3
	1	5	1	8	1	

	Measure of Agreement: Kappa	N of valid cases
Category "individual factors"	0.39	16

Intercoder reliability matrix: Individual factors after code removal

Second coder

First coder	Efficacy	Pscyhological distance	World problems	Financial reasons	
Efficacy	0	1			1
Psychological distance		3			3
World problems	1	1	2		4
Financial reasons				8	8
	1	5	2	8	

	Measure of Agreement: Kappa	N of valid cases
Category "individual factors"	0.71	16