TUDelft

Delft University of Technology

Transitioning Together, sparking change towards the energy transition

A handbook on Social Contagion

de Koning, J.I.J.C.; van Dam, S.S.; Boele, Charlotte; Buskens, Vincent; Chan, Josephine; Onencan, Abby; Ou, Jiamin; Van de Rijt, Arnout; Shah, Jesal; Schneider, Philip

Publication date
2023

Document Version
Final published version

Citation (APA)
de Koning, J. I. J. C., van Dam, S. S., Boele, C., Buskens, V., Chan, J., Onencan, A., Ou, J., Van de Rijt, A., Shah, J., Schneider, P., & Visser, R. (2023). *Transitioning Together, sparking change towards the energy transition: A handbook on Social Contagion*. Delft University of Technology.

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

TRANSITIONING TOGETHER

Sparking change towards the energy transition

A HANDBOOK ON SOCIAL CONTAGION

Colophon

Authors
Charlotte Boele, Vincent Buskens, Josephine Chan, Sonja van Dam, Zehra Eekhout, Jotte de Koning, Mick Lemmers, Abby Onencan, Jiamin Ou, Deb Panja, Arnout van de Rijt, Philipp Schneider, Jesal Shah, Floris Sombeek & Rose Visser.

Language editor
Roger Staats

Keywords
Social Contagion, Behaviour Change, Energy Transition, Social Influence, Network Theory, Toolkit, Design.

Summary

Having directly observed one of the most rapidly spreading global pandemics, we understand more than ever the power of contagion. In today's interconnected world, trends originating in one corner, whether it's a disease, clothing fashion, or an online social media challenge, can swiftly gain momentum on the opposite side of the globe, often within a matter of days or even hours. This rapid diffusion is enabled by our globalised world and developments in technology and ICT. Social networks and social influence are strong influencers in shaping our attitudes and behaviour. However, this influence can be a double-edged sword. On the one hand, it brings people and cultures together, it facilitates the exchange of information and resources. On the other hand, it can be easily exploited to spread misinformation and exert pressure on individuals to engage in negative behaviours like smoking or violence. This phenomenon is commonly referred to as 'social contagion.'

In this handbook you can find the result of ENRGISED*: Engaging Residents in green energy investments through social networks, complexity and design*. In 2019 we saw an impasse in the Dutch energy transition, where many technologies were available but not many people were taking action. Since then, global events, such as Covid 19 and the invasion of Ukraine, have disrupted our world and the energy market. In the midst of these changes we conducted our research. Between 2020 and 2023, we studied the use of social contagion - social influence and the effect of social networks - towards the energy transition in neighbourhoods in the Netherlands.

In this book we start with an introduction to the ENRGISED research project (Chapter 1) and the subject of social contagion (Chapter 2). The following three parts cover our findings for the three phases of our social contagion strategy. These also include recommendations for others to use social contagion towards the energy transition.
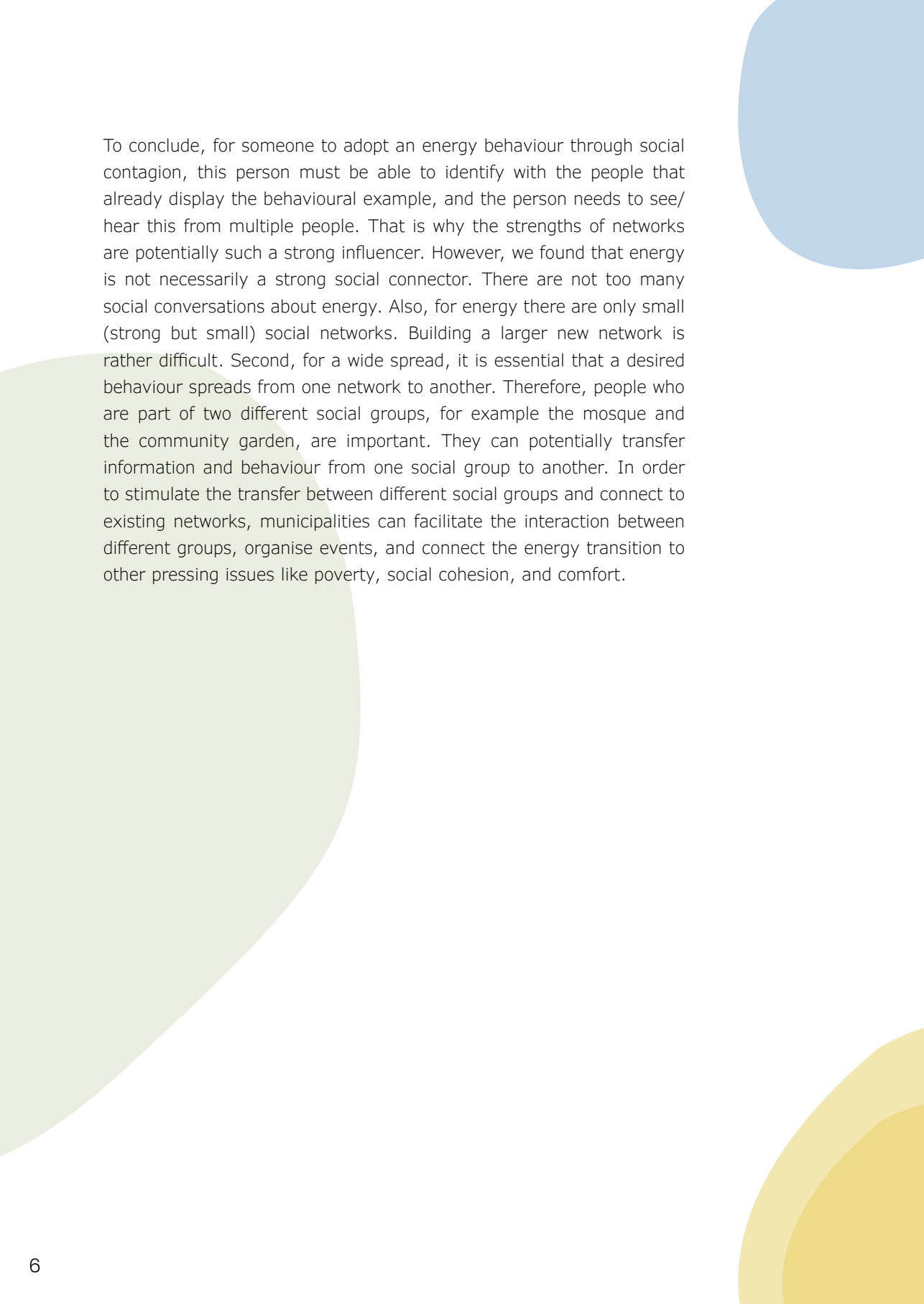
In PART I IDENTIFICATION we discuss the *identification* of people in the network who can start spreading the contagion. To do so, it is necessary to find those people who are well connected, those who have

already shown the desired behaviour, and those who are part of different social groups. We identified energy coaches as successful influencers for others in neighbourhoods (Chapter 3). We find that energy has strong but very selected social networks (chapter 4). We also report that if you are unaware of details of the social network, start with a random selection of people and ask them to name one close friend. Once at least 15% of the people have responded, you can identify your starting point (Chapter 5).

In PART II: ACTIVATING we explored what holds people back from transitioning away from gas and how to *activate* relevant groups. In setting up a social contagion process in the form of a positive chain reaction to stimulate the energy transition in a neighbourhood, it is important to clearly outline and define the options people can adopt. Any barriers in a neighbourhood need to be clearly understood. We found (chapters 6, 7 8), like others before us, that money was often the most mentioned (de-)motivator followed by perceived control and possible inconvenience. Also, people were keen on more transparency in the decision making processes. Sometimes activating people also includes uncovering narratives that need to be de-mystified. We suggest offering subsidies, tax benefits, calculators, coaching, giving good examples and bad examples, building mock-up houses, demonstrations and so on. But, what is also important, is making these things more easily accessible, for example by communicating them in different formats (visual and text) and languages.

In PART III: ACCELERATING we present results of two experiments (Chapter 9) and introduce three practical toolkits for *accelerating* social contagion (Chapters 10,11,12). To achieve social contagion, the activation has to inspire others and quickly spread through the network. Different artefacts, networks and interventions need to be designed that can enable the spread of behaviour, based on the neighbourhood's needs. These can be tokens of change that promote those people that have changed. Sometimes system structures need changing or sources of information have to be adapted to certain audiences. Interventions should focus on improving transparency between municipality and citizen, between different citizens in the neighbourhood network, or transparency about the effects of the different energy options.

To conclude, for someone to adopt an energy behaviour through social contagion, this person must be able to identify with the people that already display the behavioural example, and the person needs to see/hear this from multiple people. That is why the strengths of networks are potentially such a strong influencer. However, we found that energy is not necessarily a strong social connector. There are not too many social conversations about energy. Also, for energy there are only small (strong but small) social networks. Building a larger new network is rather difficult. Second, for a wide spread, it is essential that a desired behaviour spreads from one network to another. Therefore, people who are part of two different social groups, for example the mosque and the community garden, are important. They can potentially transfer information and behaviour from one social group to another. In order to stimulate the transfer between different social groups and connect to existing networks, municipalities can facilitate the interaction between different groups, organise events, and connect the energy transition to other pressing issues like poverty, social cohesion, and comfort.

Table of Contents

INTRODUCTION

TRANSITIONING TOGETHER

Currently, there are 7 million household gas connections in the Netherlands. By 2050 these all must have changed to an alternative energy source. However, there seems to be an impasse where householders are waiting for others such as housing corporations or municipalities to make decisions for them. People are waiting because they do not know how to change; they are waiting because they cannot see benefits in home comfort or finances. They are waiting because of the inconvenience that comes with change, and importantly, they do not see the urgency – they believe other and better or cheaper alternatives will be available in the future.

To break this impasse, we propose to use social contagion. To be able to reach and activate a large audience without having to reach everyone individually. In this first section, we introduce the ENRGISED research project and the three stage strategy. Moreover, we introduce the workings of the theory of social contagion.

ENRGISED

ENgaging Residents in Green energy Investments through Social networks, complExity, and Design

Dr. ir. Jotte de Koning
is Assistant Professor at the Delft University of Technology. She works on the role of Design in Sustainability Transitions at the faculty of Industrial Design Engineering.

In the research project ENRGISED we explored the use of social contagion towards the energy transition. We devised a three-stage strategy for the energy transition, based on social contagion theory: identify, activate and accelerate.

When people have to make decisions they are strongly influenced by decisions and (in)action of others. People have the tendency to imitate behaviours of others who are either in their vicinity (belong to similar social groups), or whom they aspire to be. A decision or behaviour is not only determined by the person's needs, attitudes and expectations but also influenced, reinforced or weakened by the social context. Therefore, it is hard (if not impossible) to target behaviour change at the individual level, in isolation from the social context. This interdependency in decision making can create a situation where it often only makes sense for one actor to act if several others have already chosen to act.

There are 7 million gas connections in the Netherlands, by 2050 these must all be gone.

In the energy transition, the interdependency in decision-making has led to the present impasse where everyone waits for others to adopt an alternative sustainable energy source, and consequently, nothing happens. However, this interdependency can also be used positively, where social influence (social contagion) can be a means of scaling up the desirability, acceptance and adoption of greener energy alternatives. We devised a three stage strategy towards positively influencing the energy transition at a neighbourhood level (Figure 1).

1. Identify the neighbours to start with

For anyone that wants to start using social contagion, the first step is to **identify** the starting households of the contagion, the network seeds. They will have to inspire others to engage in the energy transition. You will have to map and identify the social structures in the neighbourhood; to find people that are well connected, people that can spread change across social groups but especially people that can start a long chain reaction.

2. Activate the first neighbours

The second step is to **activate** the seed households. Before starting your activation phase, it is important to clearly define the behaviour you want to stimulate. Second, you need to map and understand current behaviours but also attitudes and social norms around the desired behaviours. Third, you will need to design different kinds of stimuli (social, economic, design) that can increase the likelihood that the seed households, and subsequent households, adopt alternative sources of energy.

3. Accelerate the contagion

Third, you need to **accelerate** the social contagion: spur a chain reaction of behavioural transmission among network neighbours. You will have to increase the likelihood that the transition of a specific household results in a cascading effect (of adoptions) among other households. In this phase you combine the information from the stages identify and activate to define your final social contagion strategy.

People are waiting for others to act first.

THREE STAGES OF SOCIAL CONTAGION
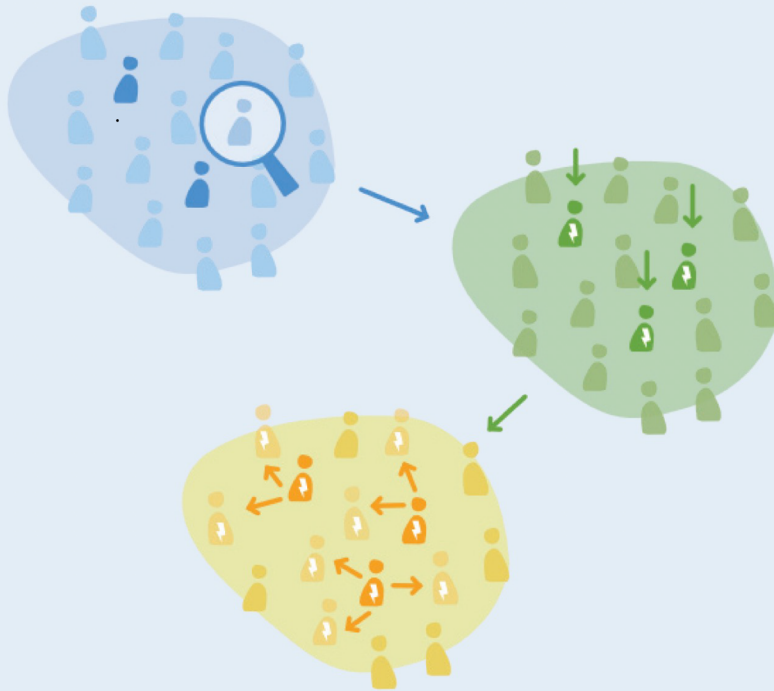
IDENTIFY

Questions to answer:

1. What networks are there in the neighborhood?
2. What causes trust in the network?
3. Content, what are people taking about?

Identifying people:

1. Who is highly regarded within a network? = Potential starting point for you contagion strategy?
2. Who is connected to many others in the network? = Potential influencers
3. Who is part of various social networks? = Potential change accelerators, they can bring change from one network to another

ACTIVATE

Questions to answer:

1. What motivates people?
2. What are people's capabilities?
3. What are people's opportunities?

Design different activation tools

1. Define the change needed
2. Design tools for increasing motivation, capabilities and opportunities
3. Ensure transparancy in the process

ACCELERATE

Actions to stimulate:

1. Increase the frequency of interaction: organize interaction between neighbors
2. Add the energy transition to the conversation: connect to other issues
3. Use people that are part of different networks to transfer information
4. Facilitate sharing: platforms, websites, positive stories, energy saving tips, trustworthy contractors, etc.

Follow the change

Monitor, evaluate, adjust

Figure 1: Three phases of social contagion.

The Theory of Social Contagion

In 2020, we experienced one of the world's most quickly spreading pandemics, first-hand. Now, the power of contagion is, more than ever, clear. A trend that starts in one part of the world, be it a disease, fashion or a social media challenge, can gain traction on the opposite side of the world in less than a few days.

Damon Centola, professor at the University of Pennsylvania, has written one of the most important books on social contagion: How behaviour spreads (Centola, 2018). Social contagion is the phenomenon that describes when one person's decision, attitude or behaviour influences others. This process can be both conscious and unconscious (Cialdini and Trost, 1998). In social contagion theory, a social network is mapped with nodes (points) and links. People or households are the nodes and they are connected to each other via links that represent the social influence of (in this case) neighbours. In certain cases, a few households can be identified that, by taking action, will influence others to act too (Centola, 2021). The action of these initial households

("seed" households in social contagion theory) sets a cascade of action in motion, eventually leading to the whole network taking action. These "seed households" may be different from the natural frontrunners often referred to in classic innovation theory, they also do not have to be the best-connected ones. These households have to be those that promise the longest chain reaction.

Complex and simple contagions

There are two types of contagions: simple and complex contagions (Figure 2). With Simple contagions, contact (exposure to) with only one other person is enough for someone to become activated (infected or informed). This applies to information such as scores of a particular tennis match, or news about a specific incident as well as infectious diseases - since they spread easily from person to person. One does not need to be coerced or persuaded to adopt or spread the information.

Starting point households may be different from the natural frontrunners.

The adoption of greener energy alternatives however is a complex behaviour. It entails high costs (not only financial), there are controversies around the topic and it entails actual changes in behaviour. Also, one needs to first believe the source of information, and subsequently form a favourable attitude in order to adopt the behaviour. With complex contagions multiple sources of exposures are needed for someone to change their behaviour. This ensures affirmation or reinforcement of the behaviour. The minimum amount of examples people need varies for different types of behaviours. The multiple examples of the behaviour must lead to credibility, legitimacy, emotional contagion and strategic complementarity.

Links between people in a network

In a social network the relationship between people is called a link. Links say something about the type and frequency of interaction between people. In general, links are more likely to form amongst individuals who share social characteristics, such as cultural background, physical appearance, tastes etc. This is referred to as Homophily. Links are also more likely formed between individuals that share a social network, when people are classmates, go to the same

gym, or when they are colleagues. And, links are more likely to form amongst individuals that have common friends. From an economic perspective, links are formed by strategic decision-making processes, where someone evaluates the cost and benefits from the interaction with another.

Strong links and clustered networks

In a network the links between people are often characterised as strong or weak. Strong links are those between family or close friends. Interactions between these people are more frequent, intimate and affective in nature. Also, when two people are both strongly connected to a third person, they are most likely to have a connection with each other too: strong ties are clustered. These clustered networks prove to be useful for the spread of contagion within this cluster. Moreover, homophilous network clusters further ensure higher adoption rates, since the reinforcement of behaviour comes from relevant peers or similar others. However, clusters of strong ties prove to be weak for contagion to a larger crowd. People stay within their own social bubble.

Weak links and random networks

Weak links are relationships with acquaintances, they are formed between socially more distant people, with few friends or neighbours in common. For behaviour to spread these weak ties are interesting because they are able to link people from different groups and spread information from one group to another. These people are called bridges. Through his experiments, Damon Centola shows that especially people that have multiple connections in two clusters are effective in spreading complex contagions across different clusters. To keep in mind: people have a general tendency to resist change.

When people are forced to do something (especially, through top-down, government driven interventions), they tend to generally resist, at first. This comes from our need for autonomy and self-determination. When someone or something (offers, persons, rules or regulations) threatens or eliminates our behavioural freedom the phenomenon of 'Reactance' comes to play. This can cause people to adopt

Links are more likely formed between people that share social characteristics.

or strengthen a view or attitude that is contrary to what is intended. Overcoming Reactance by proving that a behaviour is socially accepted

(by multiple peers) is crucial for complex contagion. Triggering social comparison can make the behaviour more desirable. Imitation of peer's behaviours, rather than coercion tactics, need to be stimulated in order to bring about social contagion.

Simple contagion

Exposure to a single activated individual is enough to activate/ influence the target
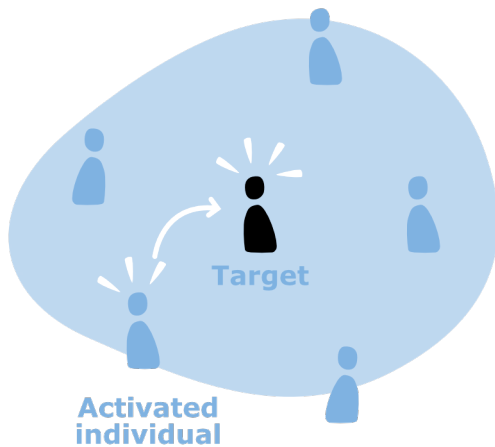
Complex contagion

Needs independent reinforcement from multiple activated individuals to influence the target

Figure 2: Factors that influence individuals decision-making (based on Centola, 2020).

PART I
IDENTIFICATION

Where to start with social contagion?

In order to effectively jumpstart a social contagion, it is important to start with those people in a social network who are well-connected and influential and relatively easy to convince to start practising the desired behaviour. We conducted three studies to learn more about how this could be achieved.

In this part we show the results of three studies. We selected a particular group of potential early adopters, namely residents already interested in looking for ways to improve the energy efficiency of their homes. We studied whether an energy coach could turn their intentions into concrete action and actually reduce their gas and electricity consumption (chapter 3). We also examined the food and energy behaviour of energy front-runners and early adopters who actively engage in pro-environmental behaviours and strive to influence others (chapter 4). Last, we compared different strategies for identifying front-runners by simulating contagions on imperfectly measured networks (chapter 5).

Energy Coaches

Prof. Dr. Arnout van de Rijt
is Professor of Sociology at the
European University Institute in Italy.
He works on social network analysis,
computational social science, collective
action, and social stratification.

Between 2017 and 2019, !WOON, an independent non-profit housing-foundation, organized thousands of energy coach home visits. Trained energy coaches visited interested households until the corona crisis in 2020 made home visits less desirable. !WOON promoted free visits from an energy coach through flyers, social media and printed ads in Amsterdam and Haarlem. We examined the energy use of residents before and after the visit by a !WOON energy coach.

Energy coaches are local volunteers who offer an analysis of a citizen's home, compare citizens' consumption patterns with similar others',

Reductions in consumption were only observed for residents with high initial consumption levels.

and advise on how to make the home more energy-efficient. A trained energy coach can give various sorts of advice on energy consumption, energy saving, and investments, such as how to insulate a house. They offer a personal advisory report, which may include a wide range of information, such as possible investments in sustainability, their relative price-effectiveness, available subsidies, and the time frame in which the investment could be recouped. The benefit of energy coaches is that they are intrinsically motivated volunteers. They provide information in a less formal and more approachable manner as they are local volunteers trying to help, and not professionals who seek to earn money providing a service.

Energy consumption decreases markedly after the visit of an energy coach!

The energy coaches visited households in Haarlem and Amsterdam in 2018. We were able to measure gas consumption shortly before as well as a year after an energy coach visit for 219 households; and for electricity for 248 households. We found that a visit from energy coaches was associated with a reduction in energy consumption, with residents reducing their gas and electricity consumption by 8.4% and 6.3% respectively (see Figure 4). To compare this with Dutch household energy consumption at the time: gas consumption actually

increased by 2.4%, while electricity consumption decreased by 2.5%. However, caution is needed when concluding that the reductions were entirely due to the energy coach visits: these residents were sufficiently interested in finding ways to reduce energy consumption that they agreed to a visit by an energy coach, so it is plausible that without the visit they might also have achieved some degree of reduction. The substantial overall reduction in energy consumption is nonetheless encouraging news for the energy coach approach.

After a visit by an energy coach, residents reduced their gas consumption by 8.4% and their electricity consumption by 6.3%.

* This text is based on the following article:
Schneider, P. T., van de Rijt, A., Boele, C., & Buskens, V. (2023). Are visits of Dutch energy coach volunteers associated with a reduction in gas and electricity consumption? Energy Efficiency, 16(5). https://doi.org/10.1007/s12053-023-10116-6

IDENTIFICATION

EFFECT OF ENERGY COACH VISITS

Energy consumption before

Consult by Energy Coach

Gas
–8.4%

Electricity
–6.3%

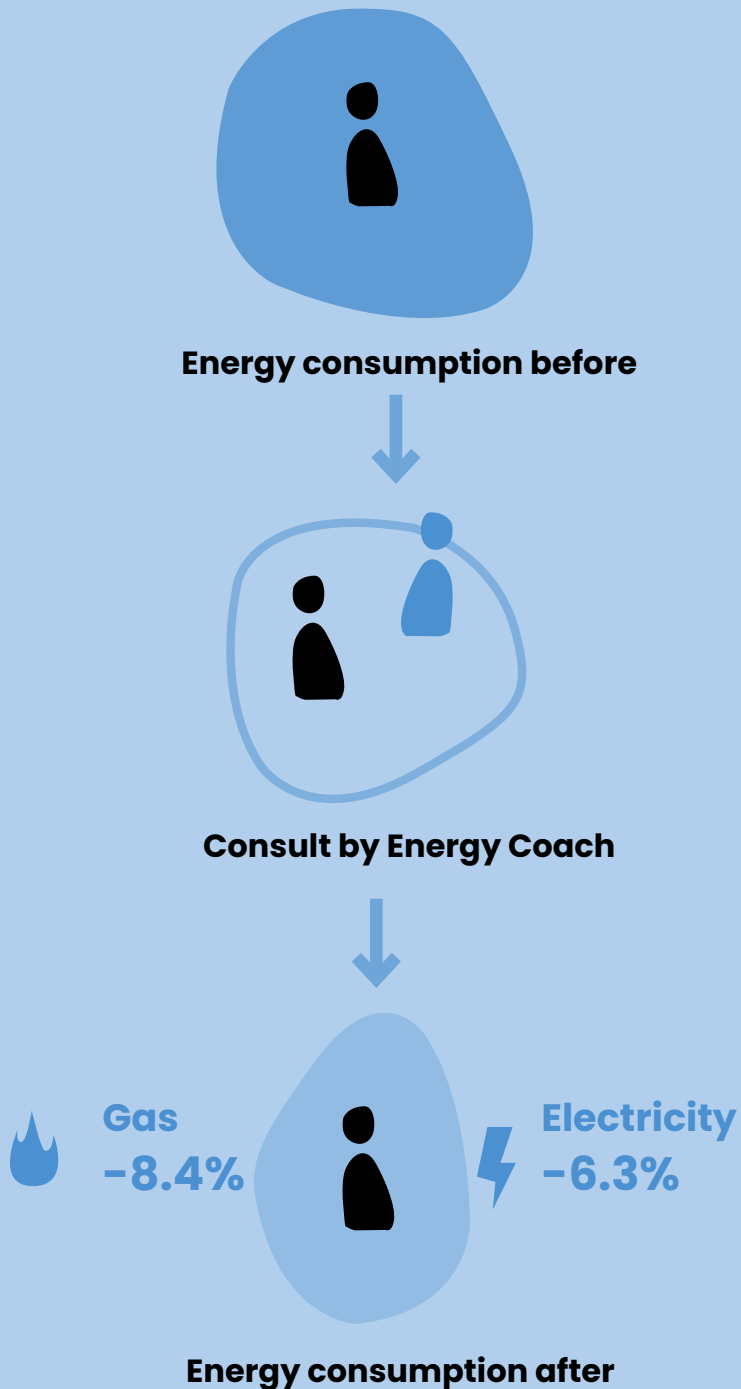**Energy consumption after**

Figure 4: Energy consumption before and after the visit of an energy coach

Sustainability champions

How life events and social networks shape Eco-Pioneers

Dr. ir. Sonja van Dam
is Assistant Professor at Delft
University of Technology.
She works on circular product design,
energy consumption and transitions
at the faculty of Industrial Design
Engineering.

We examined the behaviour of current early adopters who actively engage in pro-environmental behaviours and strive to influence others. The primary aim was to gain insights into effective strategies for social contagion that can expedite sustainable transitions.

Participants were selected on their active engagement in sustainably oriented networks, collectives, or initiatives to inspire others. In addition, a comparison was drawn between individuals engaged in environmental curtailment and investment behaviours (Ritchie and McDougall, 1985). Energy-related investment behaviours encompass one-off investments in technologies like heat pumps and insulation measures to reduce household energy consumption, typically requiring substantial financial resources. Because social contagion can also influence sustainable behaviours that do not involve financial investments, this was compared to curtailment behaviours that entail modifying and restricting people's lifestyle patterns. As a point of comparison, due to their inherent social nature we specifically selected the pro-environmental food behaviours veganism and vegetarianism.

"By just being vegan and showing people alternatives, they slowly started adopting it."

We conducted twenty semi-structured interviews with early adopters who engaged in pro-environmental food behaviour or pro-environmental energy behaviour. During the online interviews, participants were guided through various exercises to explore their pro-environmental activities and behaviour. The first exercise involved shedding light on their environmental actions by creating a mind-map of current pro-environmental activities and behaviours. The second exercise focused on how the interviewee was inspired by others in terms of pro-environmental behaviour, uncovering the social networks and social influences that shaped their actions. The third exercise required participants to create a timeline of events contributing to their pro-environmental behaviour, helping identify key life events and experiences that influenced their

"We were able to look at other houses and that brought us so much, we want to offer that to other people too."

sustainable choices (see Figure 5). Lastly, interviewees were asked about their efforts to influence others.

Participants identified several significant life events or "pinpricks" that collectively influenced their pro-environmental pathways, such as interactions with significant others, reading a book, world events, and installing new technologies. Participants in both the energy-related and food-related behaviour groups shared a strong environmental concern, yet there were distinct nuances in their other motivational factors. For the energy-related group, personal hobbies and experiences, frustrations, and education were important motivators, while for the food-related group, personal or animal welfare, defining experiences or events, and upbringing/youth were important motivators for their behaviour. Likewise. the availability of affordable alternatives and social factors played a role in pro-environmental food behaviour, while technical knowledge, awareness, and financial resources were important for pro-environmental energy behaviour. The pro-environmental energy behaviour group was more likely to be inspired by colleagues and

"Tell me I can't, and I'll prove otherwise."

STARTING SOCIAL CONTAGION

Moving to the Netherlands

Sustainability concious friends

PAST

Raised to be thrifty

Cycling to school

Buying own house
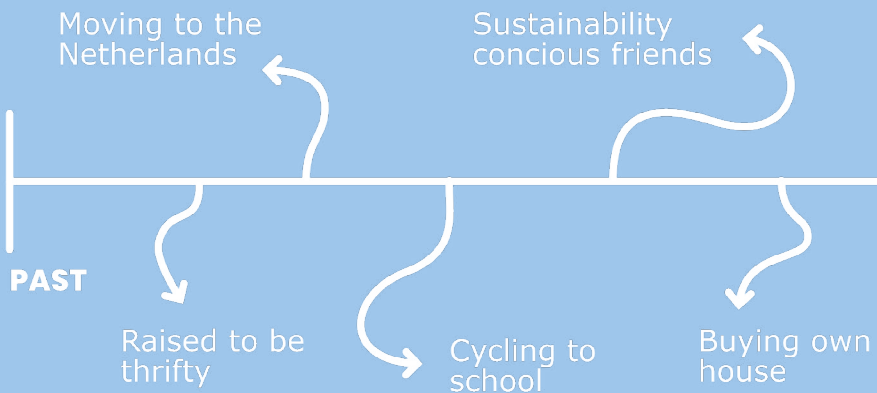
specific networks, while the pro-environmental food behaviour group had a more diverse range of inspiration sources and networks.

This study offers valuable insights into the motivations and social influences behind pro-environmental behaviour in the context of the Dutch energy transition. For the energy-related behaviour group, this was their inclination to join specific networks of like-minded and like-interested colleagues and volunteers. This created networks in which social contagion of pro-environmental investment behaviour was able to spread relatively easily. However, it appeared less likely that this behaviour would spread to other social networks. For the pro-environmental food behaviour group, specific networks were less present or weaker for the social contagion of curtailment behaviour. Instead, the diversity of overlapping networks created a broader but potentially weaker combination of networks.

Induction stove

Heatpump

Purchase electric bike

PRESENT

Floor insulation

Solarpanels

First electric car

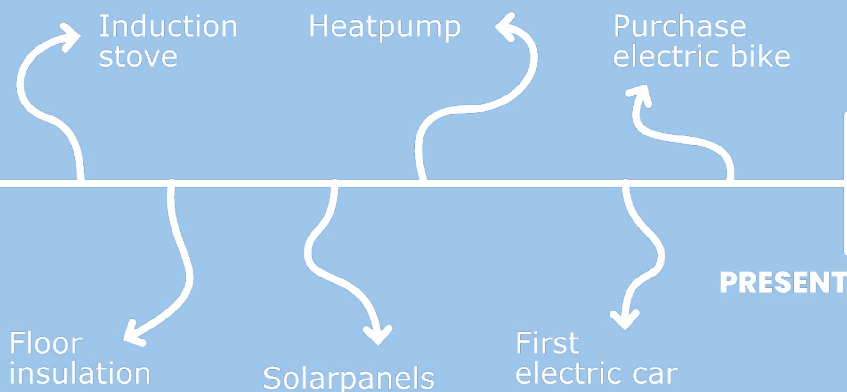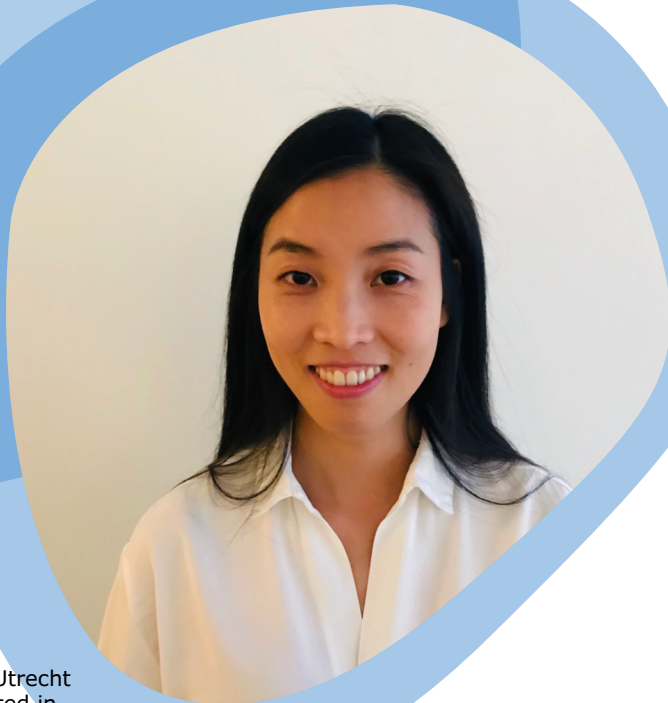*Figure 5: A fictive timeline of life events towards becoming an energy sustainability champion (based on the interview results)*

Who Changes First?

Identifying the right person to start a transition

Dr. Jiamin Ou
is Assistant Professor at Utrecht University. She is interested in climate and the energy transition. Her work focuses on the transition towards Responsible Consumption and Production.

To change norms in a community, it's essential to target key people, called 'seeds'. However, finding these seeds is tricky due to varying network structures and limited data. Our study presents a practical strategy to identify these seeds in most social networks. It circumvents the daunting challenge of collecting comprehensive connectivity information while still guaranteeing a satisfying outcome.

The well-connected people in a social network can only be identified once a good understanding of that network is available. In reality, it is often only possible to obtain partial knowledge of who is connected to who. In these less than ideal circumstances, is it then still possible to identify suitable front-runners who can jumpstart a desired social contagion? In this study, we compared different strategies for identifying front-runners by simulating contagions on imperfectly measured networks. We found that the best-performing strategy is to first contact people whom you have access to. And ask them to nominate one contact in the network. From these nominated contacts, select those with the highest numbers of connections in the community. These will be your targets for first adoption.

We can ease the tension of norm change in a community if we can identify the right people to start with.

The new strategy explained

This new strategy is a modification of 'random neighbour sampling' (or 'one-hop') and seeds the highest-degree neighbours of randomly selected nodes. We called it "one-hopHD", which includes the four steps illustrated below (see Figure 6).

When to use which strategy?

We tested this strategy in typical online and offline social networks. We found that it excels in large online social networks such as Facebook and in offline networks with a few well-knitted clusters such as those in high school with a few classes, or residents in nearby streets. It works when people need multiple exposures from their connections to pick up the new behaviour or norms, for example a costly investment to increase energy performance.

How to implement it in a real-world network?

First, randomly select a certain number of individuals in the target community. Ask each of these to provide the name of one of their friends. This can be achieved by, for example, distributing an initial survey to a random selection of people in the community and asking them to provide only one name of their contact in this community. Who responds is unimportant, as long as the response rate is higher than 15% of the targeted community for change.

The second step is to discover who are most connected. A simple way is to conduct a second survey with the nominated people and ask them how many people they know in this community; there is no need to provide names, a total number is sufficient.

The results from the second survey then show which of this group is best to start the contagion process. The nominated friends who responded in the second survey with the highest number of connections are thus identified as seeds for the contagion. The next step is to work with them and find ways to encourage them to lead the change.

* This text is based on the following article:
Ou, J., Buskens, V., van de Rijt, A., & Panja, D. (2022). Influence maximization under limited network information: seeding high-degree neighbors. Journal of Physics: Complexity, 3(4). https://doi.org/10.1088/2632-072X/ac9444

STARTING SOCIAL CONTAGION

1. Select a few random people in a neighborhood

2. Ask them to provide 1 name of a friend (nominees)

3. Contact the nominees and ask them to give a number of their connections in the neighborhood

4. Select the nominees with the highest number of connections to start (seed) your contagion

Result

Speeding up the change of the social norm in the network
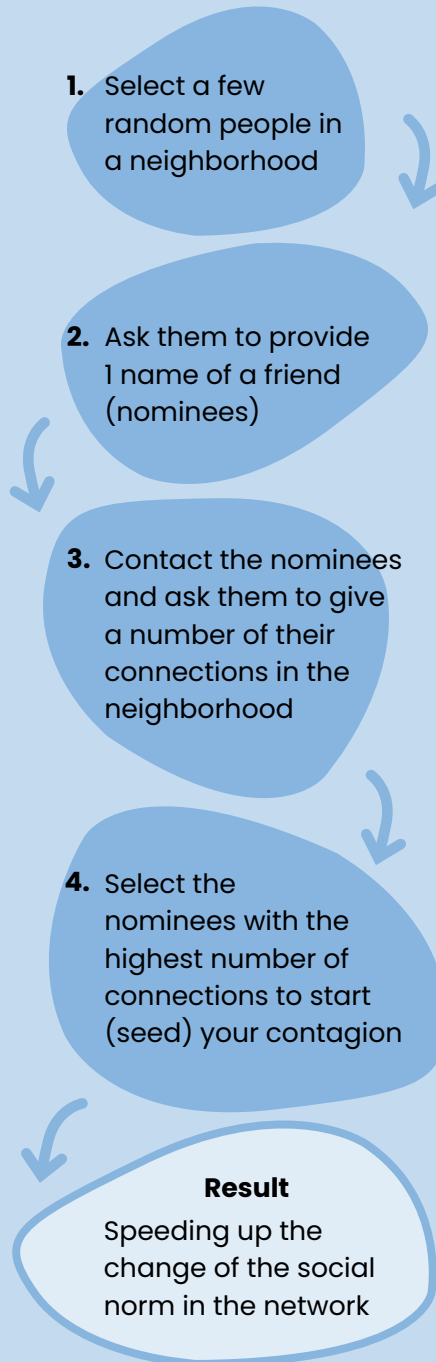
Figure 6: Four steps to identify the right person to start a social contagion transition

FACTORS THAT INFLUENCE THE BEHAVIOR OF AN INDIVIDUAL

Motivational factors: personal values, beliefs, attitudes

Contextual factors: social factors, economic trends, markets, politics, technologies available, etc.

Capability factors: habits, tasks, knowledge

Social factors: social context and social networks, and the social norms they ensue

Figure 7: Factors that influence the behavior of an individual

PART II
ACTIVATING
What works and what does not?

In order to start social contagion for a certain behaviour, it is crucial to understand people's current behaviour and attitudes to the proposed behaviour, in this case moving away from gas. In this section we present results of three studies: behaviour change, what people need to act, and what holds people back. One study took place in Zeist and the other two in Haarlem.

In behavioural theories, three factors are often identified that contribute to changing a certain behaviour: motivation, capabilities and opportunities (Michie et al. 2011, 2015; Ölander & Thøgersen, 1995, 2014), see Figure 7. The social norm or social context can be part of the motivational factor, the opportunities factor or a separate factor of influence. A person's social identity can greatly influence a person's motivation, but they can also affect a person's opportunities, and social networks also ensue social norms (Cialdini and Goldstein, 2004; Cialdini 2016). This social influence constitutes an important leverage point in shaping people's behaviours (Cialdini and Trost 1998).

Activating Households for the Energy Transition

Dr. Abby Onencan
is Post-doctoral Fellow in Environmental Crime. She works for the Erasmus School of Law at Erasmus University Rotterdam.

We held 19 interviews with homeowners in Austerlitz from different types of houses, income and age groups. We asked about their motivations for the energy transition, their capabilities and opportunities. Generally, people were positive about the energy transition, but their actions were mostly focused on short-term solutions and the monetary costs and benefits involved.

Motivation

Austerlitz residents generally had a positive attitude towards the energy transition, but they were less positive about whether their neighbourhood should transition. Finance was noted as an important (de-)motivating factor and source of uncertainty. Many people were convinced that home retrofits or alternative energy solutions would be costly. To increase motivation, we propose:

People believe transitioning away from natural gas is a good thing, but they do not (know how to) act.

- Highlighting inspirational energy transition stories on the municipality website and stimulating the spread of positive stories.
- Focusing on enhancing homeowners' belief that action towards the energy transition is beneficial.
- Presenting the financial consequences and potential benefits of the different scenarios to remove uncertainty.

Capabilities

Our results indicated two clear gaps in understanding: residents did not understand their role in the energy transition process, and they were unaware of the approximate costs of making their house gas-free. What we see, and what many other studies have reported, is that there is an intention-action gap. Many people believe that transitioning away from natural gas is a good thing. However, they are often unaware of how to make the change - they lack capabilities and opportunities. To increase capabilities, we propose:

Short-term actions do not yet lead to long-term plans.

- Focusing on training and enablement, over education. Organising scenario planning sessions and role-play

games, and clarifying misconceptions, values, and arguments.
- Using 'show' or 'display' houses where energy transition interventions are combined with renovations.
- Providing tools to calculate personalised retrofit costs and return on investments.
- Sending out regular communication, even when the future or solution is undecided.

The case of Austerlitz, Zeist

Austerlitz is a neighbourhood of approximately 800 houses (2021) in Zeist Municipality. Its building density is low, thus, installing a heat network (also known as district heating) would have little chance of success. Moreover, the neighbourhood has quite a high percentage of old houses (from 1850) and houses defined as 'monuments' that require a higher temperature heat output. Thus, application of heat pumps is problematic, unless first, the insulation is improved.

ACTIVATING

Opportunities to stop using natural gas

Money is a very important (de-) motivating factor.

Currently, Austerlitz residents are mostly focused on short-term solutions and on the potential return on investment of the energy transition. Many people had bought energy saving appliances and taken actions to save energy. However, few had made larger investments and a renovation plan. Most residents said they were aware of the different energy options and subsidies available but not on the costs of becoming gas-free. To increase opportunities, we proposed:

- Showing how quick/small steps are part of a longer process and the associated gains. This can enhance the overall belief in the benefits for the individual (motivation) and lead to a certain buy-in and spillover effects..
- Connecting households to reputable contractors, identifying good quality products and providing information on grants,or subsidies for example.
- Considering one-stop-shops where homeowners could access relevant energy transition information, easily and fast.
- Providing ways to mitigate inconvenience during retrofits (long-term solutions)
- Enabling easy access to tax benefits, tax reliefs, energy transition loans, and free or discounted energy gadgets.

Social Acceptance of District Heating

by social housing tenants in Haarlem

Dr. Abby Onencan & Dr. Jiamin Ou

By law, housing corporations need 70% approval from residents to initiate collective renovations. For district heating, collective renovations are needed to change the energy system and home insulation. For tenants this means weeks of construction, a change in the use of appliances, and possibly increased rent. In our survey we found 75% of the tenants potentially agreeing to a district heat network, however we also report different fears, high levels of uncertainty around prices and municipal plans, and low levels of institutional and interpersonal trust.

Motivation

In answer to this question, residents want change, with 75% of tenants potentially agreeing to district heating. If the intention-action gap is not too high, tenant approval of the transition to a DHN in Haarlem will be likely. The results show that people feel that district heating is sustainable and safe, especially compared to natural gas. However, our research also confirms a current lock-in to natural gas as people find it more affordable, comfortable, and convenient. This is deterring some tenants from embracing more sustainable options like district heating. We noted five fears around district heating that influenced people's motivation:

People fear that district heating will not be able to deliver a comfortable room temperature.

- A high fear (risk factor) was an increase in monthly energy costs.
- Some tenants believed that electricity is not as convenient as natural gas, particularly for cooking.
- Some tenants felt that cooking on electricity would not suit their recipes or cooking methods, though a majority had positive perceptions of using induction for cooking.
- Some tenants feared that district heating would not be able to provide a comfortable in-home temperature, particularly for poorly insulated homes.
- Some tenants fear that district heating, though safer than natural gas, is not as safe as using electricity.

The case of Schalkwijk, Haarlem

Schalkwijk is a neighbourhood in Haarlem with a majority of the population living in post-war social housing rental apartments. Different options were being explored to replace natural gas in Schalkwijk with a (local) district heating network which relies on energy from either residual heat, geothermal energy, or a combination of the two.
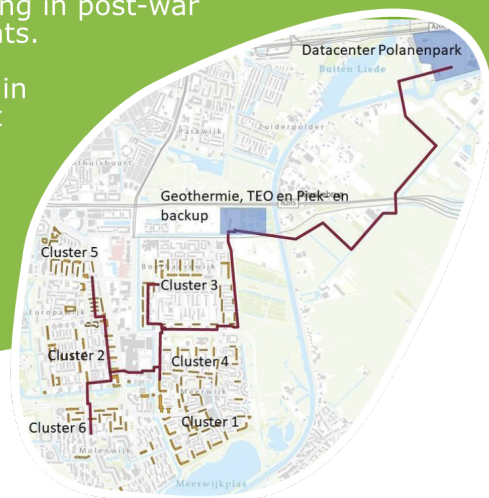
Capabilities

Respondents said they were aware of the general energy transition and the various sources of renewable energy; but not about the municipality's plans for their neighbourhood or building. Bits and pieces of information had been shared, but the whole picture was unclear. However, restricting the information flows prevented tenants from gaining timely access, so that they could potentially influence the decision-making processes. In contrast, most people indicated that they did not want more information, with only 41% wanting more information on the energy transition or the DHN from the municipality, mostly indicating a low effort information channel like a general brochure. To increase capabilities, the focus should be on enabling, making it easy for residents to access or understand possible actions.

Opportunities

The results indicate a lack of interpersonal and institutional trust; trust in the housing corporation, energy provider and municipality were equally low (below 50%), with no indication of a strongly preferred source for trustworthy information. Moreover, the interpersonal trust between tenants in the same building was low, in fact this was lower than trust in the general public. Building interpersonal trust may positively influence tenants' acceptance of DHN heat transition and induction heating. It could also strengthen the horizontal networks and organically lead to more trust and participation of tenants in ongoing energy transition processes.

Currently, if the tenants want to agree to a decision, they have low abilities to self-organise and evolve the system. This is a major problem because decisions might be made to their detriment and without their knowledge and input. To activate tenants' engagement in the energy transition, the municipality organises information

By law, housing corporations need 70-% approval from residents to initiate collective renovations.

evenings, talks and activities. Since 2018, a sounding board group has been in place consisting of residents and the neighbourhood council. The group produces ideas for the energy transition project and asks critical questions. Moreover, the Duurzaam Bouwloket (sustainable building service desk) was launched at the end of 2019 to help tenants renovate their homes sustainably. Despite these efforts, the above examples are still to a considerable extent hierarchical and not self-emergent.

* This text is based on the following two articles:

- Ligterink, J., Kleijwegt, J., & van de Rijt, A. (2019). De mobiliseerbaarheid van huurflatbewoners voor de energietransitie: (Mobilizability of rental flat residents for the energy transition). Mens & Maatschappij, 94(1), 91-115.
- A.M. Onencan, Ou, J., J.I.J.C. de Koning (Submitted). Social Acceptance of District Heating by Tenants: Evidence from the Netherlands. Sustainability Science

Increasing Social Acceptance of District Heating

Dr. ir. Jotte de Koning
is Assistant Professor at the Delft University of Technology. She works on the role of Design in Sustainability Transitions at the faculty of Industrial Design Engineering.

The housing stock in Schalkwijk, Haarlem dates largely from the 1960s. The houses are poorly insulated, and some have issues with mould. For district heating to function, retrofitting is needed and desirable. We held two co-creation workshops with 14 social housing residents. In the workshops we designed a 'perfect energy fair' together and we made 'dating profiles' of ideal people to talk to or learn from.

Schalkwijk tenants have a Calvinist Dutch attitude of saving energy and being frugal about energy use, which was recently strengthened by the spike in energy prices due to Russia's invasion of Ukraine. With district heating, residents noted fears of higher costs as well

A heat network takes away a piece of my freedom.

as uncertainty about future costs. Second, the current perceived behavioural control with gas is high: people can adjust the thermostat in every room, adjust their water temperature, and they can choose from numerous energy providers. People were afraid of losing this control were district heating be introduced. Last, there were also doubts about the chosen path for the energy transition in a wider context: 'why do we have to move away from gas when Germany is promoting gas?'. However, due to the current condition of the housing stock, residents were more positive about the potential retrofits needed for district heating.

There is a desire to connect across language groups and share energy saving tips

Wasting energy was frowned on by many and the ability to save energy was viewed as a valued skill. Residents were keen to give each other tips. This is, regardless of the energy source, positive for the energy transition. A platform to share energy-saving tips and stories could foster and nurture this social behaviour. However, the workshop participants were only Dutch language speakers; other language groups were not interviewed. Potentially different social norms exist in other language groups, however residents indicated strongly that they wanted to connect more across language groups. This provides an opportunity to improve social cohesion together with the energy transition. Second, people indicated they had not seen

positive stories and that hearing positive stories from social housing tenants in similar situations would be valuable.

People feel forced, offering more transparency could take this feeling away

General trust in participation processes was low, with residents indicating a strong feeling of being forced; they had little or no perception of having an actual say or to participate in the process. This negative feeling needs to be removed. Offering more transparency in the process (now and future) as well as showing more transparency in decision making could increase participation and take away the feeling of losing control. An important aspect is to provide feedback on what is being done with their input.

The complaints we do hear, the people that are satisfied we don't. So the story is skewed.

The perfect energy fair: technical information, demonstrations and transparency on the process

Participants indicated they needed more technical information as well as more information on the process and provided many different suggestions for improvement. First, people wanted technical information from a trustworthy source: people with experience, or independent researchers, but not from commercial stakeholders. Due to earlier experiences, the municipality was not perceived by everyone as a trustworthy source. Information would only be perceived as being trustworthy if critical aspects were also mentioned. Information on the process would need to be detailed, people wanted to be able to see the different stages of the process up front. The rationale for the choices needed better explanation and more detailed information had to be made available to those interested. People also wanted more information on the process, preferably in a visual format: a video of the transition process, or a model of what would physically change. They wanted demonstrations by experts or experienced users on cooking on induction, the use of a heat pump, floor heating or energy saving devices. Lastly, people wanted to be able to try out and experience certain products and heat systems. Figure 8 provides a summary of what people indicated they would want.

A PERFECT ENERGY FAIR

What people would like to see when they would visit an en energy fair

1. Technical information from a trustworthy source
People want information from experts, people with experience and independent researchers. People say they do not trust information from organizations with a commercial interest.

2. Detailed information on the time-line and decision making process
Including the different stages of the process and the rationale of choices.

3. Visual information of what will actually change
People want visual information on the transition process and what will change in their physical environment during the process. As well as what the end result will be.

4. Expert demonstrations and try-outs
People indicated they would want to be able to try out and have demonstrations by experts or experienced users. For example to experience certain heat systems, try cooking on induction, hear the noise of a heat pump, feel the comfort of floor heating or use energy saving devices.

Figure 8: How people would like to be activated

Prof. dr. ir. Vincent Buskens
is Professor of theoretical sociology,
Utrecht University, interested in social
network processes

PART III

ACCELERATING

How to spread the transition?

In the previous sections, we collected knowledge on how to identify starting points for the energy transition and information on who might have the greatest potential for initial activation. We also identified what currently holds people back and the concerns people have in moving to renewable energy sources. Moreover, we reviewed possible opportunities to overcome certain barriers and to motivate and enable people.

In social contagion, once the seeds have been identified and the ways these people need to change has been identified, acceleration can start. The final step is to speed the change up to run through the network as fast as possible. Still, a great deal of experimentation is necessary to optimise the energy transition acceleration process. In this section we present different toolkits to help readers design their own social contagion experiments.

Experimentation can be done in many different ways and with different aims in mind. We combined insights from three different forms of experimentation. First, we present a laboratory experiment to get to the details of how different forms of information spread in networks. Second, we show the results of an experiment with two websites presenting an intervention to see which is most effective as a call for action in the energy transition. Lastly, we present three different toolkits for social contagion which can be used for experimentation by policymakers to explore what works best in their policy context.

The Spread of Behaviour

Two experiments

Philipp Schneider
is PhD student at Utrecht University working on the effects of social influence on behavioural change for the energy transition.

Experiment 1 shows that local opposition against desired behavioural change can slow down diffusion of behaviour. Both for larger one-time decisions (e.g., buying solar panels) as well as for more continuously adaptable behaviour (e.g., turning down the thermostat). Experiment 2 shows that to promote large home-improvement investments, either qualitative or quantitative social proof on websites seems not sufficient.

Experiment 1

Diffusion studies are conducted to investigate the propagation of behaviour, attitudes, or beliefs across a networked population. Some behaviour is binary, e.g., whether or not to install solar panels, while other behaviour is continuous, e.g., turning down the thermostat. Similarly, attitudes and beliefs often permit nuance, but can become practically binary in polarized environments. We argue that this binary versus continuous property of behaviour and attitudes critically affects the diffusion of beneficial behaviour in networks. Specifically, binary

Local majorities with different opinions can prevent the spread of beneficial innovations.

behaviour allows local convergence when a concentration of people oppose beneficial behaviour in the network. We call those local majorities. Continuous behaviour permits the more subtle communication of opinions related to the behaviours, which might allow a less strict stance of local majorities. This can then also open the way for the dispersion of the beneficial behaviour into the local majorities through a logic of communicating vessels.

We tested this theoretical idea in an abstract laboratory experiment in which six people in different network structures obtained information about which of two options was beneficial. Four of the six were shown correct information while two were given information suggesting that the inferior option was beneficial. Figure 9 shows how this diffusion of information and opinions can take shape over time in a network in which the misleading information was clustered among participants connected to each other in the network.

The experiment shows that local majorities inhibit the diffusion of what is the beneficial option. However, whether the information that

could be communicated was binary or continuous did not affect the strength of this inhibiting effect. We note that even in the binary condition, participants sometimes spread information not completely in line with what they have seen, which makes dispersion of other information possible. Most importantly for policymakers is that to break the opposition of cohesive societal subgroups, it is better to bring them in contact with others with a different opinion (so breaking the local majority) than to gradually try to shift their opinion using nuanced information.

In the case of differing opinions, do not try to nuance them, but bring people with these different opinions together.
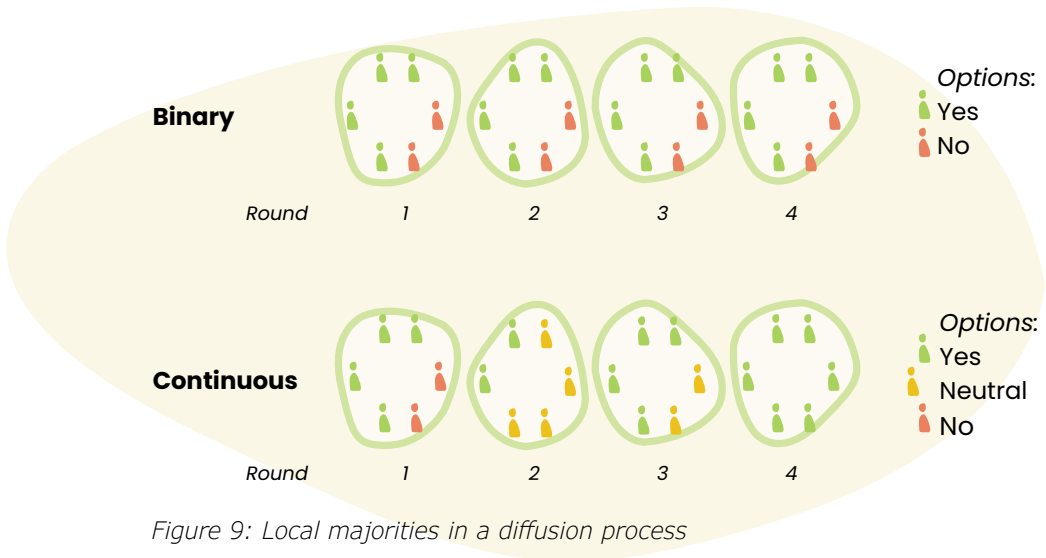

Figure 9: Local majorities in a diffusion process

Experiment 2

We tested how clients can be influenced to take action for home-improvement investments based on subtle website manipulations. A popular online marketing persuasion technique is social proof which takes advantage of other individuals who already decided on a particular behaviour. People are more likely to follow behaviour already chosen by others. Yet the effectiveness of this persuasion for more costly investment decisions taken under uncertainty is questionable. People may easily be nudged towards behaviour when low costs are involved, but if they have to invest substantially, they can be expected to do more careful cost-benefit analyses.

Online nudges can promote low-cost decisions, but more is needed for high-cost innovations.

We investigated how social proof influenced client responses to calls for action on a bank's sustainable home-improvement website. Two field experiments investigated whether clients engaged more with a web page that provided a personalized testimonial or with a website that informed users that many had used the bank's sustainable home-improvement services. The two website texts are shown in Figure 10. Clients could visit these webpages after receiving a newsletter distributed to half a million clients. The evidence suggests that social proof is ineffective at urging clients to consider larger pro-environmental household investments. In one experiment, a small effect suggests that clients more often searched for subsidy information for one social influence condition. In addition, quantitative information gave a slightly larger effect than qualitative information. These conclusions need to be carefully interpreted by policy makers in the energy transition, as any subtle nudge is not necessarily sufficient and the concrete effect of a social-influence measure needs to be considered in more detail.
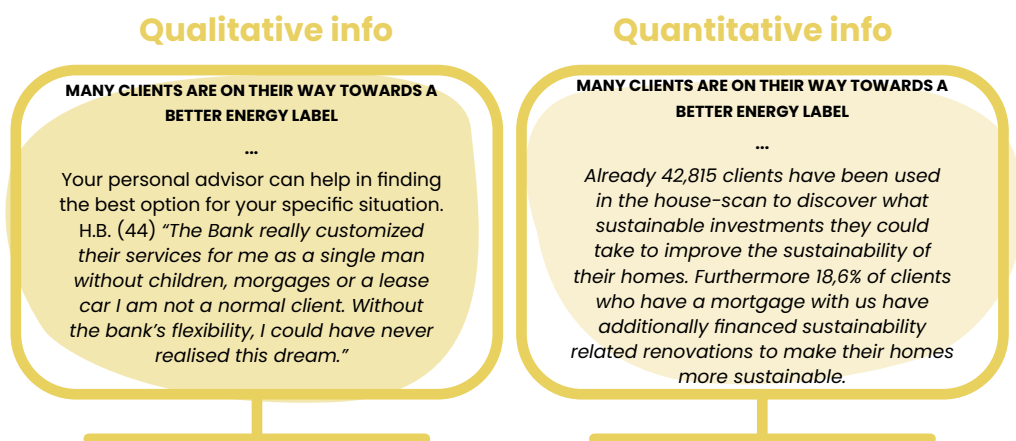
SIDE BY SIDE COMPARISON OF

Qualitative info

MANY CLIENTS ARE ON THEIR WAY TOWARDS A BETTER ENERGY LABEL

...

Your personal advisor can help in finding the best option for your specific situation. H.B. (44) *"The Bank really customized their services for me as a single man without children, morgages or a lease car I am not a normal client. Without the bank's flexibility, I could have never realised this dream."*

Quantitative info

MANY CLIENTS ARE ON THEIR WAY TOWARDS A BETTER ENERGY LABEL

...

Already 42,815 clients have been used in the house-scan to discover what sustainable investments they could take to improve the sustainability of their homes. Furthermore 18,6% of clients who have a mortgage with us have additionally financed sustainability related renovations to make their homes more sustainable.

Figure 10: Two social influence conditions on the website with qualitative and quantitative information

* This text is based on the following articles:
- Schneider, P. T., Buskens, V. & van de Rijt, A. (2023). The diffusion of binary versus continuous behavior on social networks. Forthcoming in Advances in Group Processes 40.
- Schneider, P. T., Buskens, V., & van de Rijt, A. (2023). Social proof is ineffective at spurring costly pro-environmental household investments. Online Journal of Communication and Media Technologies, 13(4), e202351.

A Toolkit to Design Interventions towards Social Contagion

Ir. Jesal Shah
is Senior Venture builder and Business designer at oneUp B.Val.

This toolkit is for municipalities, housing corporations and other organisations that wish to initiate positive social contagion for the energy transition, on a neighbourhood scale. In cases in a certain neighbourhood where many people need to be activated for the energy transition, it is often costly in terms of time, money and effort to reach everyone individually. Social contagion strategies can help in reaching a critical mass by stimulating people in a neighbourhood to activate others around them.

This toolkit supports the design of different types of social contagion interventions. However before designing an intervention, 'what' needs to be spread and 'where' in the network it can spread needs to be clearly understood.

1. ***What needs to be spread?*** In the case of gas discontinuation, it needs to be clear which renewable alternative(s) you want people to use and what attitudes different people have towards these alternatives.

2. ***Where can the behaviour spread?*** To understand the network and how social contagion can unfold, first identify the relevant social clusters and their context of interaction. In which physical and digital places do people meet? Which social networks are present, for example sport clubs, schools, churches, mosques or community gardens? Which and what type of people are actively engaged in the energy transition? This helps in understanding who can become the seed nodes (starting points for contagion), or those who can bridge clusters of different social groups (e.g. those active in both the mosque ánd the community garden), and what seeding strategy is best suited for the neighbourhood.

3. ***How can the contagion begin?*** Once the behaviour, the social clusters, and the contexts to facilitate the contagion have been identified, the seed nodes have to be identified and the seeding strategy developed. It is important to activate multiple people in homogeneous social groups as contagion is most effective when it comes from people similar to each other. Moreover, with complex behaviours such as the energy transition, it is important to hear

and see it from multiple people. Furthermore, there is the need to identify people that can spread information from one cluster to another, or provide and design contexts for people from different clusters to interact. At times the participants can themselves be asked to choose the relevant social contexts for spreading the behaviour.

The toolkit: designing interventions towards social contagion

The main element of the toolkit is a deck of cards to design interventions (Figure 11). To design a successful intervention, first define the action(s) that people can take, choose the spread-mechanism the contagion has to follow, then design the touchpoints and choose the right incentives. Design principles underly the whole design process thus the card deck contains five different types of cards:

     1. Action cards (21x)
     2. Spread Mechanism cards (6x)
     3. Touchpoint cards (12x)
     4. Incentive cards (5x)
     5. Design principle cards (4x)

The toolkit also contains five canvases that can be used in a workshop setting. The handbook explains how to use the canvases and how to set-up a workshop in the team around designing interventions. It also gives a brief introduction about the phenomenon of social contagion (social influence) and how it can be used to activate residents towards the energy transition.

Four intervention components

In order to design interventions, the card-deck in the toolkit inspires you to think about 4 components for each intervention:

1. **Actions:** 'What do people need to do / see' towards the energy transition? This can be in the form of tasks, activities, challenges, campaigns or installations, where people are asked to do (create, solve, collect, share, experience etc.) something; engaging them directly or indirectly.
2. **Spread Mechanism:** The Spread Mechanism defines how the Action or the target behaviour will spread amongst the target group. This can be in the form of direct or indirect social pressures.

3. **Touchpoints:** Touchpoints form the interface between people and the target behaviour, defining 'How will people do the Action or spread the behaviour'. These can be physical or digital - in the form of artefacts, environments or interpersonal encounters. Explicitly designing touchpoints can ensure well-curated interactions & experiences which are necessary to build positive attitudes.

4. **Incentives:** For each intervention, intrinsic and extrinsic motivations for the action need to be explicitly designed. This motivates people to participate but can also stimulate comparison amongst peers.

Figure 11: Toolkit for social contagion. Image made by Jesal Shah (Shah, 2020).

The toolkit is based on 4 design principles, that are important to keep in mind during the whole design process:

1. *Scale down: Translate global to local -* Global phenomena like climate change and sustainability need to be translated into locally / individually relevant and recognisable issues in order to capture people's attention and trigger action.

2. *3 S's -Simple, slow and steady win the race -* The target behaviour and the interventions should be easy to do, use, remember and understand; and should be incremental and continuous in nature to build commitment amongst the target group towards the desired behaviour.

3. *Comparison is key: enable (sub)conscious comparison* - People constantly compare and evaluate themselves in terms of the appropriateness of their abilities, behaviours and beliefs to those of similar others. Thus, in order to achieve social contagion, this (sub) conscious comparison to people who have adopted or are committed towards the target behaviour must be stimulated.

4. *Make it desirable, silly!* - People need to have both intrinsic and extrinsic motivations to opt for sustainable options. Making the behaviour desirable (by designing incentives) can help in prompting adoption as well as inducing emotions such as fear of missing out, envy, insecurity etc., upon comparison. These in turn increase the desirability of the behaviour, stimulating adoption and paving the way for social contagion.

Two downloads for this toolkit.
1. **Card deck and the 5 canvases**
2. **Handbook on social contagion and how to facilitate a design workshop.**

Download the files: http://resolver.tudelft.nl/uuid:77fa4a98-f647-4840-a5b4-d5ed151ea760

AN INTERVENTION AIMED AT STIMULATING SOCIAL CONTAGION

FULFILLS 2 CRITERA

ENABLE
the target behaviour

ENABLE
the contagion of the behaviour

FOLLOWS 4 DESIGN PRINCIPLES

SCALE DOWN
Translate global
to local

COMPULSION IS KEY
Enable (sub)concious
comparison

3 S'S
Simple, slow and steady
wins the race

**MAKE IT DESIRABLE,
SILLY!**
(Design for FOMO / Envy)

CAN BE DESIGNED BY DEFINING 4 DESIGN COMPONENTS

ACTIONS
Tasks / Activities /
Challenges / Campaigns

SPREAD MECHANISM
Direct / Indirect social
pressure

INCENTIVES
Rewards, Benefits

TOUCHPOINTS
Physical / Digital

Figure 12: Toolkit framework for social contagion

Lopend Vuurtje

Ir. Rose Visser
is a Projectmanager in Chemicals
& Process innovation

Lopend Vuurtje (spread like fire) has been developed for those working on the energy transition in neighbourhoods in the Netherlands. It is designed for use by municipalities, housing associations and citizen initiatives. Lopend Vuurtje is part of the 'Wijkkompas' (Neighbourhood compass), an independent tool created by Stroomversnelling: https://wijkkompas.nl. Wijkkompas provides guidance on transition neighbourhoods towards gas alternatives. It is based on four principles: (1) careful organising, (2) transparent collaboration, (3) smart knowledge sharing, (4) learn by doing. Lopend Vuurt also follows these principles.

We investigated the current use of the Wijkkompas tool by conducting 13 interviews to understand how municipalities could incorporate social contagion strategies in their neighbourhood approaches (Mick Lemmers, 2022; Rose Visser, 2022). Several observations were made:

- Ties between municipality and residents are often weak.
- Social identity can be location-based, on a very small scale, even at street level.
- Social cohesion is not lower in low social-economic neighbourhoods, but people and networks are already involved in other issues
- The fire of contagion needs fuel to keep burning, but do not unknowingly change an existing network built on different premises (from fun and casual to bound and serious).
- Find the energy rather than the strategic person; find existing intrinsically motivated people.

Lopend Vuurtje
The Lopend Vuurtje toolkit is designed to roll out a *snowball* and *hail* social contagion strategy in a neighbourhood. The toolkit comes in the form of a box (physical or digital) that contains eight individual tools to help municipalities to understand the difference between spreading information and behavior. And thus facilitates them in designing an effective transition strategy.

The contagion strategy has six steps (Figure 15).
1. Find the access point, who wants to join? Hail strategy.
2. Map your network & start: identify social groups and contagion strategy.
3. Saturate & strengthen the existing groups: snowball strategy.
4. Bridge and expand to other groups: Snowball strategy.
5. Keep the fire burning: support their process.
6. Activate for adoption: hail strategy and second round of snowball.

Three strategies of social contagion

Damon Centola (2021), Professor in sociology and expert on social contagion, describes three main types of seeding strategies for social contagion: the hail shot, silver bullet, and snowball strategy, see Figure 13.

The hail shot strategy is based on virality and can be used for spreading simple information. With this strategy you chose to have a broad but low-engagement strategy. The chosen starting points (seeds) are very diverse to reach as many different groups (networks) as possible. This works, for example, to spread a virus (simple contagion). For more complex behaviours (complex contagion) this is a less favourable strategy because there is little reinforcement from multiple sources. In this case, each seed will be alone in their network going against the social norm and face resistance with no allies. Therefore the adoption rate will most likely not accelerate and eventually come to a halt; the seeds may even stop themselves. For simple contagion, this strategy works well because there is no social norm to challenge. For complex contagion, this strategy could backfire and result in no adoption.
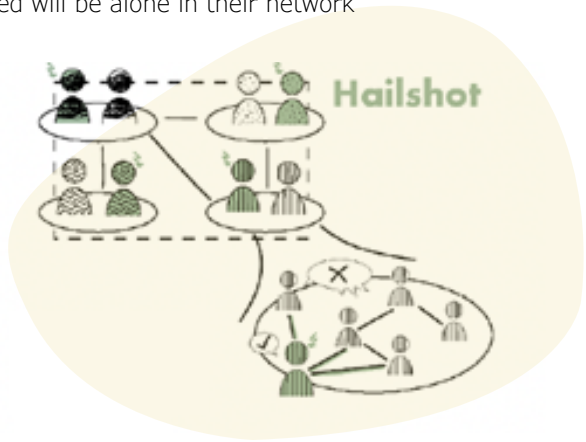
13a

The silver bullet strategy is based on influential people in the

network. In the case of the energy transition, municipalities try to find people well connected to others, and start by convincing them. This is a focused approach but one with high engagement. The central seed should start a chain reaction. For simple contagion, this is easily done: only one member needs activation to start the chain reaction. Since this method works well for simple contagion, people also tend to use it for complex contagion. Centola argues that this is the myth of the influencer. The influencer seed node is exposed to more counter influences than other average members, because this person is so well connected. However, it is improbable that the influencer will change the social norm. And even if this happens, the new frontrunners of the adoption will have the same problems as described in the last phase of the hail shot strategy. So again, this strategy works well for simple contagion, but not for the intended complex contagion.

13b

The snowball strategy is based on the strength of the network. As with the hail strategy, it needs a wide deployment. This time, however, we will ensure that (almost) all the seeds know each other. This may seem counterintuitive; why focus on connections of people who already know each other? When looking at viral simple contagion these connections would be redundant. However, facilitating the adoption of new social norms thrives when people talk about it and, most importantly, are protected from negative influences. Seeds can now share their experience safely, slowly building on the credibility and reliability story of the change. It also helps the seeds to carry the change over longer periods. Wide

13c

Figures 13a, 13b and 13c: Three strategies of social contagion. Images by Rose Visser

bridges between one social group and another eventually facilitate the growth of the adoption of new social groups. In this strategy, it works best to start at the edge of a social group, because similarly to why the silver bullet strategy does not work with complex contagion, more central nodes have more connections that affirm the old social norm.

The toolkit contains the following tools:

See Figure 14.

1. *An introduction letter* that guides users through the box.
2. *A flyer* that explains social contagion and the six steps of setting-up a social contagion process.
3. *A card-set* with examples and stories from practice, that can dynamically grow.
4. *The Wandelkaart*: a dynamic map to be sent along with the box to the next person.
5. *Logbook*: a place to share experiences with the toolkit. v
6. *Network cards*: exercise to draw your own network.
7. *Chain letter experiment*: collecting energy saving-tips.
8. *Invitation* to leave a personal gift for the next user.

Figure 14: Lopend Vuurtje toolkit, image made by Rose Visser

Methode

1. Wie doet er mee?

Doel
Voor participatie is representatie en dus diversiteit erg belangrijk. Daarom zoeken we nu in een zo breed mogelijke groep wie er mee wil denken en doen.

Aanpak
Gebruik de hagel-strategie om zoveel mogelijk mensen te bereiken. Vraag niet alleen naar het aardgasvrij-thema en participatie, maar ook naar motivatie en bijvoorbeeld verduurzaming. Zo vind je sneller het energietransitie-netwerk of vind je de juiste personen om het netwerk mee te starten.
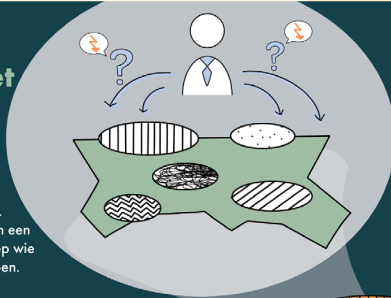
2. Netwerk leren kennen

Doel
Begin je participatieproces met een representatieve groep. Voor sociale activatie zijn we op zoek naar mensen die in elkaars sociale groep vallen.

Aanpak
Sociale groepen ontstaan in wijken vaak rond gedeelde fysieke ruimtes, denk aan pleinen of een deel van de straat. Vraag aan bewoners zelf wie zij spreken over de energietransitie en wie er veel contacten heeft in dit netwerk.
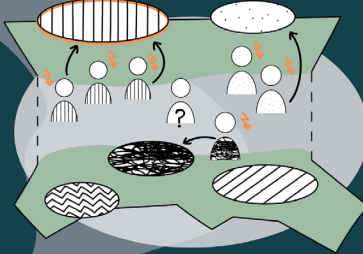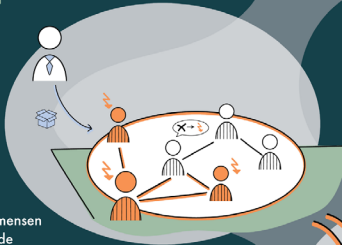
3. Een nieuwe sociale norm

Doel
In één sociale groep met actievelingen start het lopend vuurtje. Vraag hen wat ze nodig hebben om het netwerk samen te brengen. Zo ontstaat er langzaam een nieuwe veilige sociale norm.

Aanpak
Een nieuwe norm ontstaat als mensen elkaar ontmoeten. Vraag aan de actievelingen wat zij nodig hebben. In de ene wijk is dit een lezing, in de andere wijk een warme-truien-feest. Sluit vooral aan bij de behoefte van de wijk.

4. Het lopend vuurtje

Doel
Nu de eerste groep een nieuwe norm heeft kan deze langzaam worden doorgegeven. Daarvoor is het nodig dat mensen uit verschillende sociale groepen elkaar kunnen ontmoeten.

Aanpak
Vraag bewoners hoe zij elkaar willen ontmoeten. Aansluiten bij een buurt BBQ lijkt misschien een goed idee, maar dit evenement is voor een ander netwerk bedoeld: het buren en gezelligheids netwerk. Zoek een manier om de netwerken te combineren, bijvoorbeeld een buurtcafé avond met specifiek thema zoals zonnepanelen of warmtepompen.
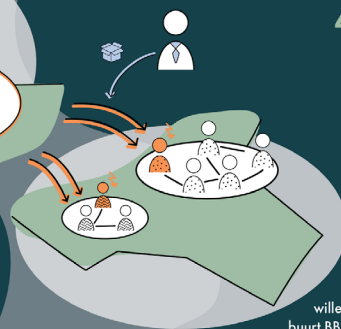
5. Hou het proces warm

Doel
Gedragsverandering kost tijd en dus is sociale activatie een project van de lange adem. Vrijwilligers hebben daarom ondersteuning nodig om actief te blijven.

Aanpak
Deze ondersteuning kan verschillende vormen hebben. Een betaalde kracht die als vertaler functioneert kan de last wegnemen bij het netwerk, terwijl het proces wel van de wijk blijft. Ook kan het helpen om de actieve bewoners van eerste uur weer samen te brengen.
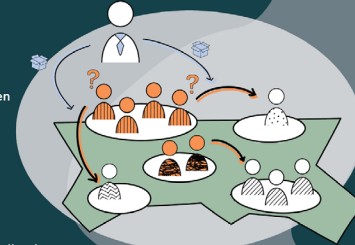
6. Na activatie acceptatie

Doel
Voor een individuele oplossing is stap 6 niet nodig. Bewoners kunnen op hun eigen tempo het proces door. Bij een collectieve oplossing moet een grote groep in een korte tijd geactiveerd worden.

Aanpak
Bewoners hebben het recht op gelijke informatie en dus zullen ze allemaal met de hagelstrategie tegelijkertijd geïnformeerd worden. Doordat in stap 1-5 het netwerk actief geworden is, sluit het aan op het gespre...
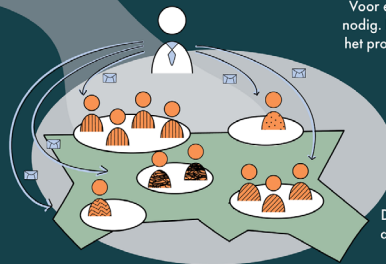
lopend vuurtje

Other side

Main menu

Figure 15: Lopend Vuurtje, image made by Rose Visser

Plan–It Together

Ir. Josephine Chan is a strategic designer with expertise in sustainability, facilitation, and developing public sector programs.

Social contagion works best with people similar to you and when there are multiple sources of information. Multiple sources of information can affirm and reinforce your learning curve. Second, people have a general tendency to resist change at first, especially when this change is enforced top-down. The idea behind this design is based on insights from social contagion. The design helps municipalities set up a mentorship program between people that have already changed their houses and multiple others that want to but have not (yet). The people are grouped based on similar housing situations.

Plan-it Together

Plan-It Together is a mentorship program run by municipalities for homeowners. The program connects homeowners who have not yet made their homes gas-free but would like to (mentees) with those in the community who already have (mentor). Mentees and mentors participate in the program together as a mentorship group. The program helps homeowners adapt their homes into well-insulated homes that are heated using sustainable alternatives to natural gas.

The program is designed as seven monthly workshops, each addressing a topic related to making a home gas-free. Figure 16 depicts the workshops and the three stages of the overall process. Municipalities are encouraged to work with different experts to address different topics from steps 2-6, as needed.

The different workshops are complemented with a toolkit. The tools are inspired by co-creative practices from the field of design which help program participants express their creativity and facilitate collaboration. In many cases it is likely that the municipality is

addressing the workshop topics with existing initiatives, so the toolkit can be used to complement them. The workshops and their respective tools are:

1. **Kick-Off:** Mentor journey mapping
2. **Introduction to financial aspects:** Reflection on home heating and budgeting
3. **Assessing your home:** Home Energy Assessment Self-Guide
4. **Learning about technologies:** Tiny Tech Cards
5. **Connecting to companies:** Question brainstorming template
6. **Looking ahead:** Future planning template
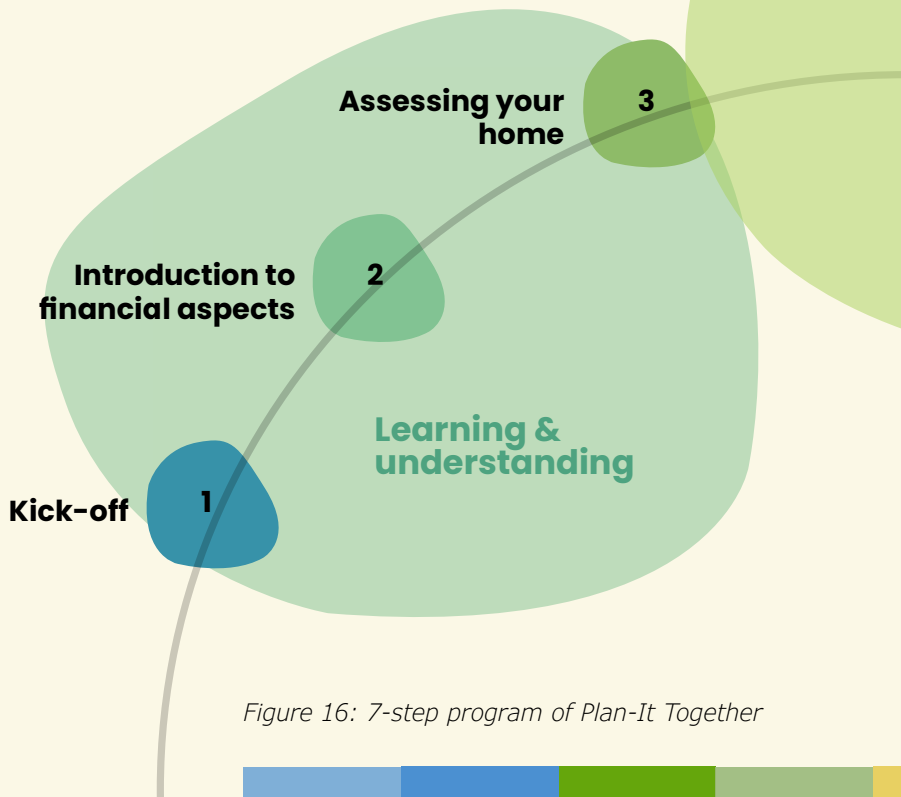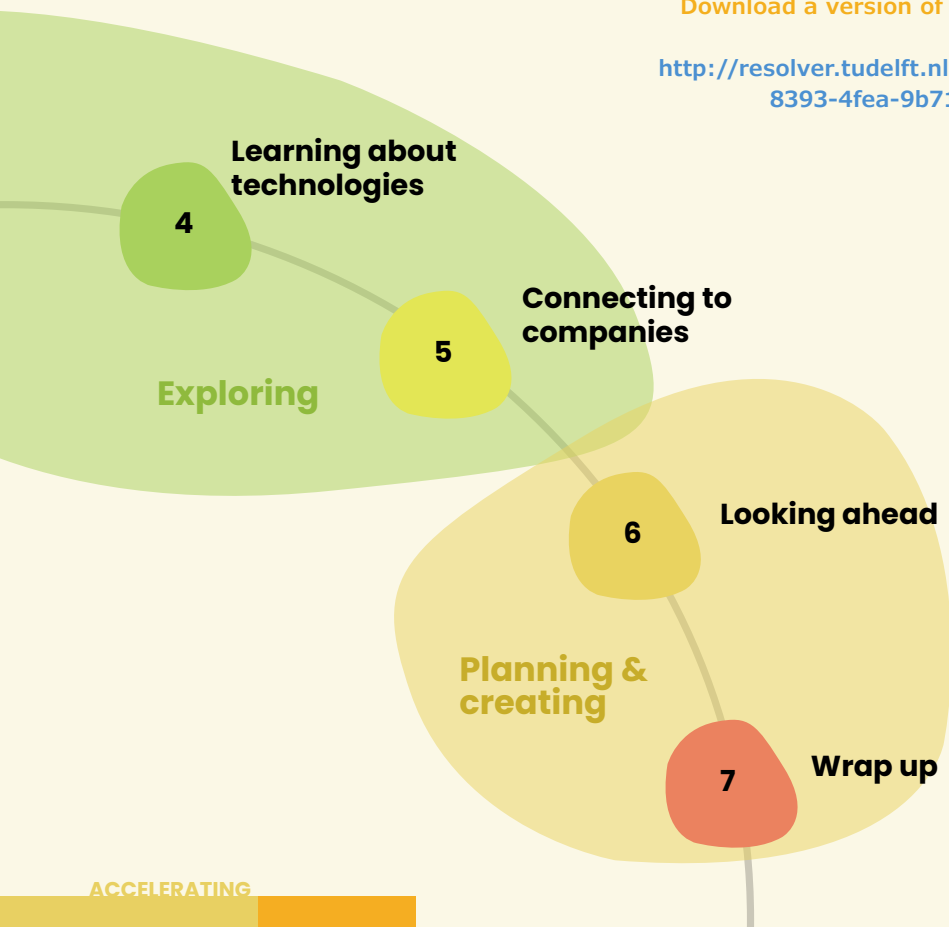7. **Wrap-up**

PLAN-IT TOGETHER TOOLKIT

Figure 16: 7-step program of Plan-It Together

Learning about technologies

4

Connecting to companies

5

Exploring

Looking ahead

6

Planning & creating

Wrap up

7

ACCELERATING

References

References to full version articles for the ENRGISED project

Identification

Schneider, P. T., van de Rijt, A., Boele, C., & Buskens, V.
(2023). Are visits of Dutch energy coach volunteers associated with a
reduction in gas and electricity consumption? *Energy Efficiency*, 16(5).
https://doi.org/10.1007/s12053-023-10116-6

Ou, J., Buskens, V., van de Rijt, A., & Panja, D. (2022).
Influence maximization under limited network information: seeding
high-degree neighbors. *Journal of Physics: Complexity*, 3(4). https://doi.
org/10.1088/2632-072X/ac9444

Activating

A.M. Onencan, & J.I.J.C. de Koning. (2022). Activating
Energy Communities for Systemic Change. In Günter Getzinger,
Michaela Jahrbacher, & Franziska Häller (Eds.), Conference Proceedings
of the STS Conference Graz 2022 (pp. 231–256). Verlag der Technischen
Universität Graz. https://doi.org/10.3217/978-3-85125-932-2

A.M. Onencan, Ou, J., J.I.J.C. de Koning (Submitted).
iiSocial Acceptance of District Heating by Tenants: Evidence from the
Netherlands. Sustainability Science

Accelerating

Schneider, P. T., Buskens, V. & van de Rijt, A. (2023). The
diffusion of binary versus continuous behavior on social networks.
Forthcoming in Advances in Group Processes 40.

Schneider, P. T., Buskens, V., & van de Rijt, A. (2023). Social proof is
ineffective at spurring costly pro-environmental household investments.
Online Journal of Communication and Media Technologies, 13(4),
e202351.

Shah, J.S. (2020). *Social contagion as a means to t*ransitions. [Master's dissertation/Master's thesis, Delft University of Technology]. Available at http://resolver.tudelft.nl/uuid:77fa4a98-f647-4840-a5b4-d5ed151ea760.

Lemmers, M. (2022). *Social contagion en de energietransitie: Een kwalitatieve studie naar het potentieel van sociale contagion processen binnen de energietransitie, en het Wijkkompas*. [Masters's dissertation/Master thesis, Universiteit Utrecht].

Visser, R.N. (2022). *Implementing social contagion for the Dutch neighborhood approach of the energy transition*. [Master's dissertation/Master's thesis, Delft University of Technology]. Available at: http://resolver.tudelft.nl/uuid:a76d8f50-81a7-40c3-92e1-fd8ffb92bf60.

Chan, J. (2023). *A Co-Creation Approach Towards Gas-Free Homes in the Netherlands: Investigating how municipalities can use co-creation practices in transitioning towards a gas-free future*. [Master's dissertation/Master's thesis, Delft University of Technology]. Available at: http://resolver.tudelft.nl/uuid:055a67f1-8393-4fea-9b71-1179e12262e5

References to other people's work

Social contagion

Much of the theory on social contagion in this book is based on the work of sociologists Damon Centola and Michael Macy. Damon Centola is Professor at University of Pennsylvania and Michael Macy is Professor at Cornell University.

Centola, D. (2018). *How behavior Spreads: The Science of Complex Contagions*. Oxford: Princeton University Press. doi:10.2307/j.ctvc7758p

Centola, D. (2021). *Change: How to make big things happen*. Hachette UK.

Centola, D., & Macy, M. (2007). Complex contagions and the weakness of long ties. American Journal of Sociology, 113(3), 702-734

Centola, D. (2007). Complex contagions and the weakness of long ties. The American Journal of Sociology 113(3), 702-734. https://doi.org/10.1086/521848

Social influence

We used the studies by Robert Cialdini, Melanie Trost and others to understand theories on social influence.

Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity and compliance. Pp. 151-192 in The Handbook of Social Psychology, edited by D. T. Gilbert, S. T. Fiske, & G. Lindzey. New York: McGraw-Hill.

Cialdini, R. B. (2016). *Influence: The Psychology of Persuasion*. Blackstone Audio, Incorporated.

Cialdini, R. B. & Goldstein, N. J. 2004. Social influence: Compliance and conformity. Annual Review of Psychology, 55, 591-621.

Behaviour change

The studies in this book dealing with behaviour change include different behavioural theories, notably the Motivation-Opportunity-Ability (MOA) model of John Olander and Folke Thogerson, and the Capabilities-Opportunities-Motivation-Behaviour (COM-B) model by Susan Michie, Maartje van Stralen and Robert West.

Ölander, F., & Thøgersen, J. (1995). Understanding of consumer behaviour as a prerequisite for environmental protection. *Journal of Consumer Policy*, 18(4), 345–385. doi: 10.1007/bf01024160

Ölander, F., & Thøgersen, J. (2014). Informing Versus Nudging in Environmental Policy. Journal of Consumer Policy, 37(3), 341–356. doi: 10.1007/s10603-014-9256-2

Michie, S., Atkins, L. & West, R. (2015). *The behaviour change wheel: a guide to designing interventions*. Great Britain: Silverback Publishing.

Michie, S., Van Stralen, M. M. & West, R. 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implementation science, 6, 42.