SHIFFT WP2 Monitoring & Evaluation of the Co-creation Pilots

WP2 (Work Package-2) Monitoring and Evaluation Report

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Management summary

Sustainable Heating Implementation of Fossil-Free Technologies (SHIFFT) is an Interreg 2 Seas-funded project focused on the adoption of low-carbon heating in existing residential and community buildings. The specific objective of SHIFFT is to increase the adoption of low-carbon technologies and applications in sectors that have the potential for a high reduction in greenhouse gas emissions. SHIFFT envisages achieving this by accelerating the market adoption of sustainable heating solutions for replacing fossil technologies used for domestic heating. One way to do this is by having six co-creation pilots located in four countries in the 2 Seas region. With the co-creation pilots SHIFFT aims to achieve a reduction of 3,422 tons CO_2 emission/year resulted from the installation of sustainable heating systems and behavioural change in heating practices by 4,295 households through co-creation and related measures. In SHIFFT, co-creation refers to a participatory process where citizens, public authorities, and other (local) stakeholders provide input, co-define problems, co-design a solution, a plan or policy to achieve a beneficial outcome for all parties participating, and do this in the domain of sustainable heating.

The aim of this report is to identify challenges, barriers, lessons and tips for replication and transfer of successful co-creation to other cities. A three-step approach was used with each co-creation pilot first conducting a stakeholder and situational analysis (February 2020). Second, co-creation action plans were developed (June 2020). These were implemented eventually implemented (July 2020 – December 2022). The process was supported by a co-creation expert team consisting of academic partners. The six co-creation pilots are: Bruges, Mechelen (Belgium), Middelburg (Netherlands), Fourmies, Hauts-de-France (France), and Norwich (United Kingdom).

Implementation of the action plans was greatly hindered in the first nineteen months of the project due to the COVID-19 pandemic, which led to lockdowns and other restrictive measures and which made it impossible to implement many real-life (in person) co-creative actions. In the face of the greater difficulty pilot hosts had to resort to less effective online modes of co-creation. After the COVID-19 pandemic restrictions were lifted in the Spring of 2022 implementation of (adapted) action plans could be begun in real-life settings. After the Summer of 2022 implementation processes and the number of actions implemented intensified, more particularly in the pilots Bruges, Middelburg, Fourmies, and Mechelen.

In total, over 60 activities were deployed, resulting in about a hundred sub activities. Performance of the co-creation pilots was measured using five key performance indicators. In terms of CO_2 emission reduction impact, the co-creation pilots jointly (i.e., on aggregated level) managed first to achieve (and exceed) the goal of 3,422 tons CO_2 emission/year. They then reached 224% of this target (i.e. 7,677 tons CO_2 emission/year). Four out of six pilots met their individual CO_2 emission reduction impact goals. In terms of households engaged, the co-creation pilots jointly (i.e., on aggregated level) managed to exceed the household engagement goal of by engaging 6,769 households. Four out of six pilots achieved their individual household engagement goal. Other performance indicators on which co-creation pilots were monitored pertained to investments made, behavioural change and social networks formation. The pilots did quite well on the latter. Average investments in co-creation pilots were estimated to be about €196,538,293.

Challenges encountered in the co-creation pilots pertain to instrumental framing, letting go of traditional (i.e., top-down) ways of working, departmental interests, dependence on local stakeholders, personnel turnover, the COVID-19 pandemic, having to do with challenges and risks potential adopters perceive (like high upfront costs and negative 'myths' about sustainable heat options), and lack of (access to) information.

In different ways the co-creation pilots contributed to setting the right conditions under which (more advanced) co-creation in sustainable heat can be implemented in the future. This approach entails both co-creative action and being tailored in combination with sustainable heat policy, which is necessary to persuade local stakeholders when implementing co-created plans. The co-creative three-step approach developed in SHIFFT can be considered for use and for scaling in locations outside the initial SHIFFT co-creation pilots. Scaling pertains to replicating certain successful SHIFFT pilots in other cities or even regions, sharing the approach and tools developed (i.e., action plan approach, monitoring approach, CO_2 impact tool, expert team support) with expert platforms on heat transitions, or expanding ongoing local practices and projects to adjacent streets or neighbourhoods. Most of the scaling modes mentioned are, in fact, already set in motion.

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Chapter 1: Introduction

1.1 Background

In 2000 around 63% of household energy consumption in the EU was utilised for home heating purposes (Eurostat, 2020). Natural gas accounted for nearly 32% of heating energy demand in households using traditional central heaters. Moreover, one-third of carbon emissions in the EU can be traced back to fossil fuels used for heating. Therefore, the European Union is actively taking action to reduce carbon emissions. Specific provisions for accelerating the transition towards using renewables in heating and cooling applications were introduced in the revised Renewable Energy Directive of 2018 (EU, 2018). This directive extends provisions and measures for strengthening heating and cooling systems in the EU region. Moreover, in the present situation, decarbonising the heat network and reducing dependence on gas imports is crucial for ensuring Europe's future energy security (Lasse, 2022).

A significant reduction in carbon emissions and gas dependence can be achieved through the wide-scale adoption of low-carbon heating technologies. However, there is a lack of awareness and knowledge of low-carbon heating technologies and their benefits. In addition, upfront investment are considered too high for early adopter households in the 2 Seas region. The transition to low-carbon heating technologies requires active engagement of local communities and homeowners, in particular in relation to raising awareness, removing barriers and introducing effective financial incentives.

1.2 Introduction to the Interreg 2 Seas SHIFFT project

Interreg 2 Seas is a European Territorial Cooperation program focused on social innovation, knowledge and research-based transition towards low carbon technologies and other project objectives in the 2 Seas region which include coastal areas in the United Kingdom (England), Belgium (Flanders), France and the Netherlands along the southern North Sea and the Channel.

Sustainable Heating Implementation of Fossil-Free Technologies (SHIFFT) is an Interreg 2 Seas-funded project focused on the adoption of low-carbon heating in existing residential and community buildings. The specific objective of SHIFFT is to increase the adoption of low-carbon technologies and applications in sectors that have the potential for a high reduction in greenhouse gas emissions. The SHIFFT project envisages achieving this by accelerating the market adoption of sustainable heating solutions for replacing fossil technologies used for domestic heating. The anticipated results of the SHIFFT project estimate a reduction of 3,983 tons of CO_2 emissions/year. The majority of the reduction - i.e., 3,422 tons CO_2 emissions/year - would result from the installation of sustainable heating systems and the adoption of more sustainable heating behaviour by 4,295 households through co-creation processes and related measures.

The SHIFFT project output includes three components. First, investment in four pilot projects to demonstrate sustainable heating technologies in a social housing scheme, a charitable refuge, and several community buildings in the four 2 Seas region. Second, co-creation pilots are carried out at six locations aiming to trigger investments in sustainable heating solutions for homes in local communities. Third, guidance is provided to local authorities and community actors for accelerating the adoption of sustainable heating. SHIFFT targets local households and communities, local or regional authorities, knowledge institutes involved in the co-

creation of local energy and heating arrangements, and professionals in the installation construction sector that provide heating system services and located in the partner municipalities of the project. SHIFFT adopts a cross-border approach combining expertise from four countries to reach effective solutions with validation under all territorial and institutional contexts of the 2 Seas area.

The SHIFFT partners are the local authorities of Bruges (Belgium), Mechelen (Belgium), Middelburg (Netherlands), Fourmies (France), and the social housing organisations Places for People (United Kingdom) and Woonpunt Mechelen (Belgium), a sustainable energy consultancy and engineering firm (CD2E, France) and two academic institutes (Delft University of Technology, the Netherlands; and the University of Exeter, United Kingdom).

There are three elements that set SHIFFT apart from other initiatives. First, there is a focus on heating as it is much more challenging for the decarbonisation of homes. Second, there is a focus on co-creation with homeowners and community leaders aiming to understand their motivation and requirements, remove barriers and facilitate investment in sustainable heating. Third, SHIFFT desires to set an example for cities and local public administrations in demonstrating effective and workable solutions, reducing CO_2 emissions whilst reaching out to local community members. With an exclusive focus on heating, SHIFFT pays more attention to one of the most urgent and complex dimensions of the zero-carbon transition.

The SHIFFT project is divided into multiple work packages and this report showcases the findings of work package 2 (WP2), which focuses on city co-creation projects for creating a sustainable heating transition with local communities. Homeowners and communities contribute by investing in sustainable heating technology for their respective buildings. WP2 facilitates a rise in bottom-up demand for sustainable heating amongst local communities and homeowners. This is achieved in multiple ways. First, by understanding the motivations of community members driving the adoption of sustainable heating. Second, by identifying and co-creating the facilities and incentives required for them to switch to sustainable heating. And third, by triggering investments in sustainable heating solutions by local communities. Multiple co-creation approaches and tools were applied and analysed as input for SHIFFT guidance (WP1) that will be transferred to different cities (WP5). The pilots used the pilot investments (WP3) as engagement and learning tools to demonstrate the potential of sustainable heating to local communities.

1.3 Role of the WP2 expert team

The WP2 expert team comprised the Delft University of Technology and the University of Exeter. In SHIFFT the WP2 expert team was involved in supporting co-creation pilot hosts in developing and implementing their action plans. This took place by means of regular (bi-monthly) WP2 meetings in which progress was discussed with all co-creation pilot hosts. The WP2 expert team co-developed a monitoring approach with the pilots' hosts. To measure and evaluate CO_2 impact per pilot host Delft University of Technology developed a methodology and calculation tool. The WP2 expert team was responsible for data collection, analysis and reporting of the WP2 evaluation report. Data and information were provided by the WP2 co-creation pilot hosts.

1.4 Problem definition

Global net zero emissions need to be reached by 2050 to limit global warming to 1.5 degrees C (IPCC, 2018)]. Reaching this target will require the rapid decarbonisation of heating systems (Murdock et al., 2018). However, social, and economic processes can make the transition to sustainable heat difficult to achieve in practice (Cowell and Wenn, 2021). Decarbonising heating and hot water systems is a major challenge in countries that are dependent on natural gas (*Ibid*.). Heat demand within buildings varies according to climate, building fabric, and occupancy (Mallaband and Lipson, 2020). Considerations relating to cost, health, comfort, and hospitality also affect the behaviour of occupants and produce additional variations in heat demand (Shove and Walker, 2014).

Considerations relating to sustainable heating technologies, like heat pumps, are perceived to offer few consumer benefits in comparison to natural gas heating systems. This is not just problematic as potential adopters and end-users face significant challenges when initiating, governing, facilitating, and promoting sustainable heat transitions. Heat decarbonisation exhibits the qualities of a wicked problem that is not open to simple definitions or solutions, and for which there are many different perspectives based on differences in social and value positions.

As a way to embrace and better accommodate these differences, local authorities and other actors like social housing organisations are increasingly involving citizens and other stakeholders, such as private companies, in the co-creation of sustainable heat transitions (Itten et al., 2021). Co-creation can be broadly defined as sharing the responsibility for the initiation, design, and implementation of public services with citizens and other local stakeholders (Flinders and Wood, 2019). Municipalities have often justified the use of co-creation in planning for sustainable heat transitions on instrumental grounds (Fiorino, 1990). It is argued that co-creating heat transitions with local stakeholders and citizens may improve the social acceptability of new heating systems (Baptista et al., 2020), which then makes it easier for local authorities to achieve targets for reducing carbon emissions. Co-creation is also perceived to be more effective and efficient than top-down forms of planning (Voorberg et al., 2015) which struggle to cope with the increasing complexity of policy demands and relationships between different political actors (Itten et al., 2021).

Although co-creation (or rather co-creative action) is considered a potentially effective tool to encourage actors to engage in collective action and achieve sustainable heat transition goals, there is currently only slight empirical evidence to support this claim (Itten et al., 2021; Manktelow et al., 2023).

1.5 Research aims and questions

In SHIFFT WP2 six co-creation pilots were set up, developing action plans of their own and implementing them. This was monitored over time (2020-2022) and evaluated. Monitoring and evaluation take place using a number of evaluation indicators jointly developed within SHIFFT and approved by the Interreg 2 Seas Joint Secretariat. By evaluating the SHIFFT WP2 co-creation plots the aim is to identify challenges, barriers, lessons and top tips for replication and transfer of successful co-creation to other cities and organisations. The six co-creation pilots are: Bruges, Mechelen (Belgium), Middelburg (Netherlands), Fourmies, Hauts-de-France (France), and Norwich (United Kingdom).

The main research question is: By evaluating six pilots on sustainable heating over 2020-2022 how did co-creative action have an impact in terms of performance on jointly developed evaluation criteria, and what can be learned from this?

Sub questions are:

1. What is co-creation (or rather co-creative action) when applied in a sustainable heat setting?
2. How were co-creation pilots developed and implemented?
3. What challenges are identified with regard to implementing co-creative action?
4. What impact did co-creative action have on selected evaluation criteria?
5. What lessons can be learned from the pilots with regard to effectiveness and potential scaling (e.g., to other cities and organisations)?

1.6 Outline of the report

The remainder of this report has the following structure. Chapter 2 describes the research approach and methodology used for evaluating and monitoring the transfer of co-creation in partner cities. Chapter 3 dives into the six co-creation pilots in detail. This is followed by an evaluation of the results in chapter 4. The report is concluded in chapter 5, which also presents suggestions for future research and advice for policy makers.

Chapter 2: Research approach and methodology

2.1 Research approach

An evaluative research approach is adopted using a set of different evaluation indicators. Because the indicators are of different nature, require different (quantitative and qualitative) research methods a mixed methods research design is used (Onwuegbuzie and Leech, 2004). The evaluative approach used is rooted in public policy and program evaluation research (Vedung, 2017). As usual in EU-funded projects, predetermined project objectives apply with indicators to measure these. The evaluation analysis of which the results are presented in this chapter examined whether the objectives were realised. This applies to Work Package 2, in which co-creative actions (and other actions) were carried out in six pilots, and should contribute to achieving goals in terms of CO_2 emission reduction, households engaged, and investments made.

2.2 Co-creation and incentives targeting citizen engagement

Co-creation refers to a category of public participation. The latter refers to citizens directly participating actively in public decision-making, for example pro or con the planning of an onshore wind park. Participation often refers to a form of collaboration or partnership between citizens on the one hand, and (local) government on the other. In the literature public participation is concerned an important means to enhancing public support, empowering (local) communities citizens whilst improving the quality of decision-making and eventually the project or public service delivery itself (Buitelaar & Heeger, 2018; Brandsen et al., 2020; Liu et al., 2020; Wolsink, 2020).

Many terms are used interchangeably to describe the collaboration between public authorities and citizens. This is confusing, and applies to concepts like public participation, citizen participation, co-creation, and co-production (Voorberg et al., 2015, Itten et al., 2021, Brandsen et al., 2018). Co-creation can be seen as an advanced, active category of public participation, where citizens do not only participate in a decision-making process, but also become initiator or designer of the process. Itten et al. (2020) define co-creation as, “Citizens and professionals sharing power and responsibility to work together in an equal, reciprocal and caring relationship” (p.22).

Voorberg et al. (2015) differentiate between co-creation and public participation by referring to co-creation as the active involvement of citizens, whereas public participation requires only passive citizen involvement. Co-creation can also be seen as a participatory process where citizens, public authorities, and other stakeholders provide input to achieve a beneficial outcome for all parties (and realise a “win-win game”). Voorberg et al. (2015) identify three types of co-creation: 1) citizens as co-implementer, 2) citizens as co-designer and 3) citizens as initiator. Citizens as co-implementer refers to involvement of citizens at the implementation phase of public service delivery. Citizens as co-designer refers to citizens getting directly involved in the design of public services with public authorities. And finally, citizens as co-initiator refers to involvement of citizens at the earliest moment, in which citizens are the initiator of a public project and the public authorities follows (Itten et al., 2020).

In SHIFFT co-creation mostly refers to a participatory process where citizens, public authorities, and other (local) stakeholders provide input, co-define problems, co-design a solution, a plan or policy to achieve a beneficial outcome for all parties participating. In SHIFFT co-creation, therefore is not limited to citizens participating actively in the co-design or co-development of a plan or policy, but also applies to local stakeholders like SMEs, NGOs and bottom-up initiatives (like energy communities). In many cases co-creation also spills over into co-production with citizens and local stakeholders actively being involved in co-producing local heat projects. Finally, co-creation should be distinguished from persuasive actions co-creation pilot hosts (like municipalities or social housing organisations) implement that target local residents and stakeholders (e.g., to adopt or invest in sustainable heating options), but do not assume co-creation prior to implementation. Examples of the latter refer to a wide number of actions and policy like subsidy, low tax measures, media campaigns, tailored advice, home audits, thermal scans, energy saving tips, (role) modelling, coaching or feedback (Abrahamse et al., 2005, Van de Vyver et al., 2020). However, in practice co-created action or projects may end up being co-implemented with (non-co-created) actions and policy. For example, a co-created action plan may involve an awareness campaign, information workshops, thermal scans, tailored advice for households, and a subsidy scheme that can be used by the latter to purchase selected sustainable heat options (like a heat pump or thermal insulation).

2.3 Implementation and evaluation research

In democratic countries public policy implementation is usually followed by formal policy evaluation. This happens to assess whether policy goals initially set in policy plans of programs have been achieved, and in line with plans made, often also with a focus on not exceeding budgets made available for implementation, and attention (avoidance) of side effects or negative externalities. In democracies policy evaluations are necessary to hold public officials accountable for policies implemented within their authority. Policy implementation that went wrong (failing to achieve the initial target) could lead to criticism of the official's function, with the most extreme consequence of the official having to leave office, or being voted away when the next elections take place. In order to conduct a policy evaluation those who evaluate policy have to monitor how the progress takes place. This means they have to collect information (i.e., data, evidence) on how the policy implementation process evolves, use (key performance) indicators to measure how the implementation process performs against achieving policy goals and collect information from both implementing agents as well as target groups on how they perceive the implementation process.

In SHIFFT the goal of WP2 is a CO_2 emission reduction of 3,422-ton tonnes/year and engaging with 4,295 households. These are the initial goals that need to be achieved. In this report, attention is paid to whether these goals have been met, and how. This addresses two levels: (i) the overall level for SHIFFT (as an aggregated level consisting of the sum of the six co-creation pilots), and (ii) the local level where co-creation pilots are implemented. For monitoring purposes, multiple indicators were developed. For CO_2 impact monitoring and calculation, a new model was conceived. To get more insight into implementation processes information was collected among co-creation pilot hosts and other actors.

2.4 Indicators and impact model

For the pilots in the SHIFFT project performance was measured on several indicators: CO_2 impact, households engaged, investments made, behavioural change and network formation.

The following goals are listed:

- 4,295 households involved;
- 3,422 tons CO_2eq/year of emissions reduced.

In order to determine the impact of co-creation activities, the following model was developed:

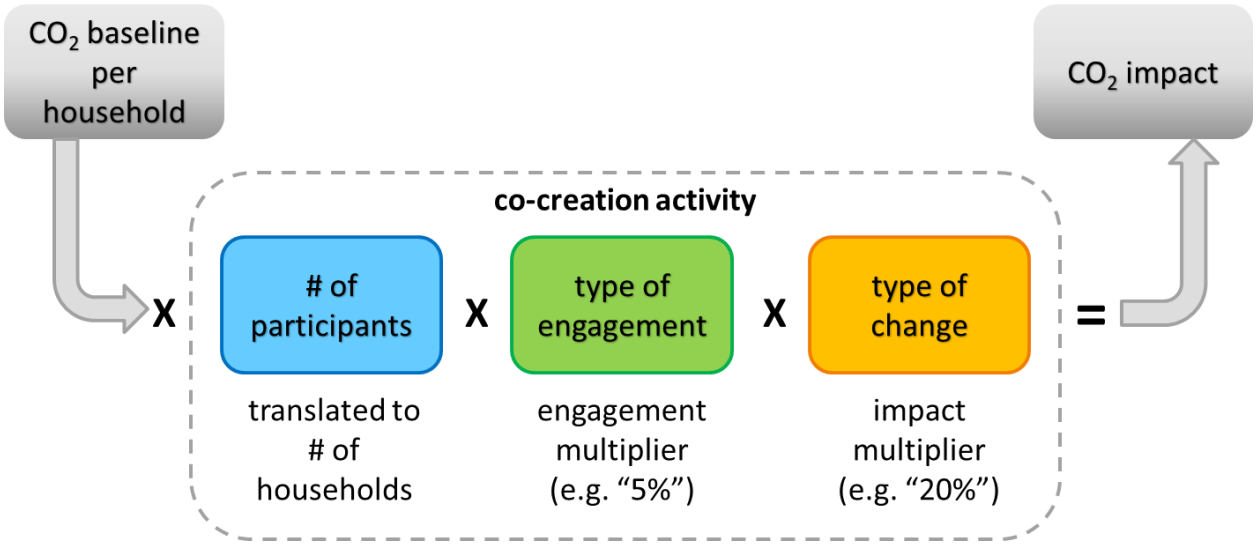

Figure 2.1: SHIFFT co-creation CO_2 impact calculation model

For the goal of households involved, counting participation in co-creation activities and estimating the percentage engaged (see below) is sufficient. For determining the CO_2 reduction impact of a co-creation activity however, a total of four variables are used:

- the CO_2 baseline per household;
- the number of participants;
- type of engagement;
- type of change.

As exact figures cannot always be determined and the nature of co-creation makes it difficult to achieve certainty in the outcome (i.e., CO_2 impact), in order to represent this, some variables have a range. As uncertainty propagates, both a minimum and a maximum outcome have been calculated for each activity. These have been added up for each pilot, after which an average was calculated in order to gauge progress.

The first variable is the CO_2 baseline per household. This includes CO_2 emissions for heating and DHW (and therefore excludes other household-related CO_2 emissions like electricity for lighting, transport, construction etc). This has been determined for the four regions that the six pilots are located in, as shown in Table 2.1.

The second variable is number of participants for an activity. Where possible, pilot hosts have kept track of these, alternatively, an estimate was made with a high and a low figure. Reasons for requiring estimates can be early activities before the model above was developed, privacy reasons (people may not want to supply their details during a booth visit) and content taking priority over statistics (resulting from a high popularity of some activities).

The third variable is type of engagement. For this, a literature study was performed in order to estimate the uptake of the information offered at an activity. Categories range from newspaper advertisements and leaflets

to tailored one-on-one advice. This variable also provides one of the targets for the project's co-creation activities: "households involved". Table 2.2 shows an overview of the events considered.

Table 2.1: CO_2 emissions per household for the pilots involved in SHIFFT.

Pilot	CO_2 emissions per household [tCO_2eq/a]	Source(s)
Middelburg (NL)	2.1	Milieu Centraal (2022)
Bruges & Mechelen (BE)	4.6	VREG (2022) and Energids (2022)
Fourmies & Hauts-de-France (FR)	2.1	Observatoire Climat Hauts-de-France (2022)
Norwich (UK)	4.7	Department for Business, E. & I. S. (2021), Carbon Independent (2022) and English Housing Survey (2020)

To provide the model with (policy) measures and other behavioural interventions aimed at energy saving or investment in sustainable heating technology, a literature study was conducted[1] into empirical studies in which quantitative information was available about the impact achieved per measure (e.g., percentage of energy saving compared to a baseline after implementation of a given measure). After the literature study, a distinction was made between various measures: workshops, energy boxes, tailoring, modelling, information (provision), loans, subsidy, community energy action. Within these measures, a further distinction is made according to more specific measures and their impact. Subsequently, a reclassification was made into: broadcast, event, face-to-face communication/tailoring, phone call, correspondence, financial economic incentives, and 'built' (for measures that are already installed). After a critical assessment of the measures, a comparison was made with the actions taken in the co-creation pilots and the actions from the pilots were classified according to the measures from the literature study. The impact of these measures has been included in the CO_2 impact model so that calculations could be made.

As there is a level of uncertainty, most of these categories have an engagement range. A special category called 'built' was included for the few co-creation activities where confirmed feedback was received, for example, from heat pump purchases. Considering the nature of co-creation activities and the sheer numbers involved in all of these however, feedback mechanisms were usually not feasible. The fourth and final variable is the type of change. Corresponding to the Interreg 2Seas SHIFFT Grant Agreement, three categories were included: awareness, improvements and renovation. Table 2.3 presents an overview of these. Because the subjects of co-creation activities do not always exactly involve one of these categories, the model includes combined figures to represent this. As the uncertainties in some of the variables also multiply, the low-end and high-end can be quite far apart. Pilot hosts have reduced this distance by improving visitor counts, and in a few cases received information on actions taken, however as the other variables cannot easily be narrowed down, a significant level of uncertainty remains. Pilot progress was tracked and encouraged based on whether the

[1] Literature used: Abrahamse et al., 2005, 2007; Gerbens & Wiekens, 2018; Coenen & Hoppe, 2022; De Jong et al., 2020; Energids, 2022; HIER, 2022; MilieuCentraal, 2022; Mlecnik et al., 2021; Rovers et al., 2020; Uitzinger & Derijcke, 2007; Van Soest & Vringer, 2021.

averages of these low-end and high-end figures passed the initial targets, which in some cases proved difficult and in others went spectacularly well.

Table 2.2: Engagement categories and expected impact

Type of activity		Type of communication	Number of recipients	Level of engagement		Description	Types of activities
				low-end	high-end		
BRC	broadcast / publication / newsletter	one way	many	0.5%	2.0%	large scale, one way, short message	newspaper ad or article (also online), magazine, flyer, TV, podcast, youtube movie
EVE	large event	one/two way	many	5%	10%	medium to large scale, one way, limited personal interaction	
MEE	meeting	two way	several	10%	30%	low to medium scale, moderate personal interaction	
F2F	face to face	two way	one	10%	70%	individual, high personal interaction	including personal advice, energy coach contacting individuals
PHO	phone call	two way	one	10%	50%	individual, high personal interaction	
COR	correspondence	two way	one	5%	40%	individual, high personal interaction	email (or letter)
INT	financial / economic incentive	two way	one	50%	90%	individual, high personal interaction	subsidies granted
BUI	built	n/a	one	100%	100%	intervention has been implemented	example: heat pump was installed

Table 2.3: Types of change

Category	Summary	Description	Low-end	High-end	Notes
1	**Awareness**	Home visits with energy and renovation advice, heating installation audits, adapted consumer behaviour	5%	10%	Curtailment behaviour, e.g., day-to-day actions to reduce consumption, like setting thermostats or switching off lights when leaving home.
2	**Improvements**	Single renovation measures: the heating system is improved with limited interventions	10%	20%	Single renovation measure: glass replacement, installing wall and roof insulation, etc.
3	**Renovations**	Integrated renovation. the heating system is improved with multiple significant interventions	30%	75%	Deep renovation: a combination of demand reduction measures (e.g., insulation) and heat supply replacement (i.e., a renewables-based heating system).

Multiplying these four variables with one another results in a low-end and a high-end CO_2 impact for an activity.

Activities are sometimes divided into sub-activities, as a single activity may have multiple types of engagement or intended impact under its umbrella. A one-stop-shop (OSS), for example, can both offer information leaflets and appointments for tailored advice. Repeated exposure of a single household to different activities is therefore possible. Additionally, a low level engagement like a newspaper ad might lead to a higher level of interaction, either with the pilot's more interactive co-creation activities, or elsewhere.

For the sake of measuring impact however, each (sub-)activity is considered to have an impact of its own. Furthermore, higher level activities that address the same impact category are less likely to be attended by the same household. Therefore, the (large) confidence interval of both results will cover this effect. When excluding the project indicators and purely looking at household interactions however, this therefore does not mean the total number equals the number of households involved.

For **behavioural change** several indicators were used. They include: awareness, intention, energy saving behaviour, and willingness to adopt energy saving and/or sustainable heating options.

For **investments made** two types of indicators were used. First - when possible - monetary indicators reflecting euros invested in sustainable heating options and thermal installation. This however, proved very difficult for pilot hosts because it was difficult to retrieve investment costs made by others (e.g., citizens and local stakeholders). If possible proxies could be used, like subsidy budget used to enable local residents to purchase heat pumps. Second, qualitative insights were collected on how pilot hosts were involved in co-developing investment and financing schemes with other actors (e.g., in partnerships or coalitions).

For **network formation** qualitative insights were collected on how pilot hosts were involved in setting up collaborative networks, regional innovation networks and partnerships together with other actors. Social network analysis techniques were not used.

2.5 Data collection

A multi-modal approach to data collection was used consisting of multiple sources of data. This was done for both reliability reasons (i.e., confirmatory, triangulation) and practical reasons (due to having the opportunity to collect different sorts of data). Data collection roughly pertained to: (1) data collected by the WP2 expert team during actions in support of co-creation pilot hosts; (2) data collected via expert interviews; (3) information delivered by pilot hosts (i.e., both qualitative and quantitative data).

Data collected by the WP2 expert team concerned information observed and gathered during support and guidance of the six co-creation pilots, during structural and occasional activities, including the (bi) monthly WP2 meetings (online, with frequent updates of all pilots), as well as multiple workshops on the development of a monitoring approach, development and validation of the CO_2 impact tool (delivered by June 22, 2022, and approved by the Interreg 2Seas Joint Secretariat (JS-EC) in July 2022.

Expert interviews with co-creation pilot hosts were conducted by a WP2 expert team member of the University of Exeter addressing the meaning, implementation and perceived effects of co-creative action (e.g., on sustainable heating options, awareness raising, and investment). Based on the interviews transcripts were made that were returned to the interviewees for confirmation and modifications.

Co-creation pilot hosts were requested to provide information to the WP2 expert team. This concerned *inter alia* documentation from co-creative events to understand how co-creation is interpreted and implemented. Also, minutes and other footage used (like media) were collected from co-creation workshops with citizens that were organised (with evidence in presence lists and via Cognito forms).

In addition reports or transcripts from focus groups (with residents participating) were collected to address behavioural changes and awareness raised associated with participating in co-creation activities (i.e., in Bruges, Mechelen, Middelburg, Norwich). On 11 October 2022, a questionnaire was developed and sent to the co-creation pilot hosts with the request to provide the requested information to the WP2 expert team. Pilot hosts delivered text files, and for detailed information, bilateral meetings were organised with the WP2 expert team. Information requested concerned:

1. **Action plan summaries** (short and updated versions of the action plans that were delivered on 1 July 2020).
2. **Implementation process description over 2020-2022** (on the implementation of the co-creation action plan, in chronological order of events, and information on persons or households reached).
3. **CO_2 impact** (data on actions implemented, and persons or households reached were used as input to the CO_2 impact calculation tool).
4. **Households and other stakeholders reached.** TN umber of target group members reached via co-creative actions implemented.
5. Observed **behavioural change**. This concerned either information via focus group workshops for which transcripts and minutes were made, or via a household survey (i.e., only in the case of Norwich).
6. **Investments made** by households or other stakeholders. This concerned both financial figures as well qualitative information on how co-creation pilot hosts influence other stakeholders to invest in sustainable heating options.
7. **Formation of social networks, coalitions or partnerships**. Description of social networks, partnerships or coalitions formed, when this took place, which other organisations (types) are involved, and whether certain events could be linked to SHIFFT activities (by co-creation pilots hosts).
8. **Reflection on the implementation of co-creative activities**. Description by co-creation pilot hosts on how co-creative actions implemented reached stakeholders, encouraged investment in sustainable heating options, and (indirectly) influenced CO_2 emission reduction.

A diverse range of co-creation activities and incentives were put in place across the SHIFFT pilot projects. Co-creation across the project pilots included a range of strategies to support engagement and participation. Details are listed in Table 2.4 and methods are summarised. Whilst there remains a clear emphasis on traditional consultative and communicative strategies we see considerable evidence of innovation and learning: working with a range of stakeholders to share knowledge, building capacity through communities and word-of-mouth and providing bespoke support and information. The principle co-creation measures put in place are: a) Traditional methods of participation (such as surveys, awareness raising, market segmentation, behavioural advice); b) Financial subsidies and supports to encourage adoption of sustainable heat options; c) Novel mechanisms that provide information (e.g. with use of a thermographic scanner); and d) Capacity building and support (one-stop-shop for supporting neighbourhood renovation, and the identification of energy ambassadors to provide in situ support and encouragement; group offer of heat pumps with tailor-made advice).

Table 2.4 Description of activities undertaken by co-creation projects

Co-creation pilot	Co-creation actions
City of Bruges	Three city districts selected via low carbon competition One stop shop to facilitate collective neighbourhood renovations (if granted) Thermographic façade scanner Neighbourhood survey. Setting up subsidy system for sustainable heating Free energetic renovation scans for citizens Competition to encourage citizens to go fossil-free Interviews with citizens who are already fossil-free ('first movers') 'Buurkracht' approach with energy ambassadors
City of Mechelen	'50 degrees' test for residents Group offer of heat pumps with tailor-made advice Coaching of homeowner associations in home co-owned condominiums.
City of Middelburg	Mapping of household profiles for communication and participation strategy Search in local social networks to identify (energy) ambassadors and initiatives (Online) workshops with citizens about communication and participation, and frontrunner experiences (communications in newspaper to share information) Ongoing planning and negotiations between stakeholders in heat network project Dauwendaele
Norwich	Co-creation with residents refuge home (design, all stakeholders, not just end-users) Engagement program about behavioural energy advice to 750+ residents Tenant Engagement Day, to raise awareness and support tenants in energy savings and sustainable heat options
Hauts-de-France	Efforts to reach out and convince new social housing organisations (SHOs) to participate in SHIFFT Convince SHOs to install solar thermal and other heating technology. (How do they reach out to their tenants?). Involve, inform and consult SHO tenants
Ville de Fourmies	Event on co-creation addressing aesthetic aspects of heat plant. With public prescriptions. To advise contract requirements Co-creative event with students (future conference) Program to increase the acceptability of bio-based heat network among local households Excursions, site visits

Table 2.5: Overview of documents collected.

Date	Documentation	Content
4th April 2020	Co-Creation Webinar	Minutes from meeting with all six project pilots.
1st October 2020	Cross-Border Workshop	Minutes from a knowledge-sharing workshop with all six project pilots.
March-June 2021	Interviews with 3 Project Coordinators	Transcripts from interviews with project administrators from all six project pilots.
7th June 2021	Co-Creation Monitoring and Update Session	Minutes from meeting with all six project pilots, updating the WP2 expert team on their progress in reaching their targets.
9th September 2021	Co-creation Monitoring Update Session	Minutes from meeting with all six project pilots, updating the WP2 expert team on their progress in reaching their targets.
December 2021-February 2022	Bilateral Meetings with Project Coordinators	Meetings with project coordinators for all six project coordinators to collect qualitative data on co-creation activities.
July 2022	Interviews with Project Coordinators	Interviews with project coordinators in Mechelen, Middelburg, and Bruges.
September - December 2022	Bilateral discussion and collection of written documents from Project Coordinators	Information on implemented actions, and supportive argumentation with background.

Qualitative monitoring of the co-creation process: The WP2 expert team monitored and evaluated their activities through interviews with the project coordinators. The individual project pilots also shared knowledge and expertise with each other through these meetings and through cross-border learning sessions and webinars. Documents collected between 2019 and 2022 relating to co-creation activities in all project pilots were analysed but with a focus on Middelburg, Mechelen, and Bruges, which shared a number of similarities in being led by municipal authority partners. A series of interviews with the project coordinators were completed mid-way through the project (March – June 2021). These interviews were completed between March and June 2021. A timeline and summary of the documents that were collected and analysed are displayed in Table 2.5.

These documents were coded using a series of themes. These included contextual variables that were influencing the co-creation process, such as budgetary constraints, organisational values and policies, relationships with other organisations and time and staffing constraints. Definitions and motivations for using co-creation were also identified and analysed to understand how these changed over time and varied between the three case studies. Questions and themes that had emerged from the analysis were then used to form the basis of three semi-structured interviews completed with the pilot project coordinators in Middelburg, Mechelen, and Bruges in July 2022. These interviews were used to validate and elaborate on findings from the initial analysis of documentation. Participants were asked for their informed consent and the interviews were audio-recorded. The interviews were then transcribed and reviewed by the participants. Transcripts and other documentation were coded to identify how definitions and expectations of co-creation had changed over time in relation to the implementation of co-creation and outcomes from the co-creation process.

On the basis of the analysis, a descriptive evaluative framework was developed that was grounded in interpretations of co-creation used by coordinating stakeholders, specifically observing changes in how co-creation is defined and implemented over time. The analysis drew specifically on the distinction between instrumental, substantive, and normative motivations for using co-creation to conceptualise these changes (Fiorino, 1990). The substantive argument holds that engagement with the public can improve agendas and decisions through the inclusion of diverse views, kinds of knowledge, value and belief systems. The normative rationale is based on the notion that empowering citizens in agenda-setting and decision-making is a democratic right, and the public is best qualified to decide on matters that lie in their own interest. Finally, the instrumental argument positions engagement as a means to endorse favoured decisions and favoured outcomes such as consent and behaviour change.

2.6. Validity and reliability

During the implementation of the WP2 SHIFFT co-creation pilots (July 2020- December 2022) several major events occurred that influenced how co-creative actions (and other actions) were prepared, organised and implemented by the pilot hosts. Most striking were the COVID-19 pandemic (2020-2021) and spiking gas prices that followed from the Russian invasion in the Ukraine (February 2022).

After COVID-19 emerged in March 2020 all in person action ceased. At the time the WP2 pilots were preparing their action plans. By 1 July the action plans were ready and had to be implemented according to the SHIFFT project's Grant Agreement time schedule. This, however, was not possible due to the COVID-19 pandemic delayed in-person co-creation activities, which meant that most of these activities did not take place until 2022.

The WP2 academic team provided guidance and support through monthly meetings with representatives from each of the six pilots. Whereas the COVID-19 pandemic had a profound negative impact on co-creative action, and had pilot hosts resort to less optimal online forms of citizen/stakeholder engagement and co-creation, the spiking gas prices (increasing to at some time in 2022 up to four-fold increase) and the inflation that came along with it (e.g., up to 18% in, for example, the Netherlands) arguably had a positive influence. Because of the surging heat prices more citizens (and other end-users) became aware of (affordable) heating which translated to increased interest in sustainable heating options as compared to a "normal situation" in which interest would be low. This was indicated by increasing waiting times for those who ordered heat pumps or thermal insulation to be installed. At the same time national and local governments relevant to the WP2 pilots implemented supportive policy to encourage adoption of sustainable heating options (like low VAT rate on thermal insulation pricing or a subsidy on heat pump adoption).

Other validity issues that influenced the course of action in some of the pilots had to do with project workers leaving the project and being replaced (i.e., Hauts-de-France, Middelburg, Fourmies), which led to delay, or certain pilot hosts benefitting from the presence of dedicated (non-Interreg) budget to run a sustainable heating pilot in a local neighbourhood (i.e., Middelburg), a pilot host being fully dependent on the willingness of external (social housing) organisations whose management boards turned out to be less willing to cooperate than initially anticipated (i.e., Hauts-de-France), or co-depending ones action plan on a regional subsidy scheme that is suddenly terminated (i.e., Fourmies).

Chapter 3: The Co-creation pilots

In this chapter an overview is presented of the six SHIFFT co-creation pilots. The six co-creation pilots are: Bruges, Mechelen (Belgium), Middelburg (The Netherlands), Fourmies, Hauts-de-France (France), and Norwich (United Kingdom). For each of these pilots information is presented regarding: activities and organisations involved, expected project output, action plan summary, and the implementation process (*a posteriori*).

3.1 BRUGES – 1000 FOSSIL FREE FAMILIES

3.1.1 Planned activity description and partners involved

The City Environmental Cluster of the City of Bruges will work in four city districts (to be selected) with existing district citizen committees and focus on mobilising (young) families, home-owners with renovation plans. The co-creation process includes the following activities.

• Raising awareness of residents in these districts;

• 'Gas-free' renovation scans for 1000 homes - roadmap and transition possibilities according to their available budget for making the homes fossil-free;

• Facilitation of this community in the transition process, e.g. support for asking and comparing quotes, organising group purchase, joint problem resolution, inventory of favourable energy loans;

• Stimulating interaction in districts, both among participants and towards other residents – using the 'transition families' as ambassadors to mobilise others;

• City-wide promotion of the pilots to mobilise other districts.

3.1.2 Expected project output

A CO_2 emission reduction of 276 tons/year. This reduction is achieved by:

- 160 households invest in new sustainable heating installations (e.g., heat pumps)
- 420 households reduce their energy use & CO_2 emission from heating by taking measures to optimise their existing installations & reduce their heat consumption.

3.1.3 Action plan summary

Multiple activities were planned in the Bruges for enabling co-creation of solutions. Key highlights:

- A refurbishment premium 2019 - October 2022 (premium 2022 to 2014)
  was planned under which local houses were helped with and made aware about the insulation, low-emission glass - geothermal heat pump, air/water heat pump, heat pump boiler and solar boiler.
- Free renovation scans were to be conducted from the year 2019 to 2022.
  Open networking moments were to be conducted twice every year. These events had a plenary part along with workshops (Figure 3.1).

Figure 3.1: Picture from a networking activity in Bruges

- A competition for citizens was to be organised with a cash price of €5,000 to take action regarding the decrease of CO_2 emissions.
- An annual climate festival is organised by Avansa, with the support of the City of Bruges. During this festival, the heat policy in Bruges would be presented.
- The city's energy platform would be reworked (energieplatform.Bruges.be, 2022). The goal was to complete the website, to insert a logical order, to incite the citizens to look into the website, to make the website more user-friendly, and to demonstrate which tools and help the city of Bruges offers.
- A climate point in the municipality service home 'Huis van de Bruggeling' (2022, open on afternoons on Mon, Tue, Wed and Thu) will be set up. This climate point hosts information panels about the various aspects of the climate plan.
- Magazine, newsletter, and infographics are to be developed to engage local residents. Stadsmagazine: quarterly magazine to all citizens of Bruges (118,000 residents) with always a section on sustainability: "Brugge Naar Morgen" campaign, follow-up climate plan (update of the different guidelines), actions taken by the city, good practices of citizens. Newsletter BrugesNaarMorgen: monthly newsletter about the seven bridges of the climate plan. An infographic addressing the Bruges heat revolution is circulated amongst residents (Figure 3.2).

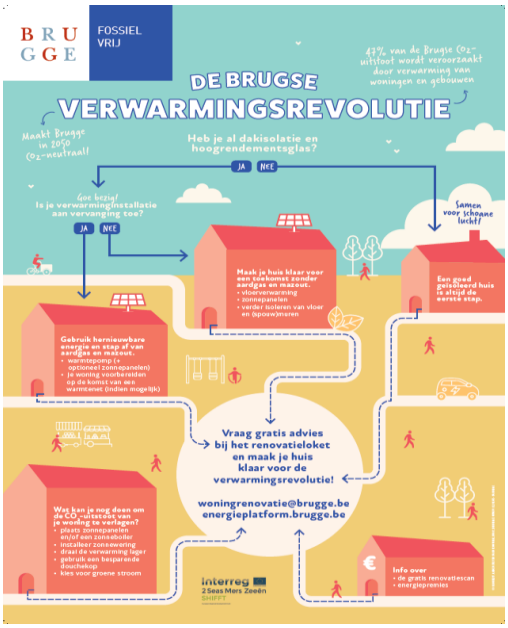

Figure 3.2: Infographic developed by the Bruges co-creation pilot.

3.1.4 Description of implementation process 2020-2022

Following is the brief summary and timeline of the implementation process segregated over different localities in Bruges. All actions and efforts are bundled under a common term: 'Buurkracht' (Neighbourhood Power in English, translation by the authors).

- **City district Assebroek 't Schuurke:**
  - 2019
    - Brainstorm evening
  - 2020
    - teaching in two local schools
    - surveys
    - energy parties and bicycle safaris (cancelled due to the COVID-19 pandemic)
  - 2021
    - thermographic facade scans
    - Info evening thermographic facade scan
  - 2022
    - information evening with various installers
    - unburdening with an external partner (Renoseec VZW) through a subsidy project from the province of West Flanders. Stavaza:
      - 50 scans - 20 quotation phase - 7 works have been delivered
      - Most common works: WP - PV - roofing - HR glass
    - The neighbourhood was put in the picture during various events: open networking moment (8/06/22), climate day VVSG (13/10/22)
    - Inclusion of the citizen's budget for adaptive and/or mitigation measures.
- **City district ZeeBrugge:**
  - Energy evening (12/12/22)
  - Brainstorming evening (Jan 23)
  - From 2023:
    - teaching in the schools
    - energy parties and bicycle safaris (one of each at least). An energy party is workable when there are about 15 attendees.
    - collaboration with a colleague that works specifically for ZeeBruges (neighbourhood improvement contract). A neighbourhood improvement contract is a project where a colleague is specifically working in Zeebrugge, a part of Bruges close to the seaport, with a lot of low incomes. In the next four years, there is €80,000 available to work on renovation and sustainable heating.
- **City district City Center of Bruges (NW, Vlamingdam-Sint-Clarastraat-Komvest) - 2022**
  - Various meetings at the request of the neighbourhood committee 't Zilletje.
  - Specific name: 'fossil free neighbourhood' - Buurtkracht (power of the neighbourhood).
  - The citizens of this neighbourhood went to the city with their desire to become more sustainable (mobility, heating, adaptation).
  - Reason: infill district, built in 2006, gas boilers need to be replaced.
  - At least five meetings with the ambassadors of the neighbourhood and several city departments to see how the city budget can be used.
  - Additional study: fossil-free neighbourhood: a step-by-step plan for the neighbourhood on its way to a fossil-free neighbourhood (to be finalised at the end of 2022).

- 5 December 2022: Workshop with citizens of the neighbourhood, city departments and the consultancy (20 people in total)

- **City district Christus Koning**
  - 2020: Neighbourhood Power webinar during the COVID-19 pandemic about neighbourhood renovations. Webinar about the actions the city of Bruges wants to take in the neighbourhood, together with the citizen committee. During the webinar, there was a presentation of the city of Bruges about the barriers to energetical renovations, how the City of Bruges can help and how neighbourhood renovations can be installed.
  - 2022:
    - Plans for a heating network in the area, in synergy with road works.
    - A number of residents of the street Karel de Stoutelaan/ Keizer Karelstraat sent out emails on their own initiative and to convince the other residents to connect to the heat network. Already 60 interested families to connect to a heat network
    - Together with the municipality, local residents are looking at how to help facilitate the development of the heating network, including connecting private homes.
      - The City of Bruges contacted the large heat demanders and developers (which will realise new developments in the neighbourhood) and have got several declarations of intention to connect them to a future heating network (swimming pool, large apartments, large public buildings).
      - Connections with the residents of the streets where district heating probably will be installed.
      - Facilitating IVBO with the number of heat demands, power of the furnace rooms, and connections with large heat demands.

3.2. MECHELEN – COLLECTIVE ACTION FOR FOSSIL-FREE HEATING

3.2.1 Activity description and partners involved

In 2011, CO_2-emissions from residential heating in Mechelen were 125 kTon/year (20,6 % of all local CO_2-emissions). The co-creation pilot aims at phasing out fossil heating technologies. The city's home renovation services already support residents to reduce their energy use. The co-creation pilot targeted the next steps by organising collective actions, in line with community needs, like group purchases on a city scale, neighbourhood actions or investments via an energy cooperative. Phase-out of fossil heating will be stimulated by replacing gas boilers and promoting optimised control settings of gas appliances. Renewable heating solutions will be promoted such as heat pumps. The co-creation pilot allowed the local community to anticipate rolling developments like the conversion from lean to rich gas between 2018 and 2029 (www.gaschanges.be) and the Flemish Energy plan 2021-2030.

3.2.2 Expected project output

CO_2 reduction 103 tons/year, achieved by:
- 25 households investing in sustainable heating installations;
- 225 households reduce their energy use & CO_2 emission from heating by taking measures to optimise their existing installations & reduce their heat consumption.

3.2.3 Action plan summary

The City of Mechelen has its own Energy Home, provided by Team Klimaat and AGB Energy Punt Mechelen. It guides citizens of Mechelen from the first to the last step in their customer journey towards a comfortable and energy-efficient home. The objective of the SHIFFT co-creation pilots of the city of Mechelen is to strengthen the integrated home renovation service of its Energy Home by targeting the theme 'fossil-free heating'. Figure 3.3 presents an overview of the initiatives aimed for single-family homes.

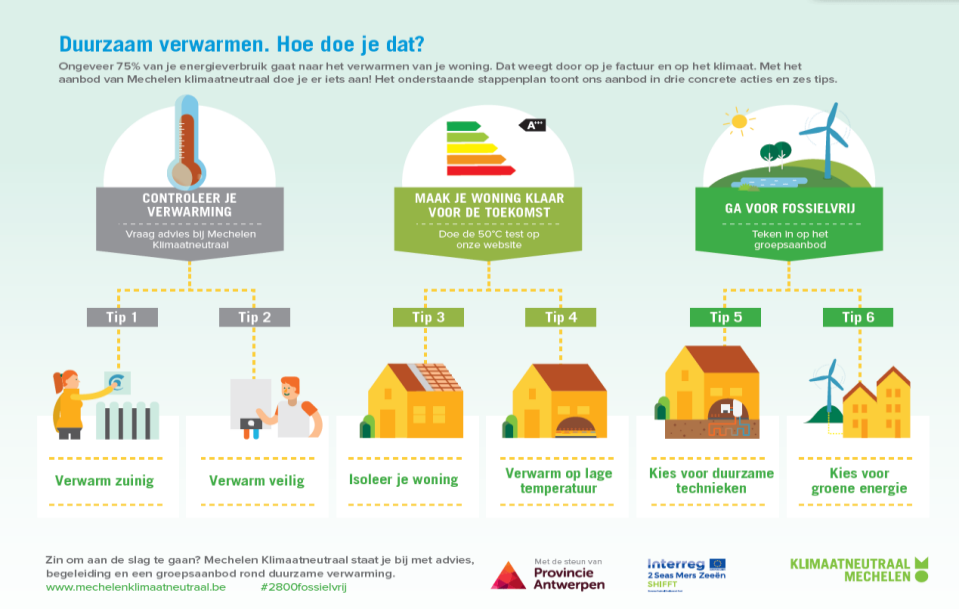

Figure 3.3: Infographic 'Sustainable heating for dummies' (https://klimaatneutraal.mechelen.be/duurzaam-verwarmen-hoe-doe-je-dat) © Atelier per Twee.

- Group offer "To check boiler" (2022 - 2025): intercommunal IGEMO, Stad Mechelen and SAAMO Provincie Antwerpen will set up a group offer Check your boiler in combination with a grant for social target groups for the maintenance of boilers. (https://www.energiesparen.be/projectoproep-premie-onderhoud-verwarming-sociale-doelgroepen). This group offer will be rolled out in 10 cities and municipalities in the Rivierenland region of the Province of Antwerp (incl. Mechelen) together with local partners and OCMWs.
- "Do the 50 degrees test" (2021 - 2023): a campaign with 140 participants with a web tool developed by Milieu Centraal.
- Group offers Heat Pumps (2021 - 2023): call with a selection of local and skilled installers of heat pumps. Four installers were retained after a selection procedure. A second call to installers is in preparation. Intercommunal IOK has contacted Stad Mechelen to roll out a similar initiative in their area.

Furthermore, the City of Mechelen will conduct local communication campaign on sustainable heating for Mechelen residents, including the following communication activities:

- An online web tool "Do the 50 degrees test" (in collaboration with Milieu Centraal).
- Launch of a call for apartment buildings to apply for energy renovation.
- Winter campaign Fossil-Free Heating (October 2022 - February 2023).

Finally, as the services of the Energy Home used to target single-family homes, an offer and service for syndics and condominium associations for the energy renovation of apartment buildings will be initiated.

- In the framework of Climate District 'Mechelse Vesten', two apartment buildings were selected (of 85 and 25 residential units respectively) for which a master plan for energy renovation will be co-developed supported by engineering and consultancy companies 'Bureau Bouwtechniek' and 'Levuur'. This will include co-creative workshops with members of the condominium association.

3.2.4 Description of the implementation process in the 2020-2022 period

In 2019, an information session for citizens of Mechelen with DSO Fluvius and Dialoog vzw was conducted. Unfortunately, In 2020, no activities were conducted because of the COVID-19 pandemic.

In 2021, Multiple activities were organised. The lecture series 'Warmte Winteravonden' were launched. On 3/2/2021 an event was dedicated to Fossil-free Heating and was co-organised with the city of Mechelen, Natuurpunt vzw and Klimaan vzw. 101 people registered and 60 actually participated in the webinar. All recordings and presentations are available at https://klimaatneutraal.mechelen.be/inspiratiesessie-groen-verwarmen. Klimaan vzw published a blog at their website https://klimaan.be/blog/2021/02/12/warmtepompen-of-verzuipen/

Online newsletter sent in February 2021 to members of the Energie group '#2800meetsamen' on the theme of sustainable heating with a contribution from Guido Crauwels, one of the 'heating coaches' of the Province of Antwerp.

Collected stories of experiential citizens with fossil-free heating systems in their homes:
https://klimaatneutraal.mechelen.be/duurzame-verwarming-in-dobbelhuizen

- Johan and Anita: heat pump with aqua thermal energy from river Dyle in a renovated rowhouse;
- Michel eand Marlies: Ground-source heat pump in a rowhouse that was first demolished then newly built;
- Sarah: fuel cell in a renovated row home;
- Frederik: Ground-source heat pump in a renovated row home;
- Luc and Tony: Air-source heat pump in a renovated row home;
- Co-housing Sint-Gummarus: Collective ground-source heat pump in a cohousing project.

The website was updated in the August – September 2021 period. The updated web pages are structured in the same way as the infographic. Apart from this, two online sessions with DSO Fluvius and Dialoog vzw were organised:

- 'Energiezuinig verwarmen' 14 october 2021;
- 'Warmtepompen' on 21 October 2021.

Additionally, an information market was organised by Energiepunt Mechelen on Mon 15 Nov 2022 at the Predikheren (i.e., the city library) with an info booth and info sessions.

In February 2022, a campaign was started to offer heat pumps. Brochure with more information about group offer and 50 degrees test. Autumn 2022. An information booth of Mechelen Climate Neutral was organised and info sessions with Dialogue vzw on fossil-free heating at the construction trade Fair Wonen 2022 in the Nekkerhal on 29 – 31 January & 4 – 6 February 2022 (https://www.wonen.eu/).

Three workshops on heat planning and heat policy for municipalities and cities in the province of Antwerp at the initiative of the City of Mechelen in collaboration with. VVSG and Province of Antwerp on Monday September 26, 2022, Thursday October 27, 2022, and December 1, 2022.

3.3 MIDDELBURG – DAUWENDAELE & DE GRIFFIOEN GAS-FREE

3.3.1 Activity description and partners involved

The Dauwendaele neighbourhood pilot area includes 550 houses, built in the 1966-1970 period. It is a mix of social and private ground-level terraced housing. 2/3 rental and 1/3 private properties. De Griffioen ~530 residential households, built ~1970, are terraced houses. 50 houses built in 1920 (post-WWI area). 90 % of the houses are ground level. ¼ are rental and 2/3 are private properties. The challenge is to disconnect homes from the gas grid. In co-creation with stakeholders (citizens, entrepreneurs, corporations and the grid operator) we want to develop an approach for this transition that can be up-scaled up to the whole city. We jointly explore the scope and opportunities for both individual solutions and collective grids. Looking for co-benefits – additional drivers and motivations of local actors – is an integral part of the process. We will co-create an approach for the roll-out of sustainable heating and provide support facilities like a collective financial deal with installers and contractors to supply in the districts.

3.3.2 Expected project output

Expected result of the pilot in Middelburg: 165 households invest in one or more measures, resulting in a CO_2 reduction of 234 tons CO_2 emissions/year.

3.3.3 Action plan summary

The aim of the co-creation pilots in Middelburg is to trigger investments in sustainable heating solutions for homes and buildings in the local communities and roll out the transfer activities to the other cities in the Zeeland province.

In Dauwendaele the project contains a study to realise a district heating system with the rest heating from a nearby factory. It concerns 900 households. It is a complex process to reach a consensus with all involved stakeholders about the sustainable heating of homes and buildings. In the meantime, houses need to be prepared, to reduce their energy needs (making them 'gas-free-ready').

Dauwendaele neighbourhood:

The creation of a consortium and agreement on the (financial) structure of the heat network was a very long and complex process. Some of the partners involved did not want to communicate about the plans before certain steps were taken and the chances of it going through are high enough. This stage was reached in early 2022 when the first communication activities were executed. For communication and participation on the heat network, an external team is hired. Actions so far:

- April 2022: A letter sent to all households in the plan area (900);
- September 2022: Flyer sent to all households in the plan area;
- Regular meetings with the neighbourhood team to update on the plans and to co-create the co-creation strategy with the residents;
- November 2022: A heat market, organised to provide information on the heat network and on energy saving measures in general, for the entire neighbourhood.

Griffioen neighbourhood and the larger part of the municipality

The goal is to inform and stimulate homeowners and other target groups to undertake action towards improving their homes and making them natural-gas-free (ready). Over time, several initiatives will be developed or implemented and tested.

- Rittenburg apartments: Co-creation started with two apartment buildings in the area of Rittenburg that want to become gas-free (36 apartments);
- VVE subsidy and letter to 105 VVE's (condominium organisations in English): up to 5 VVE's can get financial support to start up the process to become gas-free;
- VVE information evenings will be organised in October 2022 and January 2023;
- Ongoing regional collaboration and cooperation with the other twelve municipalities in the province of Zeeland, results of the pilots are being shared.

3.3.4 Description of implementation process in the 2020-2022 period

2020: Due to the COVID-19, 2020 hardly any co-creation activities were implemented. Community activities, such as neighbourhood meetings were cancelled. The heat network in Dauwendaele was not yet at a stage where potential end-users could be involved. In December 2020 the development of a communication strategy based on household profiles was started. This was developed by 'Bureau Overmorgen' (an external consultant) and during the process several times discussed in focus group meetings with stakeholders (citizens, representatives of neighbourhoods and professional stakeholders). The result was a communication strategy (finalised in June 2021) on which we could base specific communication actions, as part of the further detailing of the local Heat Strategy.

2021: In June 2021 n online information session on the local heat strategy was organised. Before finalising the strategy, the Municipality of Middelburg gave the citizens and other relevant stakeholders the opportunity to get informed about the local Heat Strategy, raise questions and respond. There were 59 registrations, a mix of homeowners and other residents. During the event, there was an average of 40 participants. All 59 were informed afterwards by email with a link to the recording, presentation and Q&A session.

September 2021: Presentation at neighbourhood meeting 'Klarenbeek Veerse Poort'. A presentation was given to residents, on the heat strategy, to 25 participants (i.e., residents).

October 2021: Presentation at a neighbourhood meeting in 't Zand/Stromenwijk, Sint Laurens, Nieuw en Sint Joosland on the 'postcoderoos' projects in the municipality, a project that makes it possible to invest in solar panels on a large roof in the same or nearby postcode areas.

December 2021: Two publications of a special page on the heat transition with interviews with inhabitants and useful links and advice in the local door-to-door newspaper De Bode. A master student of Delft University of Technology finalised his graduation research project on the implementation of the heat transition in the Griffioen and Dauwendaele neighbourhoods, and addressed the role of the municipality and other stakeholders (2021).

2022: In January/February 2022 five more publications with interviews of residents in the door-to-door newspaper 'De Bode' were published. People were activated to get in touch with the municipality in case of questions.

March 3rd 2022: The city council gave green light to proceed with the development of the heat network in Dauwendaele. On the same day, 970 letters were sent to the residents of the plan area, to provide them with information on the status and expectations.

April 2022: approached by a co-creation initiative from a homeowners association in the Rittenburg district. Two apartment blocks, each of 18 units, want to investigate how to become natural gas-free. Residents reached out to the municipality for support, both financially and in terms of process support (communication). An

information evening for the residents was organised on May 25th, during which a presentation was given on the heat strategy, co-creation and the impact on apartment buildings.

June 2022: A group of four minor students finalised a concrete plan and approach for the neighbourhood Griffioen, also looking at technical innovations (available in the near future) that might be interesting to implement. The students wrote an elaborate plan and also used a Facebook survey to get input from the residents.

September 2022: A neighbourhood approach was set up with 'Buurkracht' in the Griffioen neighbourhood, and later also in Klarenbeek, which has to lead to collective actions in the neighbourhood. The first meetings with potential team members were held in September. Delivery of 12,000 letters for the collective purchasing action of "Winst uit je woning". The letters were sent by the municipality and signed by the Alderman. The letter contains an offer for several measures, depending on the building period. Floor- and wall insulation, solar panels and hybrid heat pumps. People could subscribe and get an offer for one or more of these measures. They were given time to subscribe before the 1st of December. "Winst uit je woning" provides a dashboard that shows the response rate for each of the measures. On October 11th, an online information evening was organised to inform people further about the details of the action and to provide the opportunity to ask questions. This evening was attended by over 200 residents.

October 2022: Inspired by the co-creation activity in Rittenburg, and their request for support, the Municipality of Middelburg developed and allocated a budget to a small subsidy scheme for other apartment buildings users (five in total) that want to investigate how to become gas-free. The municipality contributed a maximum of €1500 euros to each initiative, where it pays a maximum of up to 50% of the costs of, for example, external advisors or organising meetings with the residents. Civil servants of the municipality interviewed the spokesman of the Rittenburg initiative, and sent this to 100 homeowners associations across the municipality, with the message that the municipality could support their plans to become gas-free (ready) and to inspire them with the example of the Rittenburg district.

3.4. FOURMIES – LOCAL WOOD FOR HEATING

3.4.1 Activity description and partners involved

This pilot focuses on persuading residents to use wood for CO_2-neutral heating, instead of gas. In the co-creation pilot, the Fourmies team reached residents of Fourmies centre and users of community buildings covered in the investment pilot. The process looked into opportunities, perceptions and barriers to wood use. In co-creation workshops, the Fourmies team worked with community members and also involved the local wood sector. Broadly accepted solutions for existing barriers were created, such as shared wood storage facilities, subsidies to modernise wood boilers, a secure supply of local wood, and improving wood pricing.

3.4.2 Expected project output

Result of the co-creation pilot in Fourmies:

- 50 families will invest in wood-based heating of their home to replace a fossil-fuelled installation, resulting in a CO_2 reduction of 244 tons/year.

3.4.3 Action plan summary

In Fourmies, three actors helped inhabitants at various levels will help to reduce their energy consumption:

- “France Rénov '' also called “Guichet Unique de l’Habitat. This actor, managed by the Communauté de commune Sud Avesnois of which Fourmies is the centre city, will replace the “GUICHET UNIQUE ENERGETIQUE” which was previously managed by the city of Fourmies. The services are bundled in a one-stop shop.
- “CITEMETRIE'', works for the city of Fourmies in order to deliver a specific subsidy coming from a public program named “OPAH RU” (Programmed Housing Improvement Operation dedicated to the poorest streets), to inhabitants situated in “priority neighbourhoods “. Its mission is to distribute subsidies.
- SOLIHA’s mission aims at advising residents with a very low income, on insulation methods, and also delivering subsidies. Each grant is subject to a thermal diagnosis. This partner has delivered subsidies in order to refurbish 19 inhabitants' homes, with a result of an average of 40% energy saving and five gas boilers to wood heat technology systems.

In order to promote these services, the city will publish a booklet describing a guide to explain the above services. It is available at the town hall. The city will also promote this service in its September 2022 city magazine.

Fourmies will organise an event bringing together all local actors specialised in the distribution of subsidies related to energy renovation, advice on how to reduce energy consumption, and manufacture of objects aimed at saving money (e.g., door stops).

3.4.4 Description of implementation process 2020-2022

The City of Fourmies has activated various levers in order to involve the inhabitants in the energy transition and to make them understand the issues at stake. These actions are of different kinds:

The energy press conference for young people: This event is addressed to young secondary school students. In this serious game, the students play the role of journalists and interview the inhabitants of the future in order to understand how the city has become self-sufficient in renewable heat. At the end of the conference, the students write press articles that are published in the local newspaper and distributed free of charge to every household. In 2019, 300 teenagers participated in the conference, and 6,100 newspapers were delivered to each local Fourmies household. In 2021, 100 teenagers participated online (COVID-19), writing newspapers which were distributed in 6,100 households.

Heat network co-construction: Heat network feasibility study. During the feasibility study, the city has consulted a landlord named PARTENORD, whose building is based on the network in order to propose its connection. The city has worked with him to convince PARTENORD of the value of heat networks, to investigate its energy use (357,829 kWh/year) for a maximum useful power of 177 kW and its needs. PARTENORD expressed an interest in being connected, but the de minimis rules of Interreg did not allow the project to go ahead.

Heat network webinar: Before launching the public tenders for the construction of the boiler room, Fourmies has facilitated a webinar, on February 16, 2021. The purpose was to explain the amenities of the SHIFFT co-creation pilot and during the COVID-19 pandemic, ask residents to choose the appearance of a boiler room. 97 Inhabitants participated in this event.

Public meeting (6/01/2021): In order to explain residents about the impact of the project, its design and the planning of the works, the city organised a public meeting which brought together 50 inhabitants.

Communication during the works: In order to avoid any rejection of the project during the works (i.e., roads blocked because of the trenches made in the streets to pass the network), the city communicated with the inhabitants. Flyers were distributed on each of the roads impacted by the works Big large display panels on the safety barriers.

Inauguration of the project (7/12/22): A study trip in order to raise questions about the understanding of the amenities of the biomass project. This study trip aimed at discovering the service provided by hedges, the impact of the heat network project on the maintenance of hedges, the environment, and the creation of agricultural activity. It also served to encourage residents to connect to this type of heating network and maintain their hedges. With the participation of Interreg, the French Energy Agency, the French State visited the boiler room in presence of the press, and communication in order to promote and support the project.

Study with the forestry company to find out the overview of firewood resources: The City requested the expertise of the "Société Forestière'' (Forest Society in English) in order to evaluate the potential and the price of the wood needed for the heating plant nearby Fourmies. This study gave a comprehensive and accurate overview of wood energy fuel.

Cooperation with a local farmers association specialised in hedgerow management and the supply of wood chips for fuel: The Avesnois region, in which Fourmies is located, has about 15,000 km of hedgerows, which forms the green oil of the Avesnois. In order to ensure the sustainability of the hedges and the storage of carbon, they must be maintained. All the more so as these hedges store carbon, protect animals in the event of a heatwave and shelter wildlife. Therefore, they have an important ecological and territorial resilience interest. Unfortunately, more and more hedges are destroyed because they are considered not "profitable" for farmers, and are not compatible with the large size of farm machinery. Moreover, when they are maintained, in order not to occupy too much space, they are in bad shape and too regularly cut, which leads the trees to die. To show and share the experience three farmers were invited to give a presentation (wishing to diversify their activity) together with inhabitants and project leaders inspired by two cities (i.e., Willies and Trélon).

Sharing information with a wood and pellet stove supplier: The local wood heat systems installer BRISACH shared its sales statistics in order to help the city to plot the information about the wood boiler technology supply. She has sold 42 wood boilers in Fourmies.

3.5. HEATING TRANSITION FOR SOCIAL HOUSING IN HAUTS DE FRANCE

3.5.1 Activity description and partners involved

This co-creation pilot concentrates on working with social landlords in the Region Hauts de France to encourage them to invest in sustainable heating. This region has more than 60 social landlords which represent more than 500,000 households, 200,000 individuals and 300,000 collectives.

The main issues tackled in the co-creation process are to:

- Convince social landlords to make this transition toward sustainable heating;
- Get the tenants on board, as end-users of the sustainable heating and clients of the social landlords;
- Identify needs and design adequate support related to technical aspects for a large-scale deployment of sustainable heating, like solar energy for hot water, and to reduce costs;
- Bring expertise and networking in each step of the implementation process (e.g., manufacturing, conception, installation, maintenance). The City of Fourmies will work with social landlords selected from our existing network.

3.5.2 Expected project output

As expected result of this co-creation pilot, 8 landlords will invest in sustainable heating of 2,500 households resulting in a CO_2 reduction of 1,832 tons/year.

3.5.3 Action plan summary

Goal: Co-creative action focuses mainly on reducing energy poverty in social housing, social housing organisations - SHOs - will invest in renewable hot water systems, which will be free energy for the tenants (except for operating costs). In the Hauts –de-France Region this will be done by encouraging the social housing organisations to invest in sustainable heating and particularly in solar energy for hot water systems.

Engagement of stakeholders: CD2E is driving the "CORESOL" (Collectif Regional de l'énergie solaire), a local initiative to develop solar energy (thermal and PV) in the Hauts-de-France region. The main goal of CORESOL is co-creation. CORESOL mainly involves stakeholders from the supply side, nevertheless CD2E organises workshops with SHO to present the model. There is not a specific targeted citizen group in this co creation except that tenants of SHOs are mainly people with low income. Co-creative action would include deliberative workshops, living labs and collective data analysis.

3.5.4 Description of implementation process 2020-2022

Several efforts were made by CD2E to get SHOs involved to make plans and adopt solar thermal systems. But in the end only two SHOs were persuaded to do so. To compensate for this, CD2E reached out to other actors like municipalities in the Hauts-de-France (HdF) region, a camping site, a hospital and gasoline stations to have solar thermal systems installed. CD2E was successful in doing so. No effective co-creation workshops were implemented with SHO tenants nor with any other stakeholders.

3.6. COMMUNITY ENERGY LAB TO TACKLE ENERGY POVERTY IN NORWICH

3.6.1 Activity description and partners involved

Linked to the investment site in Norwich, the Places for People Group (PfP) set up a Community Energy Lab for co-designing solutions to mitigate energy poverty (i.e., a lack of access to energy and heating services that negatively affects well-being) in the local community. The lab will be organised in five steps based on the concept of co-design. PfP provides space for inclusive participatory work that involves multiple stakeholders working together to design, test and evaluate the place and community-based solutions to mitigate energy poverty - at least twenty households as well as tenants' associations, citizens, energy suppliers, landlords, social workers and local decision-makers. Engineers, architects, energy efficiency and building experts will be involved in the core co-design activities. Outcomes of the lab will be shared on an ongoing basis with over 3,000 local tenants to incentivise them to make changes in their energy behaviour.

3.6.2 Expected project output

Expected result of the co-creation pilot in Norwich: important CO_2 emission reductions per year (estimated at 733-ton p.a.) by:

- 250 dwellings that will consider investing in sustainable heating technology (either landlords or individual tenants/homeowners);
- Providing support to 750 households, enabling them to reduce their energy use for heating.

3.6.3 Action plan summary

As a SHO, Places for People (PfP), is continuously in contact with its clients. A category of tenants is observed that is very involved and proactive, however, the majority of tenants are not really engaged, and it is difficult to get them more actively involved. The SHIFFT project offered an opportunity to test ways to change the interaction between a landlord and its tenants.

In setting up the action plan PfP already anticipated that it would need different moments where PfP could contact a client/stakeholder group. For the co-creation actions and activities, PfP appointed a specific group of tenants as 'ambassadors' who expressed their interest to be actively involved in discussing strategic and operational matters of the local housing association.

As customers become more informed, connected and active, with the ability, means and motivation to take control of their interactions with our company, PfP is trying to escape traditional approaches of delivering products and services based on a firm-centric value creation process and move toward co-creating unique experiences at critical points of interaction with customers. The main change PfP expects in this process is for tenant representatives to co-decide on the project decisions that are being made. In the case of the Norwich pilot site, PfP offered tenant ambassadors to have their say on different potential options as a solution to the heating problems of this specific project and offered tenant representatives the opportunity to add ideas to the drafted plan.

Innovative was the fact that PfP did not limit involvement to tenants but that PfP focused on multidisciplinary collaboration. That is why PfP organised meetings with a variety of stakeholders: tenants, energy suppliers, energy consultants, contractors, management organisations and the city council.

Because PfP is at the start of an important innovative transformation of housing stock, from energetically inefficient to highly efficient, PfP adopted the idea that it can and should use external ideas as well as internal ideas, and internal and external paths to market, as the company looks to advance used technology and competitiveness.

3.6.4 Description of implementation process 2020-2022

A number of actions were planned in the co-creation plan and in this section, PfP will talk more about the implementation. Unfortunately, during implementation, we had to face the COVID-19 crisis. This limited the way that PfP could interact with the stakeholders and especially physical meetings were mainly changed into online events. What also changed with COVID-19 was the planning of the pilot site renovation. Because of supply chain issues that were the consequence of the COVID-19 crisis, the project got delayed. Because some of the agreed actions were aligned with construction activities, we had to change the co-creation programme and even had to skip a few elements.

Timeline of the implementation plan

1. **Prepare first Co-creation meeting -** *1 June 2019 – 19 September 2019*
   Preparation of the first co-creation meeting took place in line with the planning. Local tenant representatives were found, responsible people from our organisation were involved and Norwich

city council was informed and engaged. A co-creation day was prepared and was planned for the 19th of September 2019.

2. **First co-creation meeting** - *19 September 2019*
   As planned the first co-creation meeting took place in Norwich on the 19th of September 2019. On the agenda (attached Annex I) were an introduction to the host organisation, an introduction to the SHIFFT project and its relation with the EC, a presentation from the City Council of Norwich, a co-creation session and a project team site visit.
3. **Follow up on 1st Co-creation meeting** - *1 November 2019*
   During the meeting on the 19th of September 2019 notes were taken and actions divided. All follow-up actions were executed before the 1st of November. Presentations of the co-creation meeting were shared and contact was established with the management organisation which is the contact point for the vulnerable group of residents that is being housed on the estate.
4. **Face-to-face meetings, and in-depth interviews** - *1 October 2019-26 June 2020*
   PfP organised informal meetings between the site management (Leeway) and customers/tenants. Because of the specific concerns in respect of the vulnerability of the client group these meetings were not recorded. PfP got a good insight into what the problems at the estate were. The malfunctioning of the heating system was mentioned, but we also got an idea about related issues like difficult control over thermostats, etc. PfP further gained some ideas of how we could make tenants benefit from the project (creation of some extra space in one of the boiler rooms).
5. **Second co-creation meeting -** *26 June 2020*
   PfP had a second co-creation meeting. Since at this stage COVID-19 had kicked in and disturbed our lives, we had an online meeting. Compared to the first meeting we had a more complete group of stakeholders involving energy consultants.
6. **Follow up on second co-creation meeting** - *31 July 2020*
   All follow-up actions including minutes and bilateral meetings were completed by the end of July 2020.
7. **Third co-creation meeting**
   A third co-creation meeting was planned to be held towards the end of the physical project. It was intended to record information about the working process, whether the expectations had been met and to see if disturbance on site had been limited and prevented the vulnerable group of tenants to be interrupted in their daily routine. As a result of COVID-19, the project was delayed and was planned to be completed by the end of November 2022. A third co-creation meeting was anticipated before the end of the SHIFFT project in March 2023.
8. **Follow up on 3rd Co-creation meeting** - *1 month after 3rd Co-cr. Meeting*
   Obviously, PfP could not execute follow-up actions on the third co-creation meeting before the meeting was over. PfP expected that follow-up actions on a third co-creation meeting could be implemented within the time frame of the SHIFFT project.
9. **Final report (FR)** - *End 2022*
   A final report on the co-creation plan was drafted. This report was planned to be finalised by the end of 2021 it was, because of earlier mentioned causes, delayed to the end of 2022.
10. **Summary FR shared with other tenants -** *February 2023*
    PfP planned to share experiences in the Norwich project with other tenants. PfP would either do this through an article on the website or through a direct mailing campaign. This action was eventually delayed to the end of the SHIFFT project.

11. **Presentation FR to tenants/stakeholders -** *End 2022*
    In December 2022 an event (i.e., a tenant engagement day) was to be planned to inform local tenants from the Norwich area about the results of the project. The event will have a more general character where we can give tailor-made advice on how to save energy, how to fund energy-saving measures, etc. The event will be co-hosted by Norwich City Council. In the Norwich area, PfP would invite all local tenants (about 1,000 households).
12. **Fourth co-creation meeting**
    A fourth co-creation meeting was foreseen a year after ending the work of the project. This will now fall out of the timeframe of the project. Nevertheless, PfP will initiate such a fourth contact moment for its stakeholders (including themselves) benefit.
13. **Follow up on the fourth co-creation meeting** - *1 month after the 4th Co-cr. Meeting*
    Like the fourth co-creation meeting itself, follow-up actions will fall outside of the timeframe of this project. The plan will, however, be implemented as described in the co-creation plan.

Tenant energy engagement day

An important part of the work in SHIFFT is focused on collaboration with clients and the general public. Studies have proven that human behaviour can significantly contribute to fight carbon emissions. PfP organised on the February 21st, 2023 a Tenant Engagement Day to inform regional clients about the way they could support the transition towards a low carbon future. The format of the day was a walk-in venue where support was delivered on a number of aspects of the transition. Over 1,000 tenants were invited by direct mail and the event was also open for members of the general public.

PfP rented the Chapel Break Village Hall in Norwich. Over 1,000 tenants had got a direct email from PfP to come and attend the event. The venue was opened the full afternoon from 12.00-18.00 PM. The event was organised in a way to let have people access to different elements of the energy transformation. There were a number of boots, that all had specialists giving specific information to the audience. Apart from PfP specialists we also had specialists from the local gas supplier (Gasway that manned a separate boot) and involvement from Norwich City Council (although they did not have capacity to man a booth). From PfP the following booths were supplied: a Heat and Energy Advice Team, an Environment and Sustainability Team, a Customer Engagement Team, an Innovation and Universal Projects Teams, and a Money Advice Team.

The results of the tenant energy engagement day were a strong sense of involvement of the people that visited the event. From the 1,000 tenants that were approached we could track that 400 people had opened the email. Eventually, we had 66 visitors (where we had hoped for a 100 visitors). These 66 people do not include children that visited the venue with their parents. The PfP specialists engaged in conversations with visitors, and we did identify topics that were most of interest to visitors: repair requests, Information on how to save money on energy use, and information on how to save energy. PfP took note of 23 matters that would require a follow-up action from the organisation. These actions range from additional information, sending repairs teams and studying the possibility of installing energy saving elements. PfP was convinced that with the organisation of the Tenant Engagement Day has positively contributed to raising awareness amongst its tenants. The PfP SHIFFT team was positively surprised and encouraged by the active engagement that visitors of the event showed. Multiple stories were told about how people have started to make a change. People visiting the event mentioned to be aware of the leaflets that were sent out by PfP in 2022t. A quick enquiry (although it was not possible to enquire every visitor to the event) learnt that around 90% (21/23) had taken note and studied the leaflets.

Chapter 4: Results and evaluation

In this chapter the results of the evaluative analysis are presented. This is done for five performance indicators: CO_2 emission reduction impact, households engaged, behavioural change, investments made, and network formation. In addition, attention is paid to reflection on the implementation process of co-creation within the six co-creation pilots. Over 60 activities were deployed, resulting in about a hundred sub activities with a measurable impact.

4.1 Impact on households involved

The first impact indicator is "households involved". Within the model (described in chapter 2), this was defined as "households engaged", which is the result of the measurable indicator of "household interactions" multiplied by an engagement factor. Table 4.1 shows a breakdown of household interactions by engagement type:

Table 4.1: Breakdown of household interactions by type of engagement

L%*	average	H%**	Type of engagement
365,698	**366,633**	367,567	broadcast / publication / newsletter
2,726	**2,968**	3,210	large event
261	**261**	261	meeting
939	**1,050**	1,161	face to face
5	**28**	50	phone call
970	**1,075**	1,180	correspondence
1,320	**1,322**	1,324	financial / economic incentive
246	**246**	246	built
372,165	**373,582**	374,999	

For both of these variables a low-end and high-end value were present. However, for most activities the number of interactions was known in detail, therefore the "household interactions" variable does not significantly impact the confidence interval. As a result, the difference between the low-end and high-end values for this indicator is, although still significant, far less wide than with the CO_2 impact indicator (which has two variables that affect this).Table 4.2 shows the number of households engaged.

Two pilots were unable to meet their targets, and four did from very well. The differences in ranking of the pilots between "households involved" and "CO_2 emissions reduced" results from having different types of engagement, where some pilots chose to engage in fewer, but more interactive activities. These translate into both more interest from the household and more tailored advice for them from the co-creation activity. The downside is that more interactive engagements also require more resources per household from the pilot, which would severely limit the number of interactions. Therefore, the broadcast category (which involves newspaper ads, leaflets, televised interviews, et cetera) far outnumbers others (see Table 4.2). Although the

engagement factor is by far the lowest, the sheer numbers involved still have a significant positive impact on both of the project goals.

Table 4.2: Households engaged

Pilot	households involved (target)	household interactions			households engaged			% of target		
		low-end	average	high-end	low-end	average	high-end	L%*	average	H%**
Bruges	**580**	249,741	**250,106**	250,471	1,385	**3,423**	5,462	239%	**590%**	942%
Mechelen	**250**	21,379	**21,555**	21,730	147	**439**	732	59%	**176%**	293%
Middelburg	**165**	70,310	**70,415**	70,520	481	**1,076**	1,671	291%	**652%**	1013%
Fourmies	**50**	31,299	**32,071**	32,842	891	**1,528**	2,164	1782%	**3055%**	4328%
HdF	**2,500**	352	**352**	352	69	**96**	123	3%	**4%**	5%
Norwich	**1,000**	1,801	**1,801**	1,801	68	**207**	346	7%	**21%**	35%
	4,545	374,882	**376,299**	377,716	3,040	**6,769**	10,498	67%	**149%**	231%

4.2 CO_2 emission reduction impact

The second impact indicator for co-creation activities is reduction of CO_2 emissions. Table 4.3 shows the goals and output, both per city and combined for the project. As discussed in Section 2.4 on the indicators and impact model, a large margin of uncertainty remains. Furthermore, the measurable indicators are at the information gathering stage for the stakeholders involved, and the large number of household interactions (well over 300,000) makes a feedback mechanism difficult (although this did happen in a small number of cases). Furthermore, compared to "households involved" this indicator relies on four variables rather than three, of which two (impact factor and engagement factor) have significant ranges that have to be multiplied in order to preserve the confidence interval. The low-end and high-end values however are the extremes, and the actual impact is likely to be in between these. Therefore, after consultation with the Interreg 2 Seas Joint Secretariat, the average value has been used as a representation of this.

Also influencing results are the nature of some of the pilots: in the case of Hauts-de-France, interaction was only indirectly with landlords, which precluded broadcast activities deployed by other pilots. For Norwich the interaction was with tenants only, which, as they are unable to replace their own heating systems or engage in renovation activities, reduces the impact factor to that of the lowest category of energy savings advice. Norwich's final 'tenant engagement event' was postponed due to an industrial action of the rail networks, so estimates have been included.

Table 4.3: CO_2 emission reduction impact of co-creation activities

Pilot		expected	Achieved				% of target		
		tons CO_2	low-end	average	high-end		L%*	average	H%**
BE	**Bruges**	276	616	**4,437**	8,258		223%	**1608%**	2992%
BE	**Mechelen**	103	26	**327**	627		25%	**317%**	609%
NL	**Middelburg**	234	198	**1,364**	2,531		85%	**583%**	1081%
FR	**Fourmies**	244	223	**1,195**	2,168		91%	**490%**	888%
FR	**Hauts-de-France**	1,832	40	**128**	217		2%	**7%**	12%
UK	**Norwich**	733	15	**225**	436		2%	**31%**	59%
	TOTAL	**3,422**	1,118	**7,677**	14,236	tCO_2e/a	33%	**224%**	416%

Although these two pilots are not likely to have met their targets, most pilots did quite well, some spectacularly so. Co-creation activities of WP2 as a whole have therefore reached (and even exceeded) their intended objectives of 3,422 tons CO_2 e per Annum reduction and 4,545 households engaged.

4.3 Impact on behavioural change

Behavioural change was researched in two ways. First, a survey among residents of a SHO owned refugee home was conducted. Second, focus group meetings were organised, transcriptions were made and sent for analysis to the WP2 expert team. Items addressed in the survey and focus group meeting included: current use of heat at home, awareness of sustainable heating options, motivation for sustainable heating, factors influencing potential adoption of sustainable heat options, and energy saving tips. Data were collected from focus groups sessions organised in four pilots (i.e., Fourmies, Bruges, Middelburg, and Mechelen) and a survey in one pilot (i.e., Norwich).

Results from the focus group sessions show participants indicating importance to energy saving behaviours and switching to sustainable home options, especially since the gas prices increased rapidly. This has also influenced the "larger environment" with media and policy increasingly paying more attention to energy savings and sustainable heat options. Participants also report a sharp increase in financial support schemes (e.g., 'Winst uit je woning' Middelburg) and long waiting lists to purchase heat pumps and thermal insulation. Participants indicate that the main motivation is of financial nature, but pro-environmental attitudes are also mentioned. Whereas some participants indicate to have already adopted sustainable heat options, others are still in the process of considering to do so, whilst others indicate not to be able to do so because they just had their heating system changed. Others indicate having adopted a "wait and see" attitude, waiting till more beneficial supportive policy measures or economic incentives are implemented. Some of the participants indicate a need for improved communication with their municipality.

Results from the survey at the Norwich pilot (N = 14) indicate that 62% of the respondents are unable to heat their home to a comfortable level, 71% are aware of small steps to keep their home warm, 79% are aware of financial support available, 29% having changed energy supplier over the last six months, 71% are aware of the benefits of changing energy supplied, 100% of the respondents indicates attaching importance to reduce home

energy consumption, 93% of the respondents indicates to already actively take measures to reduce energy consumption at home, and 62% finds it likely to start using the energy savings tips presented in the leaflet distributed by PfP.

4.4 Impact on investments made

This section describes the qualitative impact of investment made by the co-creation partners. Evaluating the impact of investments is a challenging task. Each co-creation partner is unique with different performance indicators. Access to monetary information of individual customers is difficult , more particularly due to privacy concerns. To cope with limitations the WP2 expert team develop an investment calculation tool which was connected to the CO_2 impact tool, having information on interventions made and households reached per pilot., Below, first a qualitative description of investments for each co-creation pilot is presented. Second, results on estimated investments are presented following the analysis using the estimated investment calculation tool.

Bruges: The most prominent impact of investments in Bruges is represented by renovation scans. The amount of renovation scans has increased in 2022 (compared to 2019; See Table 4.4). The output of the renovation scan is a report with a personalised road map for every citizen on how they can make their dwelling more sustainable.

Table 4.4: Renovation scans performed in Bruges from 2019 to 2022

2019	2020	2021	2022 (until 10/12/22)
678	392	387	711

An unburdening process started in May. After almost 50 scans, already 15 families requested offers for different measures such as insulation or installation of roof, glass, wall, heat pump, solar boiler. The unburdening renovation process lasts for three years. In 2023 a new communication campaign will start in the streets with more vulnerable people. IVBO, an inter-municipal partnership, will invest €27 million for the renovation and extension of the heating network. In 2021 they exceeded the cap of 50 GWh of sustainable heat delivery. In 2021 new housing projects represented a heat demand of 1.7 GWh (Duivekeet - 22 dwellings and 60 apartment units, residential care facility Vliedberg and the apartment complex Zandweghe.

Middelburg: Most of the gains in Middelburg comes from home action (“Winst uit je woning”). For this, 45 contracts have been awarded, which together amount to € 98,452 in investments. The pilot host manager requested a new intermediate. In addition, people who have been made to think by the letter, but do not want to work with the installers associated with the promotion (e.g., because communication via profit from home did not go well), have therefore decided to invest in measures via a different route. Secondly, SHO Woongoed, which also works to make their homes more sustainable. Woongoed, as a partner in the heating network, is already working on making the homes in that area more sustainable. Finally, investments with the other communication campaigns are stimulated. For example, including pages with advice and inspiration in the door-to-door newspapers. However, measuring the actual impact of these impacts is quite challenging.

Fourmies: the pilot team has actively used the investments to reach out to 500 inhabitants (to connect them to the district heating network) and all the local social landlords. Resources have been utilised to engage with public actors such as the hospital, North department and Hauts-de-France Region (for their high schools and colleges), young students, and elected representatives who want to develop the same project. Energy supplier ENGIE usually is not used to working on such projects at small scale as they are working with larger sized cities.

Therefore, this is exceptional for Fourmies. The City of Fourmies has contracted the delivery of wood for next five years with local farmers.

Whereas, in **Norwich**, it is difficult to indicate how many tenants have taken actions after they were informed about the potential of energy saving investments. With tenants Places for People typically only observes limited investments, with tenants concentrating on behaviours like changing light bulbs, draught stripping, hanging curtains for windows, or installing shower timers. For larger investments tenants rely on their landlords. The installation of solar panels, wall insulation, roof insulation, heat pumps, etc are all investments that cannot be expected from tenants that in majority live on lower incomes. In respect of the interventions made in SHIFFT most concerned learning material. PfP participated in October 2022 in a well-attended webinar of the European Federation for Living and explained to other housing associations regarding the pros and cons of this technology. Work in the wider SHIFFT community in relation to heating strategies and heating policies led to a study visit from PfP (UK based) to Amsterdam in June 2022 to study district heating systems. In the investment plans of the organisation the tested technologies have been included in a catalogue of potential retrofit options.

Estimation of overall investments made

The WP2 experts developed a calculation tool to allow for making estimations on how many investments were made per SHIFFT co-creation pilot, and in total for all six co-creation pilots (See Table 4.5 for an overview). Average investments in co-creation pilots were estimated to be in the range of €196,538,293, with a low end investment estimation of €34,218,138 and a high investment estimation of €358,858,449. The Bruges pilot was estimated to champion the SHIFFT WP2 co-creation pilots with average estimated investments of €91,213,273.

Table 4.5: Estimated investments triggered by actions implemented in the SHIFFT WP2 co-creation pilots.

Pilot		WP2 budget	Investments triggered (€)		
			low-end	average	high-end
BE	**Bruges**	€419,288	€13,076,258	**€91,213,273**	€169,350,288
BE	**Mechelen**	€213,518	€284,684	**€5,538,380**	€10,792,076
NL	**Middelburg**	€218,049	€9,979,803	**€45,309,415**	€80,639,028
FR	**Fourmies**	€83,228	€8,749,716	**€45,390,929**	€82,032,141
FR	**Hauts de France**	€139,119	€2,055,000	**€4,726,500**	€7,398,000
UK	**Norwich**	€87,831	€72,677	**€4,359,796**	€8,646,916
	TOTAL	**€1,161,032**	€34,218,138	**€196,538,293**	€358,858,449

4.5 Impact on (social) network formation

This section reflects upon the social networks formed through the co-creation activities.

General: The SHIFFT co-creation pilots have contributed to social network formation in several ways. They initiated or contributed to networking events (all pilot hosts), they established new internal organisational collaboration between departments (e.g., in Mechelen and Bruges), helped in setting up local heat coalitions

(e.g., with local stakeholders showing - financial - intention to connect to district heating systems, or started a regional collaborative heat network (Middelburg). Other forms of involvement pertain to: participation in a task force heating policy (across different levels of government and with other stakeholders nation-wide; Bruges, Mechelen); collaboration with other municipalities/consortia to develop sustainable heat project bids; making efforts to obtain an outreach within larger national company of housing associations (Norwich); to connect to (new) national program roll-out/implementation addressing energy poverty (Fourmies); to start cooperation with multiple actors in regional biomass-fired heat supply chain, and to effectively contribute as a first mover (with a first pilot demonstration) to national niche innovation development of wood-fired local district heating systems in France (Fourmies).

Bruges: Co-creation activities in Bruges have captured all questions of the neighbourhood and investigated what the city could mean for them and how they can help them. Neighbourhoods and active citizen committees have raised questions about making their neighbourhood more sustainable, persuading other neighbours to take action and start with energetic renovations and connecting to the network of existing district heating. There is a group of retired people ('Buurttrekkers') who are persuading the citizen committees to do something in the neighbourhood about sustainability and particularly about fossil-free heating.

Mechelen: Since 2019, there is a citizen community and energy cooperative Klimaan in Mechelen. Very quickly they grew into a mature organisation. It is a very nice organisation to involve in local climate policy making because it gives citizens a chance to not only participate but also to financially invest in renewable energy projects. It successfully managed to mobilise citizens for local climate action. The City of Mechelen co-organised two lecture evenings with Klimaan on the topic of fossil-free heating: 'Warme Winteravonden' and the 'KNAL' energy festival (with a workshop dedicated to fossil-free heating). Klimaan is mostly focusing on e-mobility and solar projects, as heat (grid) projects are complex with high risks for energy cooperatives (for instance out of 500 energy cooperatives there is only a fistful of thermal energy cooperatives working on heat networks). Nevertheless, cooperative heat networks are emerging in Flanders and Klimaan is open for these kinds of projects. The cooperation between Klimaan and the City of Mechelen led to the development and funding of the EU project TANDEMS, in which they will explore collaboration opportunities in the field of fossil-free heating.

Middelburg: During the SHIFFT project period, Middelburg managed to create a network with the (all) municipalities in the province of Zeeland. This originated from the process to get to a regional energy strategy, as in the other regions of the Netherlands. During this process (started in 2020) the municipalities regularly get together to discuss and share how to develop and implement the heat strategy, and everything that relates to this topic. Since early 2022, the meetings take either a half or a full day, every 6-8 weeks, with sometimes an additional speaker or excursion in the municipality where the meeting is organised. All municipalities in the province participate with one or more representatives who work on the heat transition. Also, the province and people from the regional energy strategy ("Zeeuws Energie Akkoord") are participating. The municipalities also decided to cooperate in the development of the individual heat strategies, for which they hired an external consultancy firm together ("Bureau Overmorgen"). For future implementation plans, such as the National Insulation Programme, the municipalities join forces. And there are specific working groups to work on heat-related topics, such as the approach to get to implementation plans and specific policies for homeowners associations. Last but not least, most of the municipalities are already experimenting with different kinds of measures to stimulate citizens to take action, such as in Middelburg with the "Winst uit je Woning" scheme and "Buurkracht" approach, and in another municipality with "Energybank".

Fourmies: The goals of Ville de Fourmies is to become self-sufficient using renewable energy by 2050. It has therefore studied the trajectory that will enable it to achieve this objective in practice. The study of the heat master plan started in March 2022. It was conducted in association with the city's largest consumers in order

to create a first biomass heating network (from hedgerows) in order to create a cooperative framework to obtain accurate information from the largest consumers about their needs, projects, technical situations, objectives. The future heat network will provide and launch the administrative procedures that will enable a public service delegation contract to be published in the first quarter of 2023. The City of Fourmies has set an ultimatum to create the network in view of a connection to the housing of the future REV3 district of “Les Verreries” which will be delivered in December 2025. The city has already imposed on future builders to connect to the network. A letter of intent to connect to the boiler room was sent out. This letter was delivered to “office public de habitat”, for a connection of 551 households, for a 3398 MWh consumption, landlord ‘Promocil l'avesnois’ for 63 households and landlord “PARTENORD” for 80 households.

During the construction of the SHIFFT heating network, the city administration received requests from residents to connect to the network, which unfortunately had to be refused. The study of the future heating network underlines the impossibility, at present, as is the case everywhere in France, of connecting individual homes because of the cost of connection, the impact of these connections on the decrease in density of the network and therefore on its economic model and finally, the refusal of companies specialising in the distribution and management of heating networks to manage the relationship with individuals. The City will launch a survey with a sample of 350 inhabitants and with the support of a specialised polling institute, in order to know the current modes of heating and to calculate precisely the cost of a change of secondary installations in order to estimate the precise cost of the connection of the houses or to work on the economic model which will allow these future connections Moreover, the City will organise meetings with residents to facilitate the implementation of this survey.

Norwich: Involvement of the community energy lab to tackle energy poverty in Norwich in the SHIFFT project and its co-creative actions has widened Places for People’s social networks. The SHIFFT consortium members are working closely together and the experiences in this project already has led to other initiatives that are explored in respect of energy efficiency (e.g., some partners are preparing a bid for a Horizon Europe programme). In a wider national context, Places for People has shared the experiences in the SHIFFT project with groups of SHOs. SHOs in the UK manage all together 2,500,000 dwellings. In a collaboration that PfP set up in 2021, it discussed topics that determine the future of housing (hence the alliance is called the Future Homes Consortium). Within that coalition subgroups are set up to study other energy related matters like facilitating infrastructure for electrical vehicles, international collaboration, smart energy systems.

4.6 Reflection on implementation of co-creative activities in the pilots

First, a general overview is presented. Second, reflections from each pilot are presented sequentially.

General reflection: Over the first nineteen months of the pilot implementation period most activities had to be organised online (using webinars, Teams/Zoom) for the reason of COVID-19 pandemic lockdown making it impossible to implement real-life (in person) co-creative actions. During this time several webinars were organised and the SHIFFT partners co-designed a monitoring approach. After the COVID-19 pandemic restrictions were lifted in the Spring of 2022 implementation of (adapted) action could be implemented in real-life settings. At the same time gas prices and inflation spiked, in large part due to Russia invading Ukraine in February 2022. This led to increasing awareness of residents (and other end-users of heat) on energy saving and affordable heating options. However, it took the pilot hosts time to update their co-creation action plans and prepare implementation of the intended actions. Following a request made by SHIFFT the European Commission granted the pilots more time to complete their work, with the deadline moved from 31 August 2022 to December 2022). After the Summer of 2022 implementation processes and the number of actions

implemented intensified, more particularly in the pilots Bruges, Middelburg, Fourmies, and Mechelen. In total, over 60 activities were deployed, resulting in about a hundred sub-activities with a measurable impact (with some but not all including co-creative action). In hindsight many actions were implemented, but only few pertained to actual co-created solutions (these are found in all co-creation pilots except for Hauts-de-France). Table 4.6 presents an overview of dedicated co-creative actions or approaches in SHIFFT pilots.

In terms of co-creation implemented all pilots used "micro-public" forms of co-creation, with no "macro-public" form of co-creation used, despite the fact that one particular method of macro-public co-creation - i.e. Participatory Value Evaluation (PVE) - was initially selected for implementation in the Bruges and Mechelen cases. Yet, for political, administrative and practical reasons PVE was postponed several times and eventually terminated (or to be used in the future). However, where co-creation took place (as in the Assebroek neighbourhood in Bruges) workable solutions were developed that benefitted citizens and local stakeholders in getting support to adopt sustainable heat options. Nonetheless, in one case co-creation led residents to prioritise moving back to a natural gas system because of poor experience with a previous sustainable heat system that was considered unreliable (i.e., refuge home Norwich). Experience with the implementation process also showed the importance of having the right policy framework in place as well as the right and timely follow-up actions to keep processes going that are set in motion with co-creative sessions.

Bruges: Co-creation activities in Bruges - 1000 Fossil Free Families started from a different angle in the neighbourhoods involved in the pilots. The pilot host had the idea to have co-creation activities develop organically (bottom-up). A lot of citizens found their way to the city administration to ask for a free renovation scan. Two other public organisations (i.e., the Province of West Flanders and the intercommunal organisation) helped to take over renovation scans. The City of Bruges experienced more citizens having more attention for this topic, because of surging energy prices. The energy information evenings organised in each neighbourhood of the city - with several city departments and aldermen involved – were considered very popular. A more detailed account of co-creation in Bruges in the SHIFFT project can be found in the article by Manktelow et al. (2023) in the academic journal of *Energy, Research & Social Science*.

Middelburg: The understanding of the co-creation process has evolved throughout the project duration of WP2 for the Middelburg co-creation pilot team. The first challenge encountered by the team concerned the definition and identification of citizen initiatives. The pilot team realised that the definition of bottom-up initiatives had broadened in practice because often these initiatives are started by collaborative efforts of residents and local authorities (such as municipalities). Therefore, the co-creation partner in Middelburg acted as facilitator for co-creating solutions along with local residents for enabling the transitioning to fossil-free heating. The partner organised information sessions to spread awareness and develop interest amongst citizens. These information sessions were followed by more interactive and indulging brain-storming sessions. Because of alignment of interests of local authorities, they have supported the project activities particularly the appointment of "Buurkracht" (using "neighbourhood energy ambassadors"). This helped tackling the shortage of manpower and resources in the co-creation team. However, the biggest perceived hurdle in Middelburg was a perceived lack of clarity regarding the renovation of monumental buildings. However, it is expected that future insulation regulations may address the renovation of cultural heritage buildings.

Mechelen: The energy price surge starting in 2021 and the start of the war in Ukraine in February 2022 changed the landscape for the Mechelen - Collective Action for Fossil Free Homes - pilot. As the gas-electricity price ratio changed (in favour of electricity and thus heat pumps), there was an increase of interest into heat pumps. Simultaneously, there was an urgent need to become independent of (Russian) gas and oil. As a result, there was an increased public interest in fossil-free alternatives and the team observed this at one's energy counter, with a significant increase in queries from citizens. While one cannot claim this is a result of our SHIFFT co-creation pilot, the Mechelen SHIFFT co-creatio pilots did allow one to partly anticipate this, as the Mechelen

team was able to offer heat pump advice, or redirect to its online tool. Nevertheless, due to understaffing, the Mechelen team was not able to fully benefit from the momentum created. A more detailed account of co-creation in Mechelen in the SHIFFT project can be found in the article by Manktelow et al. (2023) in the academic journal of *Energy Research & Social Science*.

Table 4.6: Dedicated co-creative approaches used in SHIFFT co-creation pilots.

Pilot	Dedicated co-creative approach
Bruges	Assebroek neighbourhood approach, including 5 workshops leading to study plan and subsidy made available. Adopted and implemented co-creative 'Buurkracht' approach
Mechelen	Co-creative workshops with condominium associations' members
Middelburg	Citizens' panel informing heating policy making and implementation. Neighbourhood meetings. Support of home owner association. Adopted co-creative 'Buurkracht' approach.
Fourmies	Workshops leading a social housing organisation willing to connect to the recently constructed district heating (DH) system. Site visits, study visits and field trips to stimulate heating projects and connection to the DH system.
Norwich	Workshops with refuge home residents

Fourmies: "Local wood for heating", a multi-channel communication plan was developed using posters, flyers, social networks, press releases in order to attract a large panel of attendees. The engagement plan engaged residents, landlords, economic actors, young students, elected representatives and professionals in the biomass sector. There are four main factors that helped in developing a low carbon heat strategy. First, the fact of co-building the first heating network by communicating and involving people in the definition of this project. Second, the fact that the City of Fourmies received local, regional and national press coverage certainly reinforced the interest in low-carbon heat among consumers. Third, the pilot itself is considered a powerful lever for raising awareness and attracting people who use heat. Lastly, co-creation of the local heat master plan was considered essential to convince the largest local consumers to connect to it.

Norwich: The Community Energy Lab to tackle energy poverty in Norwich has learnt a lot from the co-creative activities, one of the eye-openers was that bringing together different stakeholders led to better and innovative outcomes. Tenants normally only communicate with us as their landlord. This dimension comes with innovative ideas. The downside of co-creative processes is that in order to get interest and interaction a considerable amount of time must be invested. PfP will use the experiences in the SHIFFT project in future projects, but a balance must be found between available resources and the benefits of the co-creative actions.

Chapter 5: Conclusion

In this chapter the main conclusions regarding the WP2 evaluation of the co-creation pilots are presented. First, the research questions are answered. Second, limitations of the study are discussed. Based on these and progressive understanding suggestions for future research are given. Finally, policy recommendations are given.

5.1 Answering the research questions

The main research question is: How did co-creative action have an impact in terms of performance on jointly developed evaluation criteria, and what can be learned from this? This research question is answered by providing answers to five sub questions that are derived from the main question.

1. What is co-creation (or rather co-creative action) when applied in a sustainable heat setting?

Co-creation refers to a category of public participation. Participation often refers to a form of collaboration or partnership between citizens on the one hand, and (local) government on the other. Co-creation can be seen as an advanced, active category of public participation, where citizens do not only participate in a decision-making process, but also become initiator or designer of the process. In SHIFFT, co-creation refers to a participatory process where citizens, public authorities, and other (local) stakeholders provide input, co-define problems, co-design a solution, a plan or policy to achieve a beneficial outcome for all parties participating, and do this in the domain of sustainable heating.

2. How were co-creation pilots developed and implemented?

At six locations in the 2 Seas area co-creation pilots were set-up with the aim of triggering investments in sustainable heating solutions for homes in local communities. There are two pilots in Belgium (i.e., Bruges, Mechelen), one in the UK (i.e. Norwich), two in France (i.e. Hauts-de-France and Fourmies), and one in the Netherlands (i.e., Middelburg). In four cases the pilot hosts are local government administrations (Bruges, Fourmies, Mechelen, and Middelburg), in one case a social housing organisation (Norwich), and in one case an engineering company (Hauts-de-France). From the onset of SHIFFT all co-creation pilots were supported by the WP2 expert team (with researchers from Delft University of Technology and University of Exeter). Support was given via regular work package meetings and bilateral meetings. A three-step approach was used with each co-creation pilot host first conducting a stakeholder and situational analysis (February 2020), second developing a co-creation action plan (June 2020), and third implementing the action plan (July 2020 – December 2022). In developing action plans pilot hosts were given the opportunity to choose between several options of co-creative action. Action plans varied between the different pilots reflecting different situational contexts and agendas. Implementation of the action plans was greatly hindered in the first nineteen months of the project due to the COVID-19 pandemic which led to lockdowns and other restrictive measures that made it impossible to implement real-life (in person) co-creative actions. In the face of the greater difficulty the pilot hosts had to resort to less effective online modes of co-creation. After the COVID-19 pandemic restrictions were lifted in the Spring of 2022 after which implementation of (adapted) action could be implemented in real-life settings. At the same time gas prices and inflation spiked, in large part due to Russia invading Ukraine in February 2022. This led to increasing awareness of residents (and other end-users of heat) on energy saving and affordable heating options. However, it took the pilot hosts a fair amount of time to update their co-creation action plans

and prepare implementation of the intended actions. Following a request made by the SHIFFT consortium the Interreg 2 Seas Joint Secretariat granted the pilots more time to complete their work, moving the deadline from 31 August 2022 to December 2022. After the Summer of 2022 implementation processes and the number of actions implemented intensified, more particularly in the pilots Bruges, Middelburg, Fourmies, and Mechelen. In total, over 60 activities were deployed, resulting in about a hundred sub activities with a measurable impact (with some but not all including co-creative action). In hindsight many actions were implemented, but only few pertained to actual co-created solutions. Experience with the implementation process also showed the importance of having the right policy framework in place as well as the right and timely follow-up actions to keep processes going that are set in motion with co-creative sessions.

3. What challenges are identified with regard to implementing co-creative action?

The major factor hindering implementation was the COVID-19 pandemic, lasting for nearly two years in the SHIFFT project period (March 2020 – February 2022) and lasting for over 1.5 years in the pilot implementation period (July 2020 – February 2022). The lockdowns and other restrictive measures that came along with the pandemic hampered in-person events, and pilot hosts had to resort to using less effective online tools. Implementation of the co-creation pilots faced several operational barriers experienced by the pilot hosts. In three pilots personnel turnover occurred and led to a delay in the preparation and implementation of co-creative (and other policy) action. Nonetheless, this study also revealed substantial barriers to co-creation. These include a lack of political support and financial resources, which meant that pilot hosts did not have the staff and time available, nor were permitted to implement state-of-the-art digital tools (i.e., participatory value evaluation), to facilitate a dialogue with a diverse range of citizens and local stakeholders. This was for both practical and departmental reasons. In addition, at the beginning of the SHIFFT project pilot hosts were not really familiar with co-creation, sought to continue with more traditional forms of (top-down) work, and confused co-creation action with one-sided persuasive (behavioural) actions and policy. Co-creation activities therefore often tended to be mere generic modes of consultation and tokenism, rather than arenas where citizens and local stakeholders could actually be included in decision-making and the co-creation of sustainable heat policies and action plans. For the pilot hosts co-creation also meant becoming more dependent on other (local) stakeholders. This also meant becoming dependent on their agendas and the challenges and risks they perceive with regard to sustainable heating. Sustainable heating technologies, such as heat pumps, are perceived to offer few consumer benefits and high costs in comparison to natural gas heating systems. They expect to face high up-front costs. In addition they also lack information, have little awareness of regulations, face social barriers such as lack of trust (e.g., in an energy technology supplier, landlord or municipality), they are risk averse, and suffer from social comparison. And this is not just problematic to potential adopters but also to coordinating actors - those responsible for the planning and implementing local sustainable heat strategies and promoting transitions to low carbon technologies (like municipalities or social landlords). Finally, lack of (access to) information made monitoring efforts difficult for the WP2 expert team (being fully dependent on the pilot hosts).

4. What impact did co-creative action have on selected evaluation criteria?

SHIFFT co-creation pilots were measured against five performance indicators: CO_2 emission reduction impact, households engaged, behavioural change, investments made, and social network formation.

In terms of **CO_2 emission reduction impact** the co-creation pilots jointly (i.e. on aggregated level) managed to achieve the goal of 3,422 tons CO_2 emission/year. They even reached 224% of this target (i.e. 7,677 tons CO_2

emission/year). Although two pilots did not meet their targets, four other pilots did quite well, some spectacularly so (i.e. Bruges).

In terms of **households engaged** the co-creation pilots jointly (i.e. on aggregated level) managed to achieve the goal of engaging 4,295 households, by engaging 6769 households. Two co-creation pilots were unable to meet their targets, but four did very to spectacularly well (i.e. Fourmies, Middelburg, Bruges).

In terms of **behavioural change** results from focus group meetings and a survey at pilots show households indicating importance to energy saving behaviours and switching to sustainable home options, especially since the gas prices started to increase rapidly. This has also influenced the "larger environment" with media and policy increasingly paying more attention to energy savings and sustainable heat options. Households indicate that the main motivation to invest in sustainable heat options is of financial nature, but pro-environmental attitudes are also mentioned. Results also show that some households are unable to heat their home adequately, that households consider it important to reduce home energy consumption, are already actively taking measures to reduce energy consumption, and indicate to be willing to start using energy saving tips provided on a leaflet distributed by a SHIFFT pilot host. Others indicate that they are still waiting till more beneficial supportive policy measures or economic incentives are implemented, and require communication with municipalities to be improved.

In terms of **investments made,** pilot hosts indicate that attaching monetary value to the impact of investments is difficult. Based on estimations using the CO_2 impact tool the SHIFFT WP2 co-creation pilots accounted for investment in sustainable heating and energy saving options were calculated. Average investments in co-creation pilots were estimated to be in the range of €196,538,293, with a low-end investment estimation of €34,218,138 and a high-end investment estimation of €358,858,449. Bottom-up information on investments in individual pilots include the Middelburg pilot showing that 45 contracts have been awarded (to households), which together amount to € 98,452 in investments. In other cases, investments to be made by local stakeholders are mentioned, like a €27 Million investment for the renovation and extension of the heating network in Bruges or investments made by a social housing organisation in Middelburg. Subsidy allocated to households may serve as a proxy as well. In this case the City of Bruges allocated 711 subsidies over 2022 (which may roughly indicate a €2.1 Million investment by households assuming that each household invests €3000 individually). Most pilots indicate to have engaged in events to raise investments from stakeholders.

Co-creation pilots contributed in several ways to **social network formation**. They initiated or contributed to networking events, established new internal organisational collaboration between departments, helped in setting up local heat coalitions (e.g., with local stakeholders showing - financial - intention to connect to district heating systems, or started a regional collaborative heat network). Other involvement in network formation pertains to: participation in a task force heating policy (across different levels of government and with other stakeholders nation-wide); collaboration with other municipalities/consortia to develop sustainable heat project bids; obtaining an outreach within larger national company of housing associations; connecting to a national program roll-out/implementation addressing energy poverty; and starting cooperation with multiple actors in regional biomass-fired heat supply chain, and to effectively contribute as a first mover.

5. What lessons can be learned from the pilots with regard to effectiveness and potential scaling?

The co-creation pilots contributed In different ways to setting the right conditions under which (more advanced) co-creation in sustainable heat can be implemented in the future. This refers to performing a scan

of the organisational environment, situational conditions (also applying the SHIFFT Common Approach analysis), and assessing whether and which co-creative actions would fit well. Based on this information a co-creation action plan is developed, assessed on feasibility (and modified if necessary), and implemented. The entire process is supported by the SHIFFT WP2 co-creation expert team. The approach taken should entail both co-creative action and be tailored to be combined with sustainable heat policy, which is necessary to persuade others when implementing co-created plans. The approach developed in SHIFFT (but also in combination with current working approaches like "Buurkracht") can be considered for use and for scaling in locations outside the initial SHIFFT co-creation pilots. Scaling may pertain to replicating certain successful SHIFFT pilots in other cities or even regions, sharing the approach and tools developed (i.e., action plan approach, monitoring approach, CO_2 impact tool, expert team support) with expert platform on heat transitions, or expanding ongoing local practices and projects to adjacent streets or neighbourhoods. Most of the scaling modes mentioned are, in fact, already set in motion. In Bruges, Fourmies and Middelburg a DH system plan is planned, urging active involvement and eventually approval of homeowners and SHO tenants in 2023. This merits a co-creative approach. Another indicator for scaling pertains to a number of SHIFFT partners having already opted for funding for follow-up projects adopting tools and approaches for co-creation in SHIFFT (as well as the SHIFFT WP1 Common Approach). In other words, the SHIFFT co-creation pilots have already set the conditions under which different forms of scaling may take place.

5.2 Limitations

This research has several limitations. First, a large part of the project (from March 2020 until February 2022) was subjected to the COVID-19 pandemic. It was a difficult, unbalanced period with poor conditions with regard to implementing co-creative action. In person co-creation actions were virtually impossible until March 2022 (most interaction with citizens and local stakeholders had to occur via online means). This led to some of the planned interventions being postponed or not implemented at all (i.e., participatory value evaluation; however for political-administrative reasons). Afterwards, suddenly another unusual situation occurred. With most of the COVID-19 bans lifted, conditions for implementation of co-creative measures improved. However, in relation to heat systems a highly unusual situation occurred after Russia invaded Ukraine as per February 2022, which resulted in a high increase in gas prices. This had the impact that householders and other end consumers of gas and other forms of heat were confronted with sudden increases in prices like they had never experienced since the 1970's (making sustainable heat options suddenly more attractive for financial reasons). Other limitations refer to case selection. Whereas the majority of cases focused on city administrations as central actor initiating co-creative action (i.e,. the Bruges, Mechelen, Middelburg and Fourmies) others focused on a social housing organisation (i.e., Norwich) or consultancy/engineering agency (Hauts-de-France). While most focused on households as target group others focused on larger groups of stakeholders. Moreover, due to managerial reasons in one case co-creative actions were not implemented (Hauts-de-France) limiting actual co-creation to five pilot sites. Comparison between the cases is difficult. And not only for the aforementioned reasons but also due to the sites being located in four different countries, each having their own specific polities, governance arrangements, cultural ways of doing things and policy mixes encouraging (and discouraging) co-creation and sustainable heat transition. Finally, bias in this research included information often coming from pilot hosts, but few other actors, and not being able to conducting actual measurement of energy use and CO_2 emissions of buildings.

5.3 Suggestions for future research

For future research a number of suggestions can be made. First, researchers are advised to replicate this study' research design (again using a longitudinal approach), perhaps focusing on one type of implementing actor (like local government) and with a more limited (or even single) set of co-creative interventions or actions. It would also be interesting to study the impact of these interventions over time, but in a more stable period without major events influencing the implementation process (like the COVID-19 pandemic or the sudden rise of gas prices following the Russian invasion of the Ukraine). However, these conditions are beyond the scope of what researchers can influence or manipulate. Second, future research should include implementing agents (i.e., the pilot hosts) who are committed to implement pre-set actions to avoid what happened with participatory value evaluation (first being postponed and afterwards being altogether removed from the agenda) in the present study. Third, in future research it is advised to work with smaller-sized pilots (e.g., at household or street level) and mostly on the city level at large. Fourth, it is advised that in future research pilot sites are selected that enable actual heat consumption measurement (i.e., with baseline + periodic monitoring; pre-test – post-test, longitudinal). Fifth, researchers may consider adopting an urban transition lab approach (Nevens et al., 2014) or focus more on transformative change (e.g., by adopting a transformative social innovation approach; Avelino et al., 2019).

5.4 Advice for policy makers

Based on the results of the present study some advice is provided to policy makers. First, they are advised to learn about the meaning and the experiences with implementation of co-creative actions, and to be aware about the potential benefits they offer, but also to be cautious on setting overambitious, unrealistic expectations and underestimating the efforts required that go along with implementation. They are also advised to run an ex ante feasibility analysis first of suggested (policy) interventions. Second, they should be aware about the role of co-creation in broader approaches and 'policy mixes' relevant to policy implementation regarding the sustainable heat transition (e.g., addressing 'causal chains' that connect co-creative actions to policy measures like thermal scans, home audits, tax benefits and subsidies), and consider how they can design, develop and implement such combinations of actions to persuade homeowners or other stakeholders to make investments in sustainable heat options. Third, policy makers are advised to consider using tools developed in SHIFFT like the CO_2 impact monitoring tool. The same holds for considering to adopt a the broad set of indicators used in SHIFFT to monitor co-creative processes and their impact, both in terms of qualitative measurable data (like network/coalition formation or decision-making using co-creative processes) and quantitative indicators like CO_2 reductions (tonnes/year), satisfaction, investments made, and target group members reached (e.g., households). Fifth, policy makers are advised to (share and) adopt good practice from the present study (e.g., the cities of Bruges and later Middelburg adopting the "Buur(t)Kracht" approach). Sixth, in order to avoid certain actions or policy from not being implemented (despite some initial form of commitment) potential pilot hosts are advised to seek approval from within the implementing organisation (like multiple municipal departments aligning their agendas and coordinate actions to support co-creative processes and their follow-up). Finally, policy makers are advised to investigate and analyse current energy systems in local neighbourhoods (at the neighbourhood and household level), and map currently applicable policy frameworks to judge which co-creative interventions are likely to work, and in combination with which 'policy mix'. This should also be seen in line with information from the 'common approach' to municipal sustainable heat policy as developed within the SHIFFT project (i.e., in work package 1; Van de Vyver et al., 2020).

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Appendices

Appendix A: Information received from Stad Brugge, Pilot "Bruges – 1000 fossil free families"

1. **Action plan summary** (short version of the action plan that was due on 1 July 2020; recent updates to the initial action plan are welcomed). Max. 2 pages; more details can be delivered and to be inserted in the evaluation report's appendices).

General

- Brugse opknappremie 2019-2022 (premie 2022 tot 2014)
  NP: vernieuwde uitgebreide premie

	2016	2017	2018	2019	2020	2021	2022	2022 NP	2022 Tot
Dakisolatie	90	558	449	594	560	453	146	266	412
Zoldervloerisolatie	1	16	14	14	9	29	5	6	11
Vloerisolatie op volle grond	3	7	8	25	24	28	28	63	91
Isoleren buitenmuren aan buitenzijde	6	22	26	73	57	54	31	38	69
Isoleren buitenmuren aan binnenzijde		18	10	11	15	19	11	14	25
Spouwmuurisolatie								38	38
Hoogrendementsglas								153	153
Geothermische warmtepomp								1	1
Lucht-water warmtepomp								4	4
Warmtepompboiler								4	4
Zonneboiler								4	4
	100	**621**	**507**	**717**	**665**	**583**	**221**	**591**	**812**

- Gratis renovatiescans

2019	2020	2021	2022 (tot 14/11/22)
678	392	387	665

- Half jaarlijks: Open netwerkmoment (monitoring van ons klimaatplan, juni 22, okt 22, …)
  - Plenair gedeelte
  - Workshops per Brug, ook rond Brug 1: Bruges verwarmt fossielvrij
- Jaarlijks: Klimaatfestival georganiseerd door Avansa, met steun van stad Bruges
  - Oktober 2022: bezoek warmtenet IVBO met Brugeslingen
- Deze legislatuur: 11 energieavonden in elke deelgemeente van de stad: najaar 22-voorjaar 23
  Met oa tips om te besparen, uitleg over de 2 pijlers in Brug 1 'Bruges verwarmt fossielvrij': 'renoveren en isoleren' en 'installeren van duurzame verwarming (warmtepompen, zonneboilers en warmtenetten)', uitleg over de vernieuwde opknappremie van de stad, uitleg over de verbouwpremie en verbouwlening van de Vlaamse Overheid, …
  - 17/10: Assebroek, 179 aanwezigen
  - 26/10: Daverlo 182 aanwezigen
  - Nog 3 energieavonden in 2022
  - Nog 6 energieavonden in 2023

- Energieplatform van de stad werd herwerkt (energieplatform.Bruges.be, 2022)
- Klimaatpunt in het Huis van de Brugesling (2022, open op namiddagen op ma, di, woe en do)
    - Informatiepanelen over de verschillende Brugesn van het klimaatplan
    - November 2022: focus op Brug 1 Fossielvrij verwarmen
    - Sinds maart 2022, dagelijks gemiddeld 1 bezoeker aan het Klimaatpunt
- Stadsmagazine: driemaandelijks magazine met steeds een katern over duurzaamheid (campagne BrugesNaarMorgen, opvolging klimaatplan)
- Soepelere regelgeving rond het plaatsen van zonnepanelen in de historische binnenstad (in voege sinds januari 2022)
- Buurt aan de beurt: de Burgemeester en schepenen bezoeken alle deelgemeenten van de stad, het stadsbestuur wil zo opnieuw contacten aanhalen met de inwoners van Bruges. De schepen van Klimaat heeft het dan steeds over het klimaatplan, de nood aan energetische renovaties en het warmtenet van IVBO
- Ter beschikking van burgerbudget (maximal €25.000) voor buurtcomités (vanaf 2 burgers) voor het nemen van klimaatmitigerende of adaptieve maatregelen
- Nieuwsbrief BrugesNaarMorgen: maandelijkse nieuwsbrief over de 7 Brugesn van het klimaatplan
- Vanaf 2023
    - Uitsturen bestek voor het organiseren van een One Stop Shop voor minstens 800 woningen met de steun van Vlaanderen (LEKP budget – Lokaal energie en klimaatpact). Wijken zullen worden gekozen op basis van bestaande dynamiek die te vinden is in de wijk en op basis van de kaart ‘renovatiepotentieel’ die tegen eind 2022 beschikbaar zal worden gesteld door de Vlaamse regering.
    - Studie klimaatwijken – sociale wijken: conceptstudie voor duurzame verwarming in een wijk in Sint-Pieters (subsidie van de Vlaamse regering)

Buurtkracht: evolutie 2019-2022

Aan de slag met verschillende buurten op verschillende manieren. Alle acties en inspanningen worden gebundeld onder een gemeenschappelijke term: Buurtkracht

-Assebroek ‘t Schuurke:

- 2019
    - Brainstormavond
- 2020
    - lesgeven in 2 scholen in de buurt
    - enquêtes
    - energy parties en fiets safari’s (geannuleerd owv Covid19)
- 2021
    - thermografische gevelscan
    - Infoavond thermografische gevelscan
- 2022
    - infoavond met verschillende installateurs
    - ontzorging met een externe partner (Renoseec vzw) via een subsidieproject van de provincie West-Vlaanderen. Stavaza:
        - 45 scans - 20 offertefase - 4 werken zijn opgeleverd
        - Meest voorkomende werken: WP – PV – dakwerken – HR glas

    - De buurt wordt in de picture gezet tijdens verschillende evenementen: open netwerkmoment (8/06), klimaatdag VVSG (13/10), …
    - Opname burgerbudget voor adaptieve en/of mitigatiemaatregelen

-ZeeBruges:

- energieavond (12/12)
- brainstormavond (jan 23)
- Vanaf 2023:
    - lesgeven in de scholen
    - energy parties en fietssafari's
    - samenwerking met college die specifiek werkt voor ZeeBruges (wijkverbeteringscontract)

-Centrum Bruges (NW, Vlamingdam-Sint-Clarastraat-Komvest) - 2022

- Verschillende vergaderingen op vraag van buurtcomité 't Zilletje
- 'Paraat voor het klimaat'
- Wens om te verduurzamen (mobilitieit, verwarming, adaptatie)
- Aanleiding: inbreidingswijk, gebouwd in 2006, gasketels zijn aan vervanging toe.
- Verschillende vergaderingen om te bekijken hoe het burgerbudget kan worden ingezet
- Extra studie: fossielvrije wijk: stappenplan voor de buurt op weg naar een fossielvrije wijk (finaliseren eind 2022).

-Christus Koning

- 2020: webinar Buurtkracht tijdens COVID-19
- 2022
    - Plannen voor een warmtenet in de buurt, in synergie met wegenwerken
    - Een aantal inwoners van de straat Karel de Stoutelaan/ Keizer Karelstraat stuurt op eigen initiatief mails uit en overtuigen de andere inwoners om aan te sluiten op het warmtenet. Reeds 60 geïnteresseerde gezinnen om aan te sluiten op een warmtenet
    - Met de stad wordt oa gekeken naar hoe we mee de ontwikkeling van het warmtenet kunnen faciliteren, inclusief het aansluiten van particuliere woningen.

-Centrum Bruges (Noord): webinar Buurtkracht tijdens COVID-19
-Centrum Bruges (West): webinar Buurtkracht tijdens COVID-19
-Sint-Pietersmolenwijk: opstart studie 'klimaatwijken – sociale wijken, subsidie van de Vlaamse Overheid (2021)

Contact – nieuwe netwerken – nieuwe samenwerkingen

- Intern klimaatteam: transversal team over de verschillende stadsdiensten heen, zoeken naar opportuniteiten en koppelkansen
- Samenwerking met Roeselare (subsidieproject RenoseeC – ontzorging van de burger in Assebroek, 't Schuurke)
- Mei 2022: bezoek warmtenet Roeselare met de verschillende stadsdiensten: Klimaat, Openbaar domein, Facilitair beheer.
- Opstart netwerk warmtenetsteden (Harelbeke – Kuurne – Oostende – Roeselare – Bruges – Kortrijk – VVSG): jaarlijks overleg en brainstorm (nov21 – nov22)
- In navolging van de opmaak van het klimaatplan: ontwikkeling van een klimaatalliantie

- Warmtenetcoalitie, eerste werkbank van het klimaatplan – Brug 1 – halfjaarlijks overleg met de belangrijkste stakeholders voor de aanleg van het warmtenet ((mogelijke) beheerders, betrokken stadsdiensten, politiek)
- Platform van de energiemakelaar
- Werkgroep gedifferentieerd warmtebeleid georganiseerd door VEKA (met VREG, VVSG, ODE, Flux50, stad Bruges)
- Werkgroep 'boren op openbaar domein' (ODE)
- Lid van Warmtenetwerk Vlaanderen (deel van ODE)

2. **Description of the implementation process 2020-20**22 (in chronological order, per year; on max. 5 pages; additional detailed information can be supplied to be embedded in the evaluation report's appendices). Please list the activities or events implemented (with indication of when this happened). Consider using the Excel spreadsheet Michiel and I made for the overview of activities implemented. zie hierboven

3. **CO_2 impact**: please update the online spreadsheet on this as developed by Michiel.

4. Information on **households or other stakeholders reached** (via online form Michiel). Don't forget to also fill out Cognito forms.

- Brainstormavonden en webinars Buurtkracht (2019-2022) (100 personen)
- Infoavond Thermografische gevelscan Assebroek 8/02/2022 (120 personen)
- Infoavond met aannemers in Assebroek (35 personen)
- OSS in Assebroek met external partner RenoseeC: 40 scans – 12 in offertefase
- Open netwerkmomenten 8/06/22 (120p) , 13/10/22 (200p)
- Energieavonden: Assebroek (18/10, 200p), Sint-Andries (27/10, 180p), Sint-Pieters, ZeeBruges, …
- Nieuwsbrief BrugesNaarMorgen: 616 mensen die geabonneerd zijn.
- Stadsmagazine: 118.000 inwoners
- Facebook groep 'Bruges Naar Morgen': 666 volgers
- Instagram 'Bruges Naar Morgen': 204 volgers
- Facebook Dienst Klimaat, milieu en dierenwel zijn: 1.100 volgers

5. Information on observed **behavioural change**. Either via focus groups reports (collected by Chris) or via a survey analysis results (i.e., Norwich case). Don't forget to also fill out Cognito forms.
- Ook deels door de stijgende energieprijzen ontvangt de stad heel veel aanvragen voor een gratis renovatiescan. Reeds 665 aanvragen in 2022 (tot 14/11). Intercommunale WVI en de provincie West-Vlaanderen helpen ons om de achterstand deels weg te werken.
- De OSS in Assebroek is aanstekelijk. Het zien verbouwen doet verbouwen. Buren beginnen ook te renoveren zonder de hulp van vzw Renoseec.
- Verschillende buurtcomité's gaan zelf aan de slag. Buren zoeken elkaar op en vinden zelf de weg naar de stad met de vraag hoe zij hun buurt duurzamer en meer fossielvrij kunnen maken.
- Ontwikkelaars contacteren de klimaatdienst met de vraag hoe zij een nieuwe ontwikkeling duurzaam kunnen invullen.
- Als gevolg van de communicatie over het warmtenet (en de stijgende energieprijzen) kloppen burgers zelf aan met de vraag of zij kunnen aansluiten op het warmtenet.
- De verhoging van het aantal premieaanvragen toont duidelijk aan dat de Brugesling op de hoogte is van het nut van isoleren en renoveren.

6. Impact on **investments made** by households or other stakeholders (in case evidence material is available, or via investment estimation, or proxies like subsidy granted per household unit). Don't forget to also fill out Cognito forms. (zie hoger)

7. Impact with regard to **social networks, coalitions or partnerships formed**. Please describe social networks, partnerships or coalitions formed, when this took place, which other organizations (types) are involved, and if possible to which events this can be linked to SHIFFT activities (by co-creation pilots hosts). Don't forget to fill out Cognito forms. (zie hoger)

Reflection on **implementation of co-creative activities**. Please describe how you implemented co-creative activities, which target groups you reached, and how you think this led to encouraging policy, as well as influence CO_2 emission reduction. Please look at the interview transcripts from Chris, and provide updates. (max. 5 pages; more detailed information can be provided, and will be considered to be inserted in the evaluation report's appendices).

Co-creatie activiteiten startten in elke buurt vanuit een andere invalshoek. Co-creatie activiteiten dienen organisch te groeien, minimaal nood aan een aantal dynamische enthousiaste buurtbewoners.

Appendix B: Information received from Stad Mechelen – Pilot “Dauwendaele & De Griffioen Gas-Free”

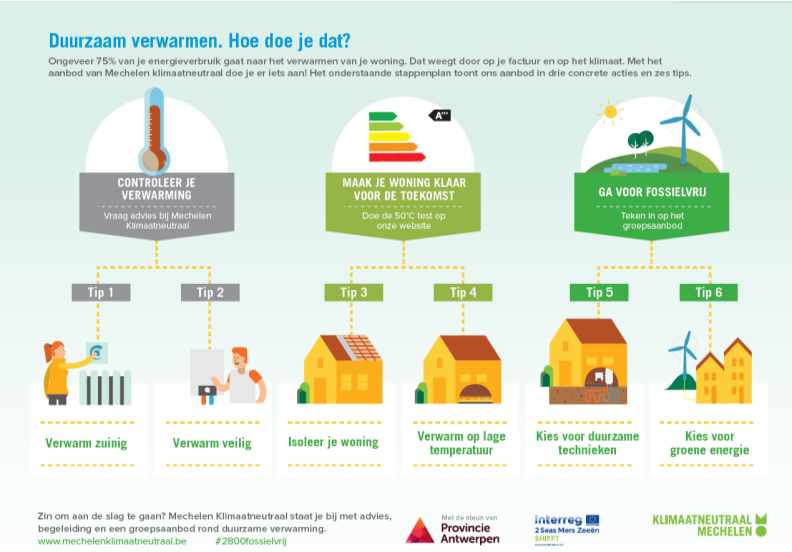
1. Action plan summary
   short version of the action plan that was due on 1 July 2020; recent updates to the initial action plan are welcomed). Max. 2 pages; more details can be delivered and to be inserted in the evaluation report’s appendices

In Flanders, there are 18 ‘Energiehuizen’ (EN: Energy Home, a regional or local energy information centres) recognised by the Flemish Energy and Climate Agency where citizens can receive technical advice and financial guidance for energy renovations. The city of Mechelen has its own Energy Home, provided by Team Klimaat and AGB Energiepunt Mechelen. It guides citizens of Mechelen from the first to the last step in their customer journey towards a comfortable and energy efficient home:

1. general information,
2. online tools to sensitise and activate citizens,
3. tailor-made advice,
4. a realistic financial plan,
5. unburdening in the execution of the works,
6. sharing testimonials to inspire other citizens.

The services are bundled in a one-stop shop. Over the years, it evolved towards an integrated home renovation service. City of Mechelen was able to fill the gaps, elaborate the service and optimise it with the financial support of several project grants, including EU projects See2Do, Triple-A, BE REEL and… SHIFFT.

The objective of the SHIFFT cocreation pilots of City of Mechelen is to strengthen the integrated home renovation service of its Energy Home by targeting the theme ‘fossil-free heating’. The figure below offers an overview of the initiatives aimed for single family homes:



Infographic ‘Sustainable heating for dummies’ ((https://klimaatneutraal.mechelen.be/duurzaam-verwarmen-hoe-doe-je-dat) © Atelier per Twee

- Group offer Check your boiler (2022 - 2025): intercommunal IGEMO, Stad Mechelen and SAAMO Provincie Antwerpen will set up a group offer Check your boiler in combination with a grant for social target groups for the maintenance of boilers (https://www.energiesparen.be/projectoproep-premie-onderhoud-verwarming-sociale-doelgroepen). This group offer will be rolled out in 10 cities and municipalities in the Rivierenland region of the Province of Antwerp (incl. Mechelen) together with local partners and OCMWs.
- Do the 50 degrees test (2021 - 2023): a campaign with 140 participants with web tool developed by Milieu Centraal. Bond Beter Leefmilieu will roll out the campaign and tool across Flanders inspired by the Mechelen example
- Group offer Heat Pumps (2021 - 2023): call with selection of local and skilled installers of heat pumps. 4 installers were retained after a selection procedure in which City of Mechelen was assisted by Dialoog vzw. A second call to installers is in preparation. Intercommunale IOK has contacted Stad Mechelen to roll out a similar initiative in their area

Detailed descriptions of each action are included in Annex.

Furthermore, City of Mechelen has done a local communication campaign on sustainable heating for Mechelen residents, including the following communication activities:

- An online web tool Do the 50 degrees test (ism. Milieu Centraal)
- Launch of a call for apartment buildings to apply for energy renovation.
- Winter campaign Fossil-Free Heating (October 2022 - February 2023). In collaboration with the consultancy based agency Pantarein Publishing.

Finally, as the services of the Energy Home used to target single family homes, an offer and service for syndics and condominium associations for the energy renovation of apartment buildings was initiated (this was made possible by SHIFFT and additional project subsidies acquired during the project):

Adres	Koningin Astridlaan 159-161, 2800 Mechelen
Bouwjaar	ca. 1979
Plannen beschikbaar?	scans beschikbaar bij syndicus
Aantal appartementen	85
Aantal leden VME	85 (?)
Verdeling eigenaars-verhuurders / eigenaars-bewoners	1/4 verhuurders – 3/4 eigenaar-bewoners (inschatting van syndicus)
Typologie gebouw	typologie 1 - middelhoogbouw - gelijkvloers + 7 andere bouwlagen - 5-6 appartementen per verdieping per ekomhal
Afwerking voorgevel bovendakse zijgevel achtergevel	natuursteen bekleding (d 5 cm), niet geisoleerd, wel spouw (d 5 cm) 1 geïsoleerd + leien, 1 niet afgewerkt, steens metselwerk buitenspouwblad metselwerk
Type dak	plat dak, vervoderde dichting, ca. 6 cm isolatiedikte
Type schrijnwerk	- aluminium, thermisch niet onderbroken (originele ramen) - niet consequent vernieuwd - deels dubbele beglazing (1e generatie), deels enkel glas - plaatselijk rolluiken
Aanwezigheid terrassen	- terrasses aan voor- en achterzijde gebouw op sommige terrassen dichting geplaatst, op sommige niet
Aanwezigheid keldervedieping	volledig onderkelderd, tuin aangelegd op gelijkvloers
Wijze van verwarmen	- collectief stookbaad – 3 hoogrendementsketel op gas in cascade - CV + sanitair warm water op deze kelels

Adres	Olivetenveld 37, 2800 Mechelen
Bouwjaar	1963
Plannen beschikbaar?	ja – papieren versie
Aantal appartementen	25
Aantal leden VME	25
Verdeling eigenaars-verhuurders / eigenaars-bewoners	1/3 verhuurders – 2/3 eigenaar-bewoners
Typologie gebouw	typologie 2 - middelhoogbouw - gelijkvloers + 8 andere bouwlagen - 3 appartementen per verdieping, 1 op gelijkvloers
Afwerking voorgevel bovendakse zijgevel achtergevel	natuursteen bekleding, niet geïsoleerd, wel spouw (?) zijgevel gaas wachtgevel – gevel analoog aan voor- en achtergevel natuursteen bekleding, niet geïsoleerd
Type dak	plat dak, bitumineuze dichting
Type schrijnwerk	- aluminium - vernieuwd 20-25 jaar geleden - dubbele beglazing - aerpseroletik staal
Aanwezigheid terrassen	neen – geen terrassen
Aanwezigheid keldervedieping	niet volledig onderkelderd
Wijze van verwarmen	- collectief stookbaad – 1 hoogrendementsketel op gas (dateert van 2001)

Adres	Koningin Astridlaan 68 en Lange Heistraat 36/38, 2800 Mechelen
Bouwjaar	Niet gekend, ca. 1974 (perceel dan aangekocht volgens akte)
Plannen beschikbaar?	geen plannen beschikbaar bij syndicus, ook niet via bewoners
Aantal appartementen	12
Aantal leden VME	12
Verdeling eigenaars-verhuurders / eigenaars-bewoners	1/2 verhuurders – 1/2 eigenaar-bewoners
Typologie gebouw	zijde Koningin Astridlaan: typologie 2 - middelhoogbouw - gelijkvloers + 8 andere bouwlagen - 1 appartement per verdieping, commerciële ruimte op gelijkvloers zijde Lange Heistraat: typologie 4 - laagbouw - gelijkvloers + 2 andere bouwlagen - 2 appartementen per verdieping, garages op gelijkvloers

- In the framework of Climate District Mechelse Vesten, two apartment buildings were selected (of 85 and 25 residential units respectively) for which a master plan for energy renovation was drawn up by Bureau Bouwtechniek and Levuur within the project
- In the framework of the EU City Facility (www.eucityfacility.eu) was followed up with a third building (12 residential units). In addition, a learning network with syndics and VMEs in Mechelen has been launched and the consortium of Ingenium - Bureau Bouwtechniek and Levuur/Contutti is currently working out an investment concept

- City of Mechelen is a partner in the LIFE project CONDORENO (with Flemish partners VCB, EOS Oostende, City of Antwerp), so that in the period Oct 2022 - Oct 2025 services around energetic renovation of apartment buildings can be further set up.

1. Description of the implementation process 2020-2022
   In chronological order, per year; on max. 5 pages; additional detailed information can be supplied to be embedded in the evaluation report's appendices). Please list the activities or events implemented (with indication of when this happened). Consider using the Excel spreadsheet Michiel and I made for the overview of activities implemented.

2019

Information session for citizens of Mechelen with DSO Fluvius and Dialoog vzw:
- 'Energiefitsessie energiezuinig verwarmen' op 13/11/2021 in Dorpshuis Hombeek

2020

No activities as a result of COVID-19 pandemic

2021

Lecture series 'Warmte Winteravond'. Event on 3/2/2021 was dedicated to Fossil-free Heating and was co-organised with City of Mechelen, Natuurpunt vzw and Klimaan vzw. 101 people registered and 60 actually participated in the webinar. All recordings and presentation can be viewed at https://klimaatneutraal.mechelen.be/inspiratiesessie-groen-verwarmen. Klimaan vzw published a blog at their website https://klimaan.be/blog/2021/02/12/warmtepompen-of-verzuipen/

Online newsletter sent in February 2021 to members of the EnergieID group #2800meetsamen on the theme of sustainable heating with a contribution from Guido Crauwels, one of the 'heating coaches' of the province of Antwerp, among other items.

Two online sessions with DSO Fluvius and Dialoog vzw:
- 'Energiefitsessie energiezuinig verwarmen' op 10/02/2021.
- 'Energiefitsessie warmtepompen' op 24/02/2021.

Collected stories of citizens with fossil-free heating systems in their home:
https://klimaatneutraal.mechelen.be/duurzame-verwarming-in-dobbelhuizen
- Johan en Anita: heatpump with aquathermal energy from river Dyle in a renovated rowhouse
- Michel en Marlies: Ground-sourced heatpump in a rowhouse that was first demolished then newly built
- Sarah: fuel cell in a renovated rowhouse
- Frederik: Ground-sourced heat pump in a renovated rowhouse
- Luc en Tony: Air-sourced heat pump in a renovated rowhouse
- Co-housing Sint-Gummarus: Collective ground-sourced heat pump in a cohousing project

Interview with citizens about fossil-free heating published in the City Magazine ‘Nieuwe Maan’ in februari 2021.

Infographic met een overzicht van het aanbod duurzame verwarming voor Mechelaars.

Call for condominium associations to select pilot projects in the framework of SHIFFT and the project Klimaatwijk Mechelse Vesten (deadline 30 June 2021). Three pilot buildings were selected.

Website update August - September 2021. The updated web pages are structured in the same way as the infographic (see above)

Two online sessions with DSO Fluvius and Dialoog vzw:
- ‘Energiezuinig verwarmen’ 14 oktober 2021
- ‘Warmtepompen’ 21 oktober 2021

Info market organised by Energiepunt Mechelen on Mon 15 Nov 2022 at the Predikheren (city library) with info booth and info sessions Do the 50 degree test and Group offer Heat Pumps

Focus group ‘Doe 50 graden test’ 11 dec: workshop 1

2022

Start campagne met groepsaanbod warmtepompen en 50 graden test in februari 2022. Brochure met meer info over groepsaanbod en 50 graden test. Najaar 2022 (zie bijlage).

The web tool 'Doe de 50 graden test'

Information booth of Mechelen Klimaatneutraal and info sessions with Dialoog vzw on fossil-free heating at the construction trade Fair Wonen 2022 in the Nekkerhal on 29 - 31 January & 4 - 6 February 2022 (https://www.wonen.eu/)

Focusgroup 'Doe 50 graden test': workshop 2

KNAL Energiefestival op 1 oktober 2022 organised by City of Mechelen and Klimaan vzw, with session 'Fossil-free heating'

Workshop communicatiecampagne 26 sep 2022 organised by Pantarein

Drie workshops rond warmteplanning en warmtebeleid voor gemeenten en steden in provincie Antwerpen op initiatief van Stad Mechelen ism. VVSG en Provincie Antwerpen op ma. 26 september 2022, do. 27 oktober 2022 en do. 1 december 2022

Press releases (zie links en/of bijlage(n)):
Do 50 degrees test

- '140 Mechelaars doen de 50 graden test met oog op overschakeling naar warmtepomp' op RTV – 17 februari 2022 (https://rtv.be/artikels/140-mechelaars-doen-de-50-graden-test-met-oog-op-overschakeling-naar-warmtepomp-a110644)
- '140 Mechelaars testen of hun woning klaar is voor warmtepomp' in Het Laatste Nieuws, Gazet van Antwerpen en Het Nieuwsblad – 17 februari 2022 (bvb https://www.hln.be/mechelen/140-mechelaars-testen-of-hun-woning-klaar-is-voor-warmtepomp~a34b7602/)

Condominium retrofits:

- Stad zoekt appartementsgebouw (dat energiezuinig wil worden (29.05.2021) 'Proefproject helpt bij renovatie van flats in Klimaatwijken' in Het Nieuwsblad - 21 Dec. 2021
- ''Klimaatwijk Vesten' start met energetische renovatie twee appartementsblokken' in Het Laatste Nieuws - 18 Dec. 2021

De oproep naar de VME's en de publicaties in de pers

2. CO_2 impact, investments made and target groups reached

The web link to the WP2 CO_2 impact model form can be found here:
https://docs.google.com/spreadsheets/d/1cwuNUjUcinIqXPLBcee8YCpCADbjovNX6-TVE9IY9Zw/edit#gid=0
Please check whether the information for your co-creation pilot in this form is still right, and otherwise please update this (e.g. on actions implemented, households, reached, etc.).

3. Observed behavioural change.

Either via focus groups reports (collected by Chris) or via a survey analysis results (i.e., Norwich case). Don't forget to also fill out Cognito forms.

See focus group meetings in Dec 2021 and March 2022 (minutes available).

4. Social networks, coalitions or partnerships formed.

Please describe social networks, partnerships or coalitions formed, when this took place, which other organizations (types) are involved, and if possible to which events this can be linked to SHIFFT activities (by co-creation pilots hosts). Don't forget to fill out Cognito forms.

Tandem with Klimaan

Since 2019, there is a citizen community and energy cooperative Klimaan in Mechelen. Very quickly they actually have grown into a very mature organisation. It is a very nice organisation to involve in local climate policymaking because it gives citizens a chance to not only participate but also to really financially invest in renewable energy projects. It successfully manages to mobilise citizens for local climate action. City of Mechelen co-organised two lecture evenings with Klimaan on the topic of fossil-free heating: 'Warme Winteravond' and KNAL energy festival (with a workshop dedicated to fossil-free heating). Klimaan is mostly focusing on e-mobility and solar projects, as heat(net) projects are complex with high risks for energy cooperatives (for instance out of 500 energy cooperatives, there is only a fistful of cooperative heat networks). Nevertheless, cooperative heat networks are emerging in Flanders and Klimaan is open for these kind of projects. The cooperation between Klimaan and City of Mechelen led to the EU-funded project TANDEMS, in which they will actually explore collaboration opportunities in the field of fossil-free heating.

More information can be found here:

- https://coop.klimaan.be/
- https://klimaan.be/

Info session at KNAL energy festival, coorganised with Klimaan vzw

'Affordable heat' coalition

The city has taken the initiative to bring together local partners around affordable heating. Four meetings took place in 2021 – 2022. All these partners are already active in the field of energy and/or fuel poverty. However, the coordination between these initiatives can be improved and a scale-up might be needed as some partners are not active in all municipalities in the region or the activities are put on-hold as a result of COVID-19.

Partner	**Relevant project, initiative, expertise**
IGEMO	Interreg NSR Stronghouse (thermoscans), SUPRA (renovation coaches)
Natuurpunt vzw – Energiesnoeiers Mechelen	Fuel poverty, energy scans
SAAMO Provincie Antwerpen	Fuel poverty, Woonmeter, H2020 Energy Measures
Klimaan vzw	Energiehelden
Kamp C	H2020 Energy Measures
Province of Antwerp	Verwarmingscoaches
LOGO Mechelen	Woonmeter, healthy and comfortable homes
Bond Beter Leefmilieu	Ecobouwers
VEKA (Flemish Energy and Climate Agency)	Grant for maintenance of boiler for vulnerable households

One of the outcomes is the 'Check your boiler' project, together with IGEMO, SAAMO province of Antwerp and social services of 10 municipalities in the region (including Mechelen). In the coming period, partners will properly map each other's communication channels and activities, so a more efficient and targeted communication can be set-up to reach their target groups.

Learning network with condominium associations
As City of Mechelen is setting up a city service for energy renovations of condominiums, the city took the initiative to set-up a focus group series involving homeowners' associations, syndicates, engineering firms, higher government etc. with the objective to co-create this new city service. It succeeded in involving all types of actors in workshops. This can lead to trust in the role of the local authority in this process and also the quality of the service. The focus group series will be continued in the framework of the LIFE project Condoreno.

Focus group with condominium associations, 27 June 2022

5. Reflection on implementation of co-creative activities

The energy price surge in 2021 and the start of the war in Ukraine in 2022 changed the landscape. As the gas-electricity price ratio changed (in favour of electricity and thus, heat pumps), there was an increase in interest in heat pumps. Simultaneously, there was an urgent need to become independent of (Russian) gas and oil. As a result, there was an increased public interest in fossil-free alternatives and we observed this at our energy counter, with a significant increase in queries from citizens. While we cannot claim this is a result of our SHIFFT-cocreation pilots, our SHIFFT cocreation pilots did allow us to partly anticipate this, as we were able to offer heat pump advice, or redirect to our online tool. Nevertheless, due to understaffing, we were not able to fully benefit from the momentum created.

Appendix C: Information received from Gemeente Middelburg – Pilot "Collective action for fossil free heating"

Summary of the co-creation action plan that was submitted in 68June 2020, and includes an update on the adjustments to the plan that took place in the meanwhile.

Location of the project activities:

Municipality of Middelburg, city districts ‘Dauwendaele’ and ‘Griffioen’.

Note: during the project, in addition to the two appointed districts, the scope of the co-creation actions was broadened to actions that are implemented for the entire municipality.

Aim:

The aim of the co-creation pilots in Middelburg is to trigger investments in sustainable heating solutions of homes and buildings in the local communities and roll out the transfer activities to the other cities in Zeeland.

We explore opportunities for both area’s and the entire municipality on individual solutions and collective grids.

In Dauwendaele the project contains a study to realise a district heating system with the rest heating of from a nearby factory. It concerns 900 households. It is a complex process to reach consensus with all involved stakeholders about the sustainable heating of homes and buildings. In the meantime, houses need to be prepared, to already reduce their energy needs (making them ‘gas-free-ready’).

In the Griffioen the aim is a journey with the inhabitants to see in what way we can achieve to gas-free houses. It concerns also about 500 households.

For some interventions we found out that it is more efficient to target the entire municipality. These actions are being tested as well.

Stakeholders:

Internal

- The team “energy transition and sustainability”
- The adjoining EU-projects Solarise, Terts
- The colleagues in the department Communication
- The district managers; the colleagues whose primary job is to maintain intensive contact with the neighbourhood teams.
- The responsible alderman

External for Dauwendaele

- The partners in the heat network (Synthomer, the heat supplier; Woongoed, the social housing association; Zeeuwind, the local energy cooperative; NetVerder, the network operator);
- Homeowners;
- Neighbourhood teams;
- Welzijn Middelburg, schools, Pennywafelhuis, City Seeds (walk-in-facilities).

External for Griffioen and the municipality as a whole

- Homeowners
- Neighbourhood teams (‘wijkteams’)
- The social housing association
- Private landlords
- Social community organizations, schools, walk-in-facilities
- Home owners associations
- Existing pioneer groups

Planned and implemented actions

General: a plan with the communications department was developed in early 2022.

Dauwendaele:

The creation of a consortium and agreement on the (financial) structure of the heat network was a very long and complex process. Some of the partners involved did not want to communicate about the plans before certain steps were taken and the chances of it going through are high enough. This stage was reached early 2022, when the first communication activities were executed. For the communication and participation on the heat network, an external team is hired. Actions so far:

- April 2022: Letter sent to all households in the plan area (900);
- September 2022: Flyer sent to all households in the plan area;
- Regular meetings with neighbourhood team to update on the plans and to co-create the co-creation strategy with the inhabitants;
- November 2022: heat market, organised to provide information on the heat network and on energy saving measures in general, for the entire neighbourhood.

Griffioen and entire municipality

The goal is to inform and stimulate home-owners and other target groups to undertake action towards improving their homes and make them natural-gas-free (ready). Over time, several initiatives will be developed or implemented and tested.

- Ongoing: investigation of needs, hurdles, starting initiatives that create possibilities for co-creation.
- April 2021: communication and participation strategy, developed in co-creation with a working group and coordinated by Overmorgen.
- Ongoing: cooperation with the social housing cooperation (Woongoed Middelburg) to stimulate sustainable renovations of their buildings.
- September 2022: Collective purchasing campaign 'Winst uit je woning', letters with the offer to get insulation measures, solar panels or a hybrid heat pump, sent to 12.000 households.
- September 2022: Local energy team being set up by 'Buurkracht' in the Griffioen, soon starting in a second neighbourhood.
- Ongoing: cooperation with Duurzaam Bouwloket, which provides tailor made energy advice and helpdesk.
- End 2021/early 2022: Media campaign in the local door-to-door newspaper "De Bode".
- Regular presentations at neighbourhood meetings, leading to further discussions on how to improved homes together.
- Other activities with Home owners' associations (VVE's):
    - Rittenburg apartments: Co-creation started with two apartment buildings in the area Rittenburg, who want to become gas-free (36 apartments).
    - VVE subsidy and letter to 105 VVE's: up to 5 VVE's can get financial support to start up the process to become gas-free.
        - 50% of the expenses, with a maximum of € 1.500.
    - VVE information evenings will be organised in October 2022 and January 2023.
- Ongoing regional collaboration and cooperation with the other 12 municipalities in the province of Zeeland, results of the pilots are being shared.

Barriers/risks

Dauwendaele: the development of the heat network can still be stopped until the final decision is taken. This is a long and complicated process with many hurdles. The business case needs to be positive and the heat supplier, an American company, needs to stay in place.

Griffioen / entire municipality: A shortage of motivation and/ or money to invest in the house. A common reaction is to be waiting and see what others are doing or the expectation the means will get better and cheaper if others do it first. Also it is a more and more growing idea that heating with hydrogen gas or green gas, is a realistic alternative. Convincing them this is not in short term available for households is hard. Development of new and better system will probably make house owners want to wait and see.

Mitigation:

Dauwendaele: The decision of the shareholders of the company is not influential. If the plans for district heating are cancelled, the alternative is an approach similar to the Griffioen and the entire municipality.

Griffioen / entire municipality: To give valued information of what to expect from investments and cut down on energy costs. Also researching what people can do together to cut down on the investment per household. Knowledge of realistic expectations in developments and answering the question what people can do now is essential. Solar panels and home insulation are commonly accepted.

Methods

- PVE (Participatory Value Evaluation) ☐
- Deliberative workshops ☐
- Living lab ☒
- Customer journeys ☐
- Storytelling ☒
- Collective data analysis ☐
- Direct observation ☐
- Interviews ☒
- Visualisations ☒
- Online tools ☒ (please describe): Middelburgers.nl: a platform for and from the inhabitants and wijkteams, social media like Facebook, Instagram and Twitter, website of the municipality (www.middelburg.nl)

Description of the implementation process 2020-2022 (in chronological order, per year; on max. 5 pages; additional detailed information can be supplied to be embedded in the evaluation report's appendices). Please list the activities or events implemented (with indication of when this happened). Consider using the Excel spreadsheet Michiel and I made for the overview of activities implemented.

2020

Due to the COVID-19 pandemic, in 2020 hardly any co-creation activities were implemented. Community activities, such as neighbourhood meetings were cancelled. The heat network in Dauwendaele was not yet in a stage where potential end-users could be involved. In dec. 2020 we started with the development of a communication strategy based on household profiles. This was developed by Bureau Overmorgen (external consultant) and during the process several times discussed in Focus Group meetings with stakeholders (citizens, representatives of neighbourhoods and professional stakeholders). The result was a communication strategy (finalised in June 2021) on which we could base specific communication actions, as part of the further detailing of the Heat Strategy.

2021

June 3rd: Online information session on the heat strategy. Before finalising the strategy, we gave the citizens and all stakeholders the opportunity to get informed about the Heat Strategy, ask questions and respond. The information session was organised by Bureau Overmorgen. We had 59 registrations, a mix of homeowners and other residents. During the event, we had an average of 40 participants. All 59 were informed afterwards by email with a link to the recording, presentation and Q&A.

September 9th: presentation at neighbourhood meeting 'Klarenbeek Veersepoort'. A presentation was given at this evening for residents, on the heat strategy, to 25 participants.

October 12th: presentation at neighbourhood meeting in 't Zand/Stromenwijk.

October 14th: presentation at neighbourhood meeting in Sint Laurens.

October 19th: presentation at neighbourhood meeting Nieuw en Sint Joosland.

October 18th: Information session organised in the Middelburg library on the 'postcoderoos' projects in the municipality, a project that makes it possible to invest in solar panels on a large roof in the same or nearby postcode areas. We had the opportunity to present the heat strategy during this evening, to a group of around 60 participants (residents).

December: first contact with Winst uit je woning on a collective purchasing action.

December, last two weeks: two publications of a special page on the heat transition with interviews with inhabitants and useful links and advice in the local door-to-door newspaper De Bode.

December: A master student of TU Delft has finalised his research on the implementation of the heat transition in Griffioen and Dauwendaele and the role of the municipality and other stakeholders (2021).

2022

January/February, five more publications with interviews of residents in the door to door newspaper De Bode. People were activated to get in touch with the municipality in case of questions.

March 3rd: The city council gave green light to proceed with the development of the heat network in Dauwendaele. The same day 970 letters were sent to the residents of the plan area, to provide them with information on the status and the expectations.

April: approached by a co-creation initiative from a home owners association in Rittenburg. Two apartment blocks, each of 18 units, want to investigate how to become natural gas-free. The asked the municipality for support, both financially and in terms of process support (communication). An information evening for the residents was organised on May 25th, during which a presentation was given on the heat strategy, co-creation and the impact on apartment buildings.

April: Focus group interview with inhabitants on motivation and hurdles (april 2022). There is still contact with the focus group members, one couple has updated us on the hurdles they experience with their monumental house, about how they feel they get not enough support from the municipality and the prosperity committee.

May 16th: A second information evening on the 'postcoderoos' project, during which a presentation about the heat strategy was given (see also 18/10/2021).

June: A group of 4 minor-students has finished a concrete plan and approach for the neighbourhood Griffioen, also looking at technical innovations (available in the near future) that might be interesting to implement. They wrote an elaborate plan, and also used a facebook questionnaire to get input from the residents.

June 14th: presentation at neighbourhood meeting in de Griffioen, about Buurkracht

September: Neighbourhood approach will be set up with "Buurkracht" in the Griffioen, and later also in Klarenbeek, that has to lead to collective actions in the neighbourhood. The first meetings with potential team-members were held in September.

September 29th: delivery of 12.000 letters for the collective purchasing action of Winst uit je woning. The letters are sent by the municipality and signed by the Alderman. The letter contains an offer for several measures, depending on the building period. Floor- and wall insulation, solar panels and hybrid heat pumps. People can subscribe and get an offer for one or more of these measures. They have the time to subscribe before the 1st of December. Winst uit je woning provides a dashboard that shows the response rate for each of the measures. On October 11th, an online information evening was organised to inform people further about the details of the action, and to provide the opportunity to ask questions. This evening was followed by over 200 participants.

October: Inspired by the co-creation in Rittenburg, and their request for support, we have developed and allocated budget to a small subsidy scheme for other apartment buildings (5 in total) who want to investigate how to become gas-free. We contribute a maximum of 1500 euro to each initiative, where we pay max 50% of the costs of for example external advisors or organising meetings with the residents. We made an interview with the initiative of Rittenburg, and sent this to 100 home owners associations in the municipality, with the message that the municipality can support with their plans to become gas-free (ready) and to inspire them with the example of Rittenburg.

November 16th: presentation at neighbourhood meeting in de Griffioen, about energy saving measures and Buurkracht. Goal was to inform people about what they can do to reduce their energy costs, and to get more people interested in the Buurkracht initiative.

November 26th: Heat market in Dauwendaele, to inform people about the heat network, and also about (small) measures that they can already take in the meanwhile to reduce their energy costs.

Appendix D: Information received from Ville de Fourmies, Pilot " Local wood for heating"

1. Action plan summary and implementation process

short version of the action plan that was due on 1 July 2020; recent updates to the initial action plan are welcomed). Max. 2 pages; more details can be delivered and to be inserted in the evaluation report's appendices

1.1. measures to help residents reduce their energy consumption and use heat from wood-burning technology

In Fourmies, 3 actors accompany the inhabitants in order to help them at various levels to reduce their energy consumption:

- "France Rénov" also called "Guichet Unique de l'Habitat ». This actor, managed by the Communauté de commune Sud Avesnois of which Fourmies is the center city, has replaced the "GUICHET UNIQUE ENERGETIQUE" which was previously managed by the city of Fourmies. The services are bundled in a one-stop shop.
  Its missions are : advising all residents on insulation methods, installers, subsidies, production and consumption of renewable energy.

  The GUICHET UNIQUE ENERGETIQUE has advised 400 people until 2021 whereas FRANCE RENOV has delivered subsidies to families, in order to change a gas boiler for a wood boiler.

- "CITEMETRIE", works for the city of Fourmies in order to deliver a specific subsidy coming from a public program named "OPAH RU" (Programmed Housing Improvement Operation dedicated to the poorest streets), to inhabitants situated in a "priority neighbourhoods ".
  Its mission is to distribute subsidies. It has delivered subsidies to families in order to change their gas boiler for a wood one.

  - SOLIHA's mission aims at advising residents with a very low income, on insulation methods, and also delivering subsidies. Each grant is subject to a thermal diagnosis.

  This partner has delivered subsidies in order to refurbish 19 inhabitants houses, with a result of an average of 40% energy saving and 5 gas boiler to wood heat technology system.

1.2. Communication actions in order to promote these services:

In order to promote these services, the city has published a **booklet** describing a guide to explain the above services. It is it is available at the town hall and has was printed in 500 copies.

The city has also promoted these services in it September 2022 city magazine (11 241 copies)

1.3. National energy poverty journey :

Fourmies has organised a event bringing together all local actors specialised in the distribution of subsidies related to energy renovation, advice on how to reduce energy consumption, manufacture of objects aimed at saving money (e.g. doorstops).
50 inhabitants took advantage of this event which was which was strongly relayed on social networks.

Next time, the event will be organised the night or the week and weekend in order to attract more people.

1.4. Co creation activities:

Foumies has activated various levers in order to involve the inhabitants in the energy transition and to make them understand the issues at stake.
These actions are of different kinds:

1.4.1. **the energy press conference for young people**:

This event is addressed to young secondary school students. In this serious game, the students play the role of journalists and interview the inhabitants of the future in order to understand how the city has become self-sufficient in renewable heat. At the end of the conference, the students write press articles that are published in the local newspaper and distributed free of charge to every household in.

In 2019, 300 teenagers participated to the conference, and 6100 newspapers were delivered in each Fourmies households.
In 2021, 100 teenagers participated on line (COVID-19), wrote newspapers which were distributed in 6100 households.
This event was also been relayed in the regional and local press, before and after the event, but also in the social networks:

- La voix du Nord “Trois centes élèves face au défi municipal de l’autonomie d’énergie » - Le courrier de Fourmies « 300 élèves, 300 futurs écolos »
- Le courrier de Fourmies « ils ont vécu une journée en 2050 »
- La voix du Nord«

Fourmies

300 ÉLÈVES, 300 FUTURS ÉCOLOS

Des Rencontres de l'énergie jeune public le 12 mars

-

Fourmies

ILS ONT VÉCU UNE JOURNÉE EN 2050

Trois cents jeunes aux Rencontres de l'énergie

Ville et établissements scolaires réunis pour porter le message

version écolo sillonnera bientôt nos routes

vélo pour aider les personnes dans le besoin

FOURMIES EN 2050

A quoi pourrait ressembler votre quotidien

Trois cents élèves face au défi municipal de l'autonomie d'énergie

95

In 2021, Le Courrier de Fourmies has published “collégiens et lycéens imagines les quartiers de demain »

Le Courrier de Fourmies

Collégiens et lycéens imaginent les quartiers de demain

1.4.2. Heat network co-construction

1.4.2.1. Heat network feasibility study

During the feasibility study, the city has consulted the landlord named PARTENORD, whose building is based on the network in order to propose its connection. The city has worked with him to convince him of the value of heat networks, to know its energy systems and its needs (357 829 kWh/year) for a maximum useful power of 177 kW.

The latter expressed an interest in being connected, but the de minimis rules of Interreg did not allow the project to go ahead.

1.4.2.2. Heat network Webinar

Before launching the public tenders for the construction of the boiler room, Fourmies facilitated a webinar, February the 16th 2021. The purpose was to explain the amenities of the SHIFFT pilot and during the COVID-19 pandemic, ask residents to choose the appearance of the boiler room. 97 inhabitants have participated in this event.

This event was reported in the press:

Fourmies

LA VILLE VA SE CHAUFFER AU BOCAGE

Une chaudière au bois pour 5 à 9 bâtiments publics

Le Sud-Avesnois est en pointe sur les énergies

1.4.2.3. Public meeting (6/01/2021)

In order to explain to inhabitants, the impact of the project, its design and the planning of the works, the city has organized a public meeting which brought together 50 inhabitants.

The city has develop a communication plan in order to attract visitors : flyers, posters and communication in the social networks

This event and its co-creation method was reported in the press:

- La voix du Nord, “des bâtiments communaux seront chauffés au bois de gaies bocagères”.
- Courrier de Fourmies “Fourmies, la ville va mettre en place un réseau de chaleur pour ses bâtiments”.

Fourmies : des bâtiments communaux seront chauffés au bois de haies bocagères

1.4.2.4. Communication during the works

In order to avoid any rejection of the project during the works (roads blocked because of the trenches made in the streets to pass the network), the city has communicated with the inhabitants:

- Flyers distributed in each road impacted by the works;
- Big large display panels on the safety barriers.

We went on call in the REV3 van in order to answer inhabitants' questions about the project.
20 inhabitants came to ask questions about the works.

1.4.2.5. Inauguration of the project (7/12/22)

- <u>A study trip in order to understand the amenities of the biomass</u>

This study trip aimed at discovering the service provided by hedges, the impact of the heat network project on the maintenance of hedges, the environment, the creation of agricultural activity. The aim was also to encourage residents to connect to this type of heating network - to encourage residents to connect to this type of heating network and encourage farmers to maintain their hedges.
53 participants: inhabitants, farmers, social landlords, students, mayors

- <u>The inauguration:</u>

Presentation of the energy and ecological context as well as the solution offered by biomass heat and the strategic vision for the deployment of a large-scale heat network. With the participation of Interreg, the French Energy Agency, the French State - visit of the boiler room in presence of the press, communication in order to promote and enhance the project.
80 participants : inhabitants, farmers, social landlords, students, mayors

Communication plan in order to promote the study travel: - Interview of the Mayor of Fourmies on the regional radio RCF- Invitation card addressed to elected people;- 30 posters in public spaces and shops;- Interview and news release on the local radio Canal FM;- Article in the city magazine in order to promote the inauguration (11 241 copies)

Communication during and after the event:La voix du Nord “le bois va chauffer la commune”

1.2. General Communication about the project and the heat strategy of Fourmies

As a national demonstrator, Fourmies regularly shares its energy strategy in order to inspire other project leaders and encourage the acceleration of the fossil-free energy transition.

1.2.1. Press release:

- Article in the national magazine “Les clés de la Transition energétique” (Fourmies : du photovoltaïque à la chaleur renouvelable | Les clés de la transition énergétique (clesdelatransition.org)) in order to describe the energy transition of Fourmies, focuses on the local the heat strategy and the SHIFFT project.
- Regional Newspaper specialised in agriculture “Terres et Territoires”. - Video report for TV news of FRANCE 3.

- Interwiew Batiradio à l’occasion des rendez-vous du mondial du bâtiment en présence du ministre Franck RIESTER : https://www.batiradio.com/podcasts/megatrends/actualites-et-evenements/le grand-temoin-avec-franck-riester/

(Monsieur le Maire de la Ville de Fourmies évoque SHIFFT > à écouter entre 4’28 jusque 4’55)

1.2.2. Conferences

Ville de Fourmies was invited to participate in conferences in order to share its experience:

- The Mayor of Fourmies has been invited to speak about his energy strategy and in particular “low carbon heat” during a conference dedicated to the elected representatives of the Sambre Avesnois agglomeration. (date + nombre participants).
- Presentation of the heat strategy of Fourmies, in the CD2E conference dedicated to the cities heat strategy (2/12/22) , 50 participants (cities, private enterprises).

1.2.3. REV3 study travels:

Fourmies welcomes groups of elected representatives, students, or residents to share its REV3. We discuss our energy strategy and systematically promote our European and Interreg

partnerships:

- Visit of the President of the REGION GRAND EST;
- Visit of students of university of STRASBOURG;
- Visit of the boiler room and planting of trees near the boiler room by XX students within the framework of a study trip led by the association "Grand Hainaut 2040 - intervention Lycée St Pierre.
- Visit of the boiler room works by 2 groups of secondary school students t11 October 22, 30 students.

1.3. Collaboration with specialised players in the wood value chain – energy

1.3.1. Study with the forestry company to find out the overview of firewood resources the Town requested the expertise of the "Société Forestière" (FOrest Society) in order to evaluate the potential and the price of the wood needed for the heating plant around Fourmies.

This study gave a comprehensive and accurate overview of wood energy fuel: what is it? availability of the regional resource, its local supply chain, SWOT of different wood fuel typologies with regard to their availability, need for storage, calorific characteristics, the ash generated by the combustion.

1.3.2. Cooperation with a local farmers association specialised in the in hedgerow management and the supply of wood chips for fuel

The Avesnois region, in which Fourmies is located, has 15,000 km of hedgerows, which are the green oil of the Avesnois. Indeed, in order to ensure the sustainability of the hedges, and the storage of carbon, they must be maintained. all the more so as these hedges store carbon, protect animals in the event of a heatwave and shelter wildlife. They therefore have an important ecological and territorial resilience interest.

Unfortunately, more and more hedges are being destroyed because they are not "profitable" for farmers and are not compatible with the large size of farm machinery. Moreover, when they are maintained, in order not to occupy too much space, they are badly and too regularly cut, which leads the trees to die.

The "Agriculture Avesnois Thiérache" association, made up of farmers, is trained to maintain the hedges in a sustainable way, to harvest all the wood, to transform it into chips, to store it and to transport it to consumers.

It is faced with the problem of a stock that exceeds demand.

Fourmies worked with this association:

- to explain to the inhabitants the interest of hedges and heating with wood chips (public meeting on 6 January)
- To show and share the experience and welcomed 3 farmers (wishing to diversify their activity), inhabitants, and project leaders inspired by the one of Fourmies: - 2 cities (Willies and Trélon).

- the “Trait d’Union association” which welcomes and accommodates. children in difficulty and disabled adults : 90 buildings to heat! (7/12/22).

1.3.3. sharing information with a wood and pellet stove supplier

The local wood heat systems installer BRISACH shared its sales statistics in order to help the city to plot the information about the wood boilers technology supply.

She has sold 42 wood boilers in Fourmies.

3.HEAT MASTER PLAN

3.1. The 2nd network in order to provide 31% of the city’s energy needs

The city's goal is to become self-sufficient in renewable energy by 2050. It has therefore studied the trajectory that will enable it to achieve this objective in practice.

The study of the heat master plan started in Marsh 2022.

It was carried out in association with the city's largest consumers in order to size a first biomass heating network (from hedgerows) in order to create a cooperative framework to obtain accurate information from the largest consumers about their needs, projects, technical situations, objectives.

Here are the stages of co - construction:

- Kick off meeting with 3 landlords, AGRATI manufacture, Hospital, Department North of France, Région Hauts de France, Fourmies Mayor in order to present what a renewable heat network is, present the next steps of the study, its targets steering.
- Visits of about 20 buildings and meetings with the biggest owners in order to have detailed data on their facilities and speek about their projects (between 06/05/22 and 2/06/22).
- 2 individual meetings with the manufacturer AGRATI (the most important energy consumer of the city), in order to negotiate the injection of its waste heat, from its industrial process, into the heating network.
- 28/08/2022 : steering committee in order to present the 2 scenario for the development of the future heating network.
- 6/10/2022 : presentation of the economic and legal model of the heat network.

The future heat network will provide and launch the administrative procedures that will enable a public service delegation contract to be published in the first quarter of 2023.

Indeed, the city has the ultimatum to create the network in view of a connection to the housing of the future REV3 district of Les Verreries which will be delivered in December 2025. The city has already imposed on future builders to connect to the network.

Main characteristics of the district network:

Length	15 km
Postes de livraison	68
delivery stations (MWh/an)	21 154
Average power (kW/an)	11 589
Wood quantity	22 500 tonnes / year
% of renewable energy	89
Investment	22 090 000 €
coverage of the city's needs (all consumers combined)	31%

4 stakeholders has ever sent a letter of intent to connect to the boiler room:

- OFFICE PUBLIC DE habitat, for a connexion of 551 households.
- Fourmies's HOSPITAL, for a 3398 MWh consumption (equivalent to 444 households?) - The landlord PROMOCIL L'AVESNOISE for 63 households.
- The landlord PARTENORD for 80 households.

Next steps:

- 22/12/2023 : presentation of the scenario for the development of the futur heating network to the to all the town's elected representatives in order to validate the principle of the public service delegation, the energy mix and the roadmap. - January> April: Preparation of the consultation file for companies
- April: Preparation of the consultation procedure;
- July: Submission of tenders;
- Sept to April 2024: Presentation of offers and negotiations;
- 2024-2025: works;
- October 2025: commissioning.

3.2. What about the individual homes?

During the construction of the SHIFFT heating network, the city received requests from residents to connect to the network, which unfortunately had to be refused. (due to de minimis aid).

The study of the future heating network underlines the impossibility, at present, as is the case everywhere in France, of connecting individual houses because of the cost of connection, the impact of these connections on the decrease in density of the network and therefore on its economic model and finally, the refusal of companies specialising in the distribution and management of heating networks to manage the relationship with individuals. (risks of non-payment...)

The city will launch survey (by phone and on line) with a sample of 350 inhabitants and with the support of a specialised polling institute, in order to know the current modes of heating and to calculate precisely the cost of a change of secondary installations in order to estimate the precise cost of the connection of the houses or to work on the economic model which will allow these future connections The city will organise meetings with residents to facilitate the implementation of this survey. > January 2023

4. CO_2 impact, investments made and target groups reached

Information filled out in the CO2 impact tool:
https://docs.google.com/spreadsheets/d/1cwuNUjUcinIqXPLBcee8YCpCADbjovNX6-TVE9IY9Zw/edit#gid=0

5. Observed behavioural change.

Fourmies has published 2 questionnaires (online, posters in public spaces) in order to develop a focus group of inhabitants but the responses were not up to expectations.

On the other hand, the town has set up a very important discussion space with representatives of the inhabitants, such as the social landlords, the Fourmies hospital, the secondary schools, and the town's biggest industrial consumer. This collaborative work has made it possible to size a heating network that will supply 30% of the needs of the entire town by 2025. The town has already received letters of intent to connect.

The city has also observed a change in behaviour on the part of its own elected representatives and other cities that did not necessarily support the project during the initial feasibility studies and that are now personally promoting it or wish to deploy an equivalent project in their own areas.

The inhabitants who live on the edge of the network struggle to understand why they cannot connect to it. because for them, it is enough to pull a pipe in the trunk that they could not benefit from it. It will use this experience to work with the 350 residents during the study of connecting individual houses to the future heating network.

The city's partners, in charge of distributing the energy renovation and heating conversion

subsidies, have reported to the city that many inhabitants are already heated by gas (a vestige of the period when Fourmies was flourishing, which has allowed to benefit from a very important gas network.)
They do not want to switch to wood or pellet heating because of the need to readjust their internal heating network, but also because of the need to carry the wood or bags of pellets, which requires storage space and also a physical strength that older people do not have. This is why a (too) large share of subsidies is still dedicated to condensing gas boilers. It should be noted that GRDF, manager of the Gas network in France, finances a local association in charge of supporting people in fuel poverty. Facilitators mobilized by this association as part of the "CIVI'GAZ" operation, offer RV at home in order to advise residents on the use of their gas boiler, which can influence their choices towards technology. fossil or condensing boilers.

This confirms the relevance of offering a "turnkey" service for the supply of renewable heat, provided that the secondary installations are suitable.
Finally, we found, during the study trip, that it is possible to benefit from a biomass boiler using wood from bocage hedgerows, provided you have a significant heritage and sufficient areas to accommodate a storage silo. as well as suitable equipment for transporting the wood to the silo. This type of installation is therefore reserved for consumers such as farmers or individual entrepreneurs (craftsmen, small businesses, etc.). 3 farmers present during the trip announced that they were working on this track given the current price of gas.

Appendix E: Information received from Places for people Group, Pilot “Norwich - Community energy lab to tackle energy poverty”

Action plan summary

As part of Deliverable 2.1.4 in the SHIFFT project, Places for People drafted a co-creation action plan in 2020. The plan was drafted in consultation with both TU Delft as Exeter University. It was intended to give a clear description of the co-creation process, the planned activities and the followed methodology. This document was prepared to evaluate the process and the outcome of the co-creation process.

The co-creation process in the SHIFFT project was special because it gave clients and other stakeholders an even stronger position to influence the design of the project. Within set conditions (budget, quality, carbon emissions, etc.) the input of clients/stakeholders was taken into account and determined the direction that was taken.

As a housing association, Places for People, is continuously in contact with its clients. We see a category of tenants that is very involved and pro-active, however, the majority of tenants is not really engaged, and it is difficult to make them more actively involved. The SHIFFT project offered an opportunity to test ways to change the interaction between a landlord and its tenants.

In setting up the action plan we already anticipated that we would need different moments where we could contact a client/stakeholder group. For the co-creation actions and activities, we invited a specific group of tenants that had expressed their interest to be actively involved in discussing strategic and operational matters of the local housing association. We call these active tenants: tenant Ambassadors.

As customers become more informed, connected and active, with the ability, means and motivation to take control of their interactions with our company, we are trying to escape traditional approaches of delivering products and services based on a firm-centric value creation process and move toward co-creating unique experiences at critical points of interaction with customers. The main change we expect in this process is for tenant representatives to co-decide on the project decisions that are being made. In the case of the Norwich pilot site, we offered tenant Ambassadors to have their say on different potential options as a solution to the heating problems of this specific project and offered tenant representatives the opportunity to add ideas to the drafted plan.

Innovative was the fact that we did not limit involvement to tenants but that we focused on multidisciplinary collaboration. That is why we had meeting with a variety of stakeholders: tenants, energy suppliers, energy consultants, contractor, management organisation and city council.

Because we are at the start of an important innovative transformation of housing stock, from energetically inefficient to highly efficient, we adopted the idea that we can and should use external ideas as well as internal ideas, and internal and external paths to market, as the company looks to advance used technology and competitiveness.

Before starting our co-creation activities, we clearly wanted to answer the following main question:

- How can we engage (i.e. get hold of the attention to participate) and involve (i.e. to participate and co-create) customers in the innovation process in an effective way?

This main question was divided in the following sub questions:

- When is it appropriate to engage and involve customers in this innovative project?
- What kind of customers/stakeholders can be involved?

Other questions we would like to have resolved before the start were:

- In what parts of the innovation process is customer co-creation beneficial?
- Which process, procedures and methods should be followed?
- What are the tools to be used?
- What pitfalls or disadvantages exist in engaging and involving customers in this co-creation in innovations, and how can they be overcome and avoided?

Description of the implementation process 2020-2022

A number of actions were planned in the co-creation plan and in this section, we will talk more about the implementation. Unfortunately, during implementation we had to face the COVID-19 crisis. This limited the way that we could interact with the stakeholders and especially physical meetings were mainly changed into online events. What also changed with COVID-19 was the planning of the pilot site renovation. Because of supply chain issues that were the consequence of the COVID-19 crisis, the project got delayed. Because some of the agreed actions were aligned with construction activities, we had to change the co-creation programme and even had to skip a few elements.

Co-creation activity with residents of the refugee home (design, all stakeholders, not just end-users). This was probably the key activities that was planned, and we had anticipated this activity to take place over the time span of the project. We now present you with the timeline that we tried to follow and will comment whether, if and how we achieved the activity.

Timeline

1. **Prepare 1st Co-creation meeting** *1 June 2019 – 19 September 2019*

Preparation of our first co-creation meeting took place in line with the planning. Local tenant representatives were found, responsible people from our organisation were involved and Norwich city council was informed and engaged. A co-creation day was prepared and was planned on the 19th of September 2019

2. **1st Co-creation meeting** *19 September 2019*

As planned the first co-creation meeting took place in Norwich on the 19th of September 2019. On the agenda (attached Annex I) were an introduction to the host organisation, an introduction to the SHIFFT project and the relation with the EC, a presentation from the City Council of Norwich, a co-creation session and a project team site visit.

3. **Follow up on 1st Co-creation meeting** *1 November 2019*

During the meeting on the 19th of September 2019 notes were taken and actions divided. All follow up actions were executed before the 1st of November. Presentations of the co-creation meeting were shared and contact was established with the management organisation that is the contact point for the vulnerable group of residents that is being housed on the estate.

4. **Face-to-face meetings, in-depth interviews** *1 October 2019-26 June 2020*

We held informal meetings between the site management (Leeway) and customers/tenants. Because of the specific concerns in respect of vulnerability of the client group these meetings were **not** recorded. We got good insight in what the problems at the estate were. Especially the malfunctioning of the heating system was mentioned, but we also got an idea about related issues like difficult control over thermostats, etc. We further gained some ideas of how we could make tenants benefit from the project (creation of some extra space in one of the boiler rooms).

5. **2nd Co-creation meeting** *26 June 2020*

We had a second co-creation meeting. Since at this stage COVID-19 had kicked in and disturbed our lives, we had an online meeting. Compared to the first meeting we had a more complete group of stakeholders involving energy consultants.

6. **Follow up on 2nd Co-creation meeting** *31 July 2020*

All follow up actions including minutes and bilateral meetings were completed by the end of July 2020

7. **3rd Co-creation meeting** *to be determined end of project*

A third co-creation meeting was planned to be held towards the end of the physical project. It was intended to record information about the working process, whether the expectations had been met and to see if

disturbance on site had been limited and prevented the vulnerable group of tenants to be interrupted in their daily routine. As a result of COVID-19, the project was delayed and will be completed by the end of November 2022. A third co-creation meeting is anticipated before the end of the SHIFFT project.

8. **Follow up on 3rd Co-creation meeting** *1 month after 3rd Co-cr. Meeting*

Obviously, we cannot execute follow up actions on the third co-creation meeting before the meeting has been executed. We expect that follow up actions on a third co-creation meeting can be executed within the time frame of the project.

9. **Final report (FR)** *End 2022*

This is the final report on the co-creation plan. This report was planned to be finalized by the end of 2021 it was, because of earlier mentioned causes delayed to the end of 2022.

10. **Summary FR shared with other tenants** *February 2023*

Places for People will share experiences in the Norwich project with other tenants. We will either do this through an article on the website or through a direct mailing campaign. This action has been delayed to the end of the SHIFFT project.

11. **Presentation FR to tenants/stakeholders** *End 2022*

In December 2022 an event is to be planned to inform local tenants from the Norwich area about the results of the project. The event will have a more general character where we can give tailor made advice on how to save energy, how to fund energy saving measures, etc. The vent will be co-hosted by Norwich City Council. In the Norwich area Places for People will invite all local tenants (1,000 households).

12. **4th Co-creation meeting** *to be det. 1 year after delivery*

A fourth co-creation meeting was foreseen a year after ending the works of the project. This will now fall out of the timeframe of the project. Nevertheless, Places for People will initiate such a fourth contact moment for its stakeholders (including themselves) benefit.

13. **Follow up on 4th Co-creation meeting** *1 month after 4th Co-cr. Meeting*

Like the fourth co-creation meeting itself, follow up actions will fall outside of the timeframe of this project. The plan will, however, be executed as described in the co-creation plan.

Engagement programme about behavioural energy advice 750+ residents

Literature and practice have convinced us that behavioural change of residents can contribute to savings of between 5-15% In order to involve the wider Norwich community in our efforts to save energy we decided to send out a series of leaflets (Annex 2 Leaflet) to all tenants that we have in Norwich. The leaflets have attention for both heating and electricity consumption.

In every season a leaflet is being distributed amongst 1,000 households in Norwich. In order to measure impact, we will do a survey under a sample of the people that we send the leaflets to. We will ask questions about whether behaviour has changed because of the information that was shared in the leaflets.

Focus group

Within Places for People there are nationwide focus groups (remember that Places for People is letting over 230,000 dwellings across the UK) that address all issues around our daily operations and where we are in direct contact with our clients. The SHIFFT project has provided information about the SHIFFT project that has been presented in the Focus groups for reflection. We have noticed that attention for energy saving operations has increased after the breakout of the war in the Ukraine. As a result of the increased prices of energy tenants have become more aware of the impact that energy and its price make on their lives.

The SHIFFT project has raised awareness around decarbonization and information about the project was used to improve our credentials as an organisation with high attention for all elements around ESG (Environmental, Social, Governance). Last year Places for People did get a certified sustainable housing label. In the annual ESG report there was attention for the SHIIFT project and in international meetings we have been able to share our experiences with battery technology (as part of the technical solution in Norwich).

Workshop in Norwich

In December 2022 we organised a workshop in Norwich. Apart from a few keynote speakers about the project we set up a space where people could interactively (market stye) get involved with energy advisors, financial specialists, the local council and housing officers.

The session gave a wide audience the opportunity to learn more about the SHIFFT project. We limited the information about the Norwich site because of the vulnerable character of our clients in that estate. The City Council contributed to the event and we invited over a 1,000 residents whilst the event was announced publicly to be open to any interested audience.

CO_2 Impact

It is difficult to measure the exact result of co-creation activities on CO_2 emissions. Within the project a methodology was developed by TU Delft to make a fair estimation of the savings.

Before this calculation method was developed within the project PfP made its own assessment based on literature that forecasted a significantly higher impact (Annex 3).

Within the SHIFFT project we did, however, need to use one common calculation method and this led to a lower result for the co-creation activities that were executed by Places for People. The difference is specifically to find in the estimated impact of actions and the used engagement multiplier.

In the statistics of the project, you will find savings by means of co-creation activities from Places for People of 66 tons tCO_2e/a (average). In our estimations before starting the project we had anticipated 5% of savings by means of changed behaviour of over 1,000 households that would lead to savings of 733 tons tCO_2e/a (average).

In respect of the impact that our actions are making it is very difficult to measure the results. Best would be to compare energy consumption before our campaigns with energy consumption after our campaign (like for like). Consumption data are, however, not available to us since tenants have their individual energy contracts.

Households or other stakeholders reached

The targets that we set before we started the project in terms of the number of engaged households were exceeded. We anticipated to be in contact with 750 households but finally managed to be in contact with over 1,000 households. The type of engagement varied from intense to anonymous. There were a number of levels of engagement.

We had the most intense contact with the tenant ambassadors that took part in the co-creation sessions and with the Focus groups, a national tenant panel. This group had the opportunity to get directly engaged and to influence our ideas towards the pilot project.

At the pilot project we indirectly, through the management organisation (Leeway), communicated with the 12 households. These contacts gave us a deep understanding about the underlying issues in the estate. The management organisation (leeway) was actively involved in the co-creation process and had feedback from its sitting tenants.

Then we had genuinely interested people that attended the final conference in Norwich. These people showed their engagement by directly participating in a workshop and by attending the presentation of the results of the SHIFFT project. In a market style workshop these people could interactively get informed by a group of specialists.

Finally, we sent our seasonal leaflets to over 1,000 households. From this group some people got more actively involved and attended the workshop. Others were less engaged and probably a small group did not even bother to read the leaflet.

Places for People Group also communicated about the SHIFFT project on social media, and we have recorded some of the interest from external people at those platforms.

Observed behavioural change

We have observed changes in the behaviour of people living on the pilot site. One of the desires of occupants was to have an easily manageable control over their heating systems (thermostat). We did inform the occupants that certain simple behavioural changes can save an important amount of energy (closing curtains at night, etc.). The management of the refugee did notice that advice that was given to the tenants was picked up and led to behavioural change.

The group of tenants that was reached through mailing campaigns or that attended workshops or co-creation events is probably a mixed group. Some do act where others don´t. Tenant ambassadors noticed behavioural changes but could not differentiate between changes in behaviour because of price hikes or because of a higher awareness as a result of the co-creation activities.

When looking at the changes that were observed, it was not surprising that people are looking at the easy gains first. Switching off lights, closing doors, closing curtains, shower less time, put on an extra jersey, etc. are mentioned most in our conversations with tenant representatives.

It seems to help when we can make changes in behaviour visible in the consumption. When people see the results of their actions, they often become motivated to save even more.

Impact on investments made

It is difficult to tell how many tenants have taken actions after we informed them about the potential of energy saving investments. With tenants we normally see limited investments, and people concentrate on things like changing light bulbs, draught stripping, hanging curtains for windows, shower timers, etc. For the bigger investments, tenants rely on their landlords. The installation of solar panels, wall insulation, roof insulation, heat pumps, etc are all investments that cannot be expected from tenants that in majority live on lower incomes.

In respect of the tried solutions in SHIFFT they have been used as learning material. We have clearly seen an increased interest in battery technology. Places for People participated in October 2022 in a well-attended webinar of the European Federation for Living and explained to other housing associations what the pros and cons of this technology are.

Also, in respect of ground and air source heat pumps an increased interest across the sector has et to a number of inquiries from both internal and external contacts.

Work in the wider SHIFFT community in relation to heating strategies and heating policies led to a study visit from PfP Group (UK based) to Amsterdam in June 2022 to study district heating systems.

In the investment plans of the organisation the tested technologies have been included in a catalogue of potential retrofit options.

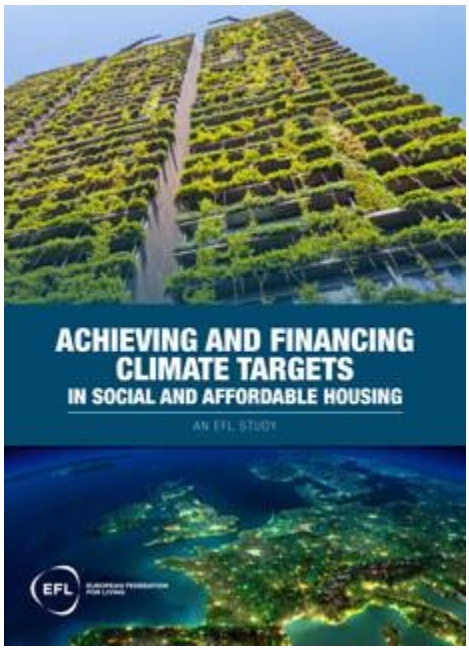
Impact on social networks, coalitions and partnerships formed

Our involvement in the SHIFFT project and its co-creative actions has widened our social networks.

The SHIFFT consortium members are working closely together and the experiences in this project already has led to other initiatives that are explored in respect of energy efficiency (e.g., some partners are preparing a bid for a Horizon Europe programme).

In the co-creation project that was set up for our own organisation, we see that the intense contacts have led to a better understanding of the different stakeholders. In Norwich the collaboration with the City Council have been strengthened.

In a wider national context, we have shared the experiences in the SHIFFT project with groups of housing associations. Housing associations in the UK manage all together 2,500,000 dwellings. In a collaboration that Places for People set up in 2021, we discuss topics that determine the future of housing (hence the alliance is called the Future Homes Consortium). Within that coalition subgroups are set up to study other energy related matters like facilitating infrastructure for electrical vehicles, international collaboration, smart energy systems, etc.



On an international level we shared our experiences in peer-to-peer networks that we are members to. The most important international alliances being the European Federation for Living and the Urban Land Institute. Both membership organisations now adopted newly established working groups to elaborate the impact of the energy transformation and are sharing best practice.

Reflection on Implementation of co-creative activities

We have learnt a lot from the co-creative activities, one of the eye-openers was that bringing together different stakeholders led to better and innovative outcomes. Our clients (tenants) do normally only communicate with us as their landlord. Info. This dimension comes with innovative ideas.

The downside of co-creative processes is that in order to get interest and interaction a considerable amount of time must be invested.

We will certainly use the experiences in the SHIFFT project in future projects, but we are certain that a balance will need to be found between available resources and the benefits of the co-creative actions.

Miscellaneous

Agenda SHIFFT Project meeting 19th September 2019

Sustainable **H**eating**: I**mplementation of **F**ossil**-F**ree **T**echnologies

Project to be held at: Cotman Housing Association
Bowthorpe Hall, Cotman House, Bowthorpe Hall Road
Norwich NR5 9AD
United Kingdom

Invited to this meeting: Jane Warnes (CEO Cotman HA)
Nigel Gardiner (Property & Compliance Manager Cotman HA)
Julie Alexander (Director of Technology and Innovation PfP Group)
Derek Watters (Sustainability Manager PfP Group)
Anatol Itten (TU Delft)
Corne Koppelaar (International Director PfP Group)
Richard Willson (City Council Norwich)
Tenant representatives

09.45 Meet at the Cotman Housing office (address above). Introduction to Cotman (JW to prepare) and setting the objectives of the day

10.15 Meet with Norwich City Council. Richard Willson (Environmental Strategy Manager) agreed to meet us during the day and I have asked him to inform us if he wants some other colleagues to get involved (CK to prepare a presentation on the project).

11.30 Site visit. We might want to invite technical specialist for the site visit (Sunamp?). Maybe Derek and Nigel can advise who they would like to bring along. I understand that we will have to carefully communicate who will join the site visit due to the vulnerability of this specific client group. (JW/NG/DW to prepare)

12.30 Lunch

13.30 Meet the management organisation Leeway (DW to prepare)

14.30 Brainstorm session about the co-creation process. The idea is to give a 15-minute presentation to some tenant ambassadors and have a brainstorm session about how we could shape the co-creation process. Anatol Itten from Delft University will be with us during the whole day and contribute to the brainstorm session giving examples of how such a process has been successfully set up in different European locations. (Introduction CK and co-creation process by AI)

16.00 End of programme

Leaflet

Places for People

Interreg
2 Seas Mers Zeeën
SHIFFT

Summer 2021

'Shift' your energy usage!

Places for People is participating in the SHIFFT project, an EU funded project which aims to promote the use of more environmentally friendly heating systems.

As part of this project, we have put together some useful advice and tips to help you save energy.

Here are some reasons why saving energy is so important:

You save money

Even something as simple as switching your television off standby can save you up to £80 a year.

You reduce your toxic emissions

Emissions are bad for the environment causing climate change and extreme weather events like flooding.

Emissions from cars is also bad for those with respiratory conditions and makes our air more difficult to breathe.

You create less waste

Any waste that is not recycled usually ends up at a landfill, where it rots and produces toxic substances.

This ends up in the soil, affecting the water supply and harming the local environment.

Clean-up of water uses a lot of energy and is very costly.

SHIFFT, Leeway Norwich. Work Package 2: Tenant Engagement

Places for People is a housing association providing affordable housing with a focus on energy retrofitting of existing properties to provide warm and sustainable homes for vulnerable customers. As part of the commitment for innovation, Places for People are participating in the SHIFFT project along with other organisations in the 2 Seas area. As part of the wider project, Places for People will be engaging with the local residents to provide information on energy savings with up to 1,000 households contacted. The aim is for local areas to contribute to reducing carbon dioxide emissions as well as saving their money on energy bills.

It has been established that the aim is for the residents to reduce their energy consumption and henceforth their bills by 5%. *The aim was set based on similar studies carried out where a minimum goal of 5% was initially set*. The Environmental Sustainability team at Places for People has undertaken a research to establish what tenant interactions and advice are most effective in bringing the required savings. Based on the research, a campaign is being drafted which contains a communication plan along with the content that will be delivered to the tenants.

Research studies

Studies in the UK and across Europe demonstrated that engaging with household residents and providing the right information, can influence their habits and behaviour which in turn leads to energy savings. For tenants, it can be a simple measure that is often overlooked so the idea is to give them a reminder of the importance of efficient energy use. The key to effective tenant engagement can be categorised by the below concepts:

Convenience

1. **Simplifying Things:** making the process of energy savings easier, for example installation of automatic controls on heating or providing a reduced flow shower head
2. **Prompting:** reminders that focus on performing an action, for example 'turn off lights when leaving a room'

Information

3. **Justification:** Explanation on why the action is important and linking it to a further cause. 'Saving energy is important as it reduces global emissions and in turn prevents global warming'
4. **Instruction:** Providing direct information and instructions on day-to-day procedures.

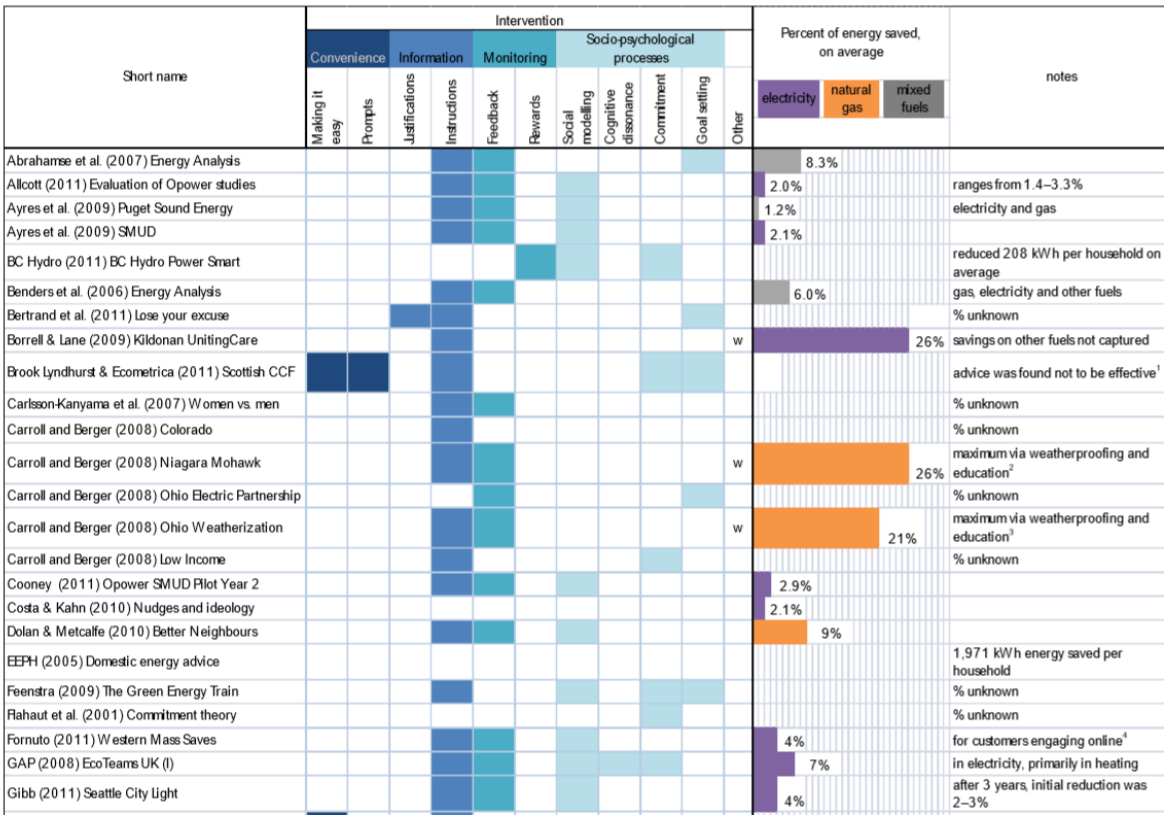
Monitoring

5. **Feedback:** Allowing the tenant to see for themselves the results of action they have made early on. For example, a reduction in the monthly energy bills so they can see a direct impact.
6. **Rewards:** Incentives which are provided as a result of participation in the interventions such as coupons, gifts and prizes.

Social-Physiological Processes

7. **Goal setting** is the process of asking participants to aim for a predetermined goal, such as reducing their electricity consumption by 20%

Other concepts include Social modelling, Cognitive Dissonance and Commitment however these were not reviewed as part of this report.

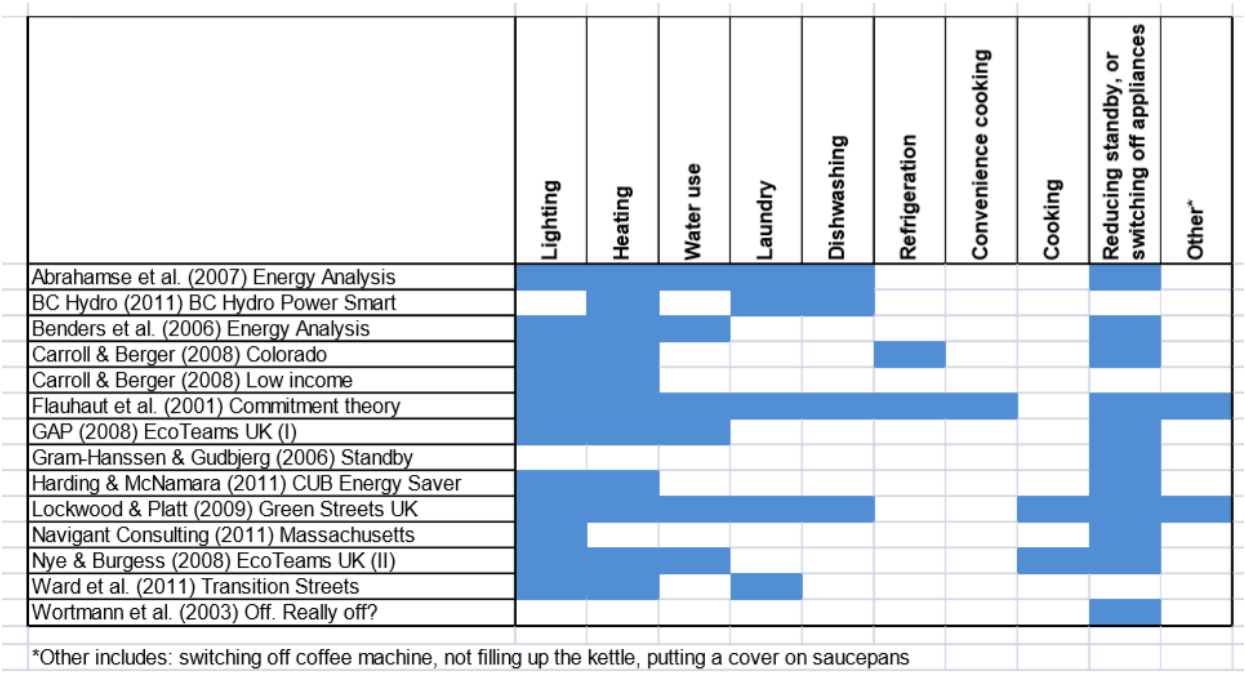


Energy savings by Intervention

The table of studies carried out demonstrates that the most common interventions which prove to be effective is the use of Instructions and Feedback. For example, the Borrell & Lane (2009) study demonstrated savings of 26% in electricity as a result of providing instructions, and Carrol and Berger (2008), a 26% reduction in natural gas usage as a result of providing physical measures of weather proofing and education. Other effective measures include goal setting such as in the Abrahamse (2007) study, with 8% reduction in mixed fuels. Henceforth, the main focus of tenant engagement would be in the provision of information and setting goals as well as allowing the tenant to feedback on their savings.

Large population programmes such as Home Energy Reports usually provide reductions of 1-3% energy savings per household. Henceforth, the aim would be to provide more direct and bespoke approach to a smaller size of population in order to achieve higher savings. The medium that would be used would be a mixture of physical letter posting as well as having distribution online. In some instances, the use of online methods has shown to be more effective. However, considering that some tenants may not have the skills to access information online, the postal option will still be utilised. In terms of the information delivered, the focus would be on innovative methods of energy reductions. Studies have shown that the focus on new technologies demonstrated savings of 20% (Department of Energy & Climate Change, 2012). This information would include the physical ways of saving energy around the house, from simple things such as draft proofing and insulation to more advanced things such as boiler upgrades and smart metering. Simple measures such as draft proofing and insulation can reduce gas use by up to 16%. If this is combined with the provision of education such as short classes, a further 10% additional saving can be achieved. The most common advice that was used in the studies that proved to be effective is things like turning off lights and replacing traditional light bulbs with LEDs;

reducing standby consumption of applications; changing habits in hot water usage. Table below shows the most common areas which were targeted in the studies which brought savings.



	Lighting	Heating	Water use	Laundry	Dishwashing	Refrigeration	Convenience cooking	Cooking	Reducing standby, or switching off appliances	Other*
Abrahamse et al. (2007) Energy Analysis	■	■	■	■	■				■	
BC Hydro (2011) BC Hydro Power Smart		■		■	■					
Benders et al. (2006) Energy Analysis	■	■	■						■	
Carroll & Berger (2008) Colorado	■	■				■			■	
Carroll & Berger (2008) Low income	■	■								
Flauhaut et al. (2001) Commitment theory	■	■	■	■	■	■	■		■	■
GAP (2008) EcoTeams UK (I)	■	■	■						■	
Gram-Hanssen & Gudbjerg (2006) Standby									■	
Harding & McNamara (2011) CUB Energy Saver	■	■							■	
Lockwood & Platt (2009) Green Streets UK	■	■	■	■	■			■	■	■
Navigant Consulting (2011) Massachusetts	■								■	
Nye & Burgess (2008) EcoTeams UK (II)	■	■	■					■	■	
Ward et al. (2011) Transition Streets	■	■		■						
Wortmann et al. (2003) Off. Really off?									■	

*Other includes: switching off coffee machine, not filling up the kettle, putting a cover on saucepans

Areas of focus for energy savings across different studies

As a means of motivation to participate, the money savings aspect was a common reason for taking part in the intervention. This can be further improved by the additional rewards for participating.

In summary, the studies demonstrated the following:

- Consistent reduction in energy use of 2% through routine energy advice and comparative consumption reporting;
- Using a baseline of consumption pre-intervention, provided an effective comparison mechanism for tenants to observe savings;
- Bespoke and tailored instructions with comparative feedback resulted in higher levels of savings;
- Using a community approach (peer support) encouraged wide behaviour change and savings of up to 8-10%
- There is no one single intervention that proves to be most effective. The ultimate savings come from an integration of different ideas such as financial incentives, community benefits, environmental awareness, and concern.

Source: 6921-what-works-in-changing-energyusing-behaviours-in-

A further study has explored the roll out of smart metering and the resulting savings. Smart meters are devices that provide accurate metering to the supplier. The study has found that savings of 5% or more were observed as a result of smart meter rollout. When smart meters are combined with a real time display which shows the

tenant their consumption and costs, they consistently provide an average of 3% savings, with highest observed at 11% for some time periods and certain groups. Furthermore, this needs to be backed up with regular energy advice. In general, direct feedback such as this is more effective than in-direct feedback, however this still depends on the quality of information being delivered.

Energy-saving target	Energy consumption reduced with feedback	Energy consumption reduced without feedback
20 %	15.1 %	4.5 %
2 %	5.7 %	0.6 %

Savings achieved through setting goals and providing feedback

Source: Achieving energy efficiency through behaviour change

Conclusion for Places for People

The Environmental Sustainability Team at Places for People has developed an engagement program for the distribution of energy advice to 750+ residents in Norwich. The topics have been structured with consideration of the analysed studies and taking account of the nature of the customer. The objective is for tenants to save at least 5% with the interventions, however based on the studies, Places for People are confident that more can be achieved. The information will be delivered on a quarterly basis each season with the following areas:

1. **Benefits of Energy Savings (Sustainability) –** April 2021
    - Information on energy consumption and how it links to global warming
    - Importance of energy savings and simple measures
    - Emphasis of individual and community benefits
    - Emphasis of the SHIFFT project and the importance for local community

2. **Changing Energy Supplier –** July 2021
    - Advice on selecting the best energy tariffs through the use of online comparison websites
    - Advice on charities/ organisation who would be able to guide the tenant

3. **Energy Finance Support –** November 2021
    - Information on financial support the government can provide in provision of help with bill payment as well as financial support for home energy efficiency installations

4. **Smart Meters -** February 2022
    - Information on the smart meter rollout in the UK
    - How smart meters can save the tenant energy
    - Smart meter installation schemes
5. **Feedback Survey –** April 2022
    - Providing insight into resident energy awareness
    - Possible savings in costs overtime
    - Affordable Warmth – can customers comfortably heat their homes
    - Other information they want to find out about
    - General comments on informative material