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Bringing together citizens and professionals to develop know-how for energy efficient renovations

Part of the Collection: Findings and Recommendations
from the SHARED GREEN DEAL Social Experiments



May 2025

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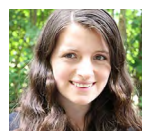
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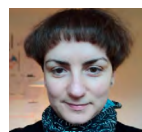
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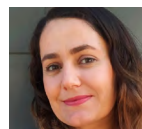
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Executive summary of recommendations

This report outlines the design and implementation of Knowledge Networks, whereby professionals and citizens are brought together to share knowledge, in this case, about energy efficient building renovations. Based on four experimental Knowledge Networks – delivered in Hungary, Lithuania, Ireland and Spain – we propose a number of learning points and recommendations (see Section 4 for a more detailed breakdown of these).

These learning points and recommendations cover three main areas: 1) the value of a Knowledge Network approach; 2) the process of implementing Knowledge Networks; and, 3) wider policy implications. These learning points and recommendations are aimed at both policyworkers and practitioners who may want to support or run Knowledge Networks at any level.

Firstly, we recommend a Knowledge Network approach to policyworkers and practitioners as an effective tool in the delivery of the European Commission's Renovation Wave Strategy and other energy efficiency goals. In particular, we note the usefulness of Knowledge Networks for developing 'know-how', i.e. practical knowledge about how to organise and implement a renovation. The value of Knowledge Networks is that they can: facilitate sustained and focused interactions between renovations professionals and diverse citizens; deliver actionable, up-to-date and place-specific knowledge about renovation processes; enable know-how to be shared through direct encounters with residents who have lived experience of renovation; build a sense of community that motivates and supports renovation journeys; and foster a 'multiplier effect' through flexible and evolving connections.

Second, we recommend that effective learning is more likely to come through a Knowledge Network, when the following actions are undertaken: deliver Knowledge Networks through established community partners; ensure effective co-ordination; connect with gatekeepers and wider organisations; engage and enthuse renovation professionals; provide one-stop shops to advise citizens; facilitate eco-tours and home visits; sustain long-term Knowledge Networks; and, embed gender justice and inclusion at every stage.

Thirdly, when looking towards the wider policy implications of our Knowledge Network experiences and analyses, we recommend that policy actors and practitioners:

- **Engage with diverse knowledges:** Policyworkers need to recognise, value and use the knowledge and know-how of both citizens and professionals within the renovation sphere. Currently, little focus is placed on people's experiential know-how around renovation. Policyworkers can learn from local Knowledge Networks to gain a better understanding of the real-world drivers and barriers to efficient renovations.
- **Provide clear and consistent financial support for households, especially those in energy poverty:** There is a need to upscale the provision of subsidies and grants for renovations, and ensure these are well-targeted and consistent. If criteria fluctuate year-by-year, or are not clearly communicated, this makes it very difficult for advisors and citizens to access them. Energy poverty needs to be established as a cross-cutting policy priority.
- **Invest in ongoing advice provision:** Equally important is sustained resourcing for the provision of advice to citizens. Subsidies are useless if the relevant groups do not know about them, or do not have the know-how to navigate complex application processes. Advice can be provided through governmental and/or non-governmental bodies, but needs to be accessible, comprehensive and trusted.
- **Take a joined-up approach:** Policyworkers need to examine the intersections between renovation goals and other policy frameworks, especially those around tenure and taxation, which may act as barriers to efficient renovations, and take action to address inconsistent policies.
- **Draw on Knowledge Network approaches** within related energy policy agendas. For example, policy and practice around Energy Communities and Positive Energy Districts could benefit from the learnings reported here.
- **Invest in research on Knowledge Networks and engage researchers in policy processes:** Research across disciplines, including the Social Sciences and Humanities, can ensure policy is grounded in rigorous and in-depth understanding of the challenges, lived experiences and sociotechnical dynamics of renovation practices.

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1. Introduction

1.1. Introducing the SHARED GREEN DEAL project

This report presents findings on Efficient Renovations as part of the Horizon 2020 project “*Social sciences and Humanities for Achieving a Responsible, Equitable and Desirable Green Deal*” (SHARED GREEN DEAL). The EU Green Deal is a programme of policies aimed at overcoming climate change and environmental degradation by transforming the EU into a modern, resource-efficient and competitive economy. The goal of SHARED GREEN DEAL is to stimulate behavioural, social and cultural change across Europe, aligned with the policy priorities of the Green Deal.

SHARED GREEN DEAL provides Social Sciences and Humanities (SSH) tools to support the implementation of the Green Deal programme. In the past, SSH research on green transitions has focused on changes to either individuals (‘micro’ phenomena) or systems and collectives (‘macro’ phenomena). In contrast, SHARED GREEN DEAL focuses on ‘middle range’ (‘meso’) changes to bridge these two sets of understandings and priorities (Foulds et al., 2025a). Using this innovative ‘meso’ approach, the project links societal actors to foster knowledge sharing, learn from collective experiences, and feed back into ‘macro’ policies and governance.

The SHARED GREEN DEAL consortium brings together 22 leading organisations from across Europe, including universities, research institutions, network organisations and businesses. The project is structured around six priority Green Deal topics: Clean Energy, Circular Economy, Efficient Renovations, Sustainable Mobility, Sustainable Food, and Preserving Biodiversity. Within these six themes, a total of 24 social experiments have been delivered across different EU Member States and affiliated countries, working with local municipalities and not-for-profit organisations¹. Alongside this report on Efficient Renovations, there are five further reports, on the other five priority Green Deal topics of the project². Other resources related to the running of and impacts from the social experiments can also be found via www.sharedgreendeal.eu.

1.2. Introducing the Efficient Renovations experiment stream and this report

The meso unit that we focused on for the Efficient Renovations stream was **know-how**, i.e. practical knowledge on how to get energy efficient renovations done (see Section 2.1). Our experiment stream aimed to develop renovation know-how via setting up, organising and delivering Knowledge Networks. Inspired by Catney et al.’s (2013) work on Community Knowledge Networks, we define our (experimental) Knowledge Networks as multi-stakeholder groups who share a common interest in learning through doing. Learning through doing is achieved by participating in formal Network events as well as more informal exchanges between Network Members. As such, our Networks

1 Further detail about each of the SHARED GREEN DEAL social experiments can be found in the project’s Case Study Guides (Kovács et al., 2024).

2 All reports can be accessed here: www.sharedgreendeal.eu/expt-findings

brought together individuals from a particular locality, and spanned both a range of renovation professionals (e.g. finance, architects, municipality representatives) and a range of householders (e.g. including those who had previously renovated, alongside those who had no experience and sometimes minimal initial interest). Over the course of around 12 months, our Knowledge Network Members participated in numerous Network events, which were focused on interactivity and learning through doing, such as eco-tours of homes before, during and after energy efficient renovations. In addition to this experiential ethos, the Networks aimed to enable learning through facilitating dialogue and building new relationships and contacts.

Our experiment stream relates strongly to the European Commission's Renovation Wave Strategy (European Commission, 2020), which is part of the EU Green Deal policy programme (European Commission, 2019). The Renovation Wave Strategy has set ambitious objectives for advancing the energy efficiency of Europe's existing building stock. In particular, it aims to renovate 35 million buildings by 2030, which would require at least doubling the annual rate of energy efficient energy renovations in Europe. To achieve this step change, throughout the Commission's strategy document, there are commitments to e.g. skilling the construction sector as well as addressing market barriers and providing technical assistance to citizens and householders.

For clarity, we acknowledge that there is no universal definition agreed for (building) renovation. For the purposes of our experiments and this report, the term renovation usually refers to substantial changes to the fabric and/or structure of buildings (Wilson et al., 2015), whereas improvements or retrofits often refer to smaller, more modest, or interior changes (Maller and Horne, 2011). Our experiments, therefore, focus on structural improvements to buildings, as well as building-level energy-consuming technologies and technological systems, primarily relating to heating, cooling and ventilation. Furthermore, our focus on renovations that aim to improve building energy performance excludes renovations performed solely for lifestyle purposes (e.g. modernising kitchens) or for enlarging the space available (e.g. adding extensions such as conservatories). Similarly, we do not focus on the installation of renewable energy or smart technologies, as this is beyond the scope of energy efficiency.

This report is structured as follows: we begin by outlining how our know-how-focused social experiments were organised, including timelines, forms of engagements, our theoretical approach to 'know-how', which local actors were involved, and who participated in the interviews that were analysed for this report³ (Section 2). The core of this report focuses on the transformations in knowledge achieved through the experiments, including impacts on individual practice and wider stakeholders, as well as factors limiting and promoting such experiment impacts (Section 3). We then reflect on recommendations for policyworkers and practitioners who may wish to implement a Knowledge Network approach (Section 4), before closing with conclusions on key findings and implications for research and governance (Section 5).

3 For further detail on the methods, including a more detailed breakdown on participant characteristics and their participation in the Knowledge Network see the Methodological Appendix (Foulds et al., 2025b).

2. The Efficient Renovations experiment stream

The purpose of this section is to offer more detail in terms of what actually happened in the organisation and delivery of this experiment stream (Section 2.2), as well as how this builds upon our definition and approach to know-how (Section 2.1).

2.1. Our approach to know-how

Our renovation experiment stream made a clear distinction between the explicit ‘know-what’ of renovation practices on one hand, and the practical and experiential ‘know-how’ on the other. ‘Know-what’ refers to explicit knowledge that can be put into words or instructions, such as descriptions of technical systems. This ‘know-what’ can be passed from person to person through words and discussions. In contrast, whilst ‘know-how’ can be explicitly discussed and learnt, it also involves more tacit forms of knowledge that cannot always be expressed with words. In addition, this experiential know-how is not only individual, but also collective. We strongly argue that a focus on know-how is severely lacking in policy and governance interventions targeting (learning for) building energy efficiency. We illustrate this markedly different approach through our working definition on know-how for energy efficient renovations, in Box 1.

A key rationale for focusing on the know-how of renovation was to highlight the ways in which people understand and perform everyday practices at home, which are directly relevant to renovation practices and processes. For example, the ways in which people experience comfort (and their indoor environments) at home is an experience that then affects the ways in which they seek to upgrade their spaces and related energy-consuming technologies. In addition, we designed our experiments to capture and account for the know-how of professional actors, who have occupations that are directly involved in renovation processes. These professional actors have similarly amassed considerable know-how on how to practically do (and plan and think about) renovations, through their various experiences. We thus set up our experiments on the assumption that both householders and professionals have useful know-how, and so it would be fruitful

Box 1. Know-how for energy efficiency renovations

Know-how for energy efficient renovations refers to the practical, hands-on knowledge required to effectively plan, manage, and implement renovation projects that improve a building’s energy performance. It goes beyond theoretical understanding or technical specifications; it’s about knowing how to apply that knowledge in real-world situations. For example, it might involve understanding how to communicate renovation plans to neighbours, or how to manage contractors to ensure a renovation project stays on track. It could also include skills like navigating local grant paperwork for funding, or troubleshooting issues that arise during (and immediately after) the renovation. This type of knowledge is often gained through experience and is therefore embedded in the daily practices of renovation professionals and homeowners alike, making it distinct from simply knowing what energy efficiency is or why it is important.

to establish interactive learning opportunities that enable dialogue and informal engagements between them. The aim of our experiment stream was therefore to develop renovation know-how by building Knowledge Networks.

2.2. How we organised and implemented our four experiments

Over June 2023 to April 2024, we ran our Knowledge Network experiments in four locations across Europe: Vilnius, Lithuania; Nógrád County, Hungary; Zaragoza, Spain; and, Mayo County, Ireland⁴. We had two rural (Ireland, Hungary) and two urban (Lithuania, Spain) locations; the urban locations' housing stocks were dominated by multi-apartment renters, and the rural locations were dominated by detached house owner-occupiers. The local partners - who organised and coordinated the Knowledge Network activities - also had a balanced split, with two being non-for-profit organisations (ECODES, Spain; Habitat for Humanity, Hungary) and two being municipality(-owned) organisations or working in partnership with the municipality (Let's Renovate This City, Lithuania; Climate Action Louisburgh Locality, with Mayo County Council, Ireland).



Examples of buildings visited during eco-tours for each of the four experiment sites: a) Vilnius, b) Nógrád County, c) Zaragoza, and d) Mayo County

⁴ Section 1.1 in the Methodological Appendix (Foulds et al., 2025b) includes further detail on the local context of each location (Table A1.1a) and the evaluation process that led to the selection of these four locations.

Consent to joining the Networks was confirmed through a Network Membership Survey in each location. Detailed summaries of each Network's membership characteristics (Table A1.1b) and of the members' motivations for joining their Network (Table A1.1c) are available in the Methodological Appendix (Foulds et al., 2025b). By the end of the experiments, the final network sizes ranged from 31 to 38, totaling 138 members across the four Networks. In our recruitment, we prioritised a balance between professionals and citizens, and also intentionally prioritised women members⁵ to help push back against the dominance of men in this sector (Table 2.2a).

Table 2.2a. Summary of headline characteristics of Network Members, per experiment location

	Vilnius Lithuania	Nógrád County Hungary	Zaragoza Spain	Mayo County Ireland	Total
Participation					
Initially signed-up	47	34	34	36	150
Dropped out	10	3	0	1	14
Newly recruited	1	0	0	1	2
Network Member at experiment end	38	31	34	36	138
Participant type					
Professional	17 (45%)	15 (50%)	19 (56%)	16 (44%)	67
Citizen	21 (55%)	15 (50%)	15 (44%)	20 (56%)	71
Gender					
Man	16 (42%)	12 (40%)	17 (50%)	16 (44%)	61
Woman	22 (58%)	18 (60%)	17 (50%)	20 (56%)	77
Age					
18-29 years	2 (5%)	2 (7%)	0 (0%)	0 (0%)	4
30-39 years	4 (11%)	14 (47%)	3 (9%)	3 (8%)	25
40-49 years	8 (21%)	12 (40%)	13 (38%)	12 (33%)	44
50-59 years	7 (18%)	2 (7%)	7 (20.5%)	5 (14%)	21
60-69 years	13 (34%)	0 (0%)	5 (15%)	9 (25%)	27
70-79 years	4 (11%)	0 (0%)	5 (15%)	2 (6%)	11
80+ years	0 (0%)	0 (0%)	1 (2.5%)	4 (11%)	5
Prefer not to say	0 (0%)	0 (0%)	0 (0%)	1 (3%)	1

Note: one survey from Nógrád County, Hungary was lost, meaning the characteristics for this Member are not captured in the table

All four experiments followed the same overall journey, in that they all began with a Network launch event, including introducing the Network purpose, establishing shared expectations, and getting to know one another; and held a final Network event, involving reflecting on the journey and openly discussing what could come next. In between these two events, each Network focused on a range

⁵ When collecting data on participants' genders, we asked them to self-identify. We report genders using the terms "man", "woman" and "non-binary", in accordance with World Health Organisation guidance on sex and gender terminology. See: <https://www.who.int/health-topics/gender>

of site visits, all of which prioritised learning-by-doing. There was a general, shared focus on developing renovation know-how through experiencing homes at different renovation stages. Indeed, all Networks ran tours of homes that had either been renovated, were undergoing renovation, or were seriously considering renovation in the future. In this report, we often refer to these home tours as ‘eco-tours’, not least because that was the term most used by local partners and Network members. However, there was no rigid schedule or programme of activities that each Network needed to follow, thereby allowing flexibility to tailor the visits to local needs and Network Member interests. As such, Networks took advantage of other opportunities for experiential learning; for instance, visiting manufacturer showrooms to test out the latest energy efficiency technologies.

The overall learning journey taken by each of the Networks therefore had various similarities and differences (Figure 2.2a). On average, the Networks organised 10.5 visits (not including the launch and final events), ranging from 7 to 14. For a detailed breakdown of each network’s programme of events – including dates, participant information journey and event descriptions – see Tables A1.1d–g, in the Methodological Appendix (Foulds et al., 2025b).

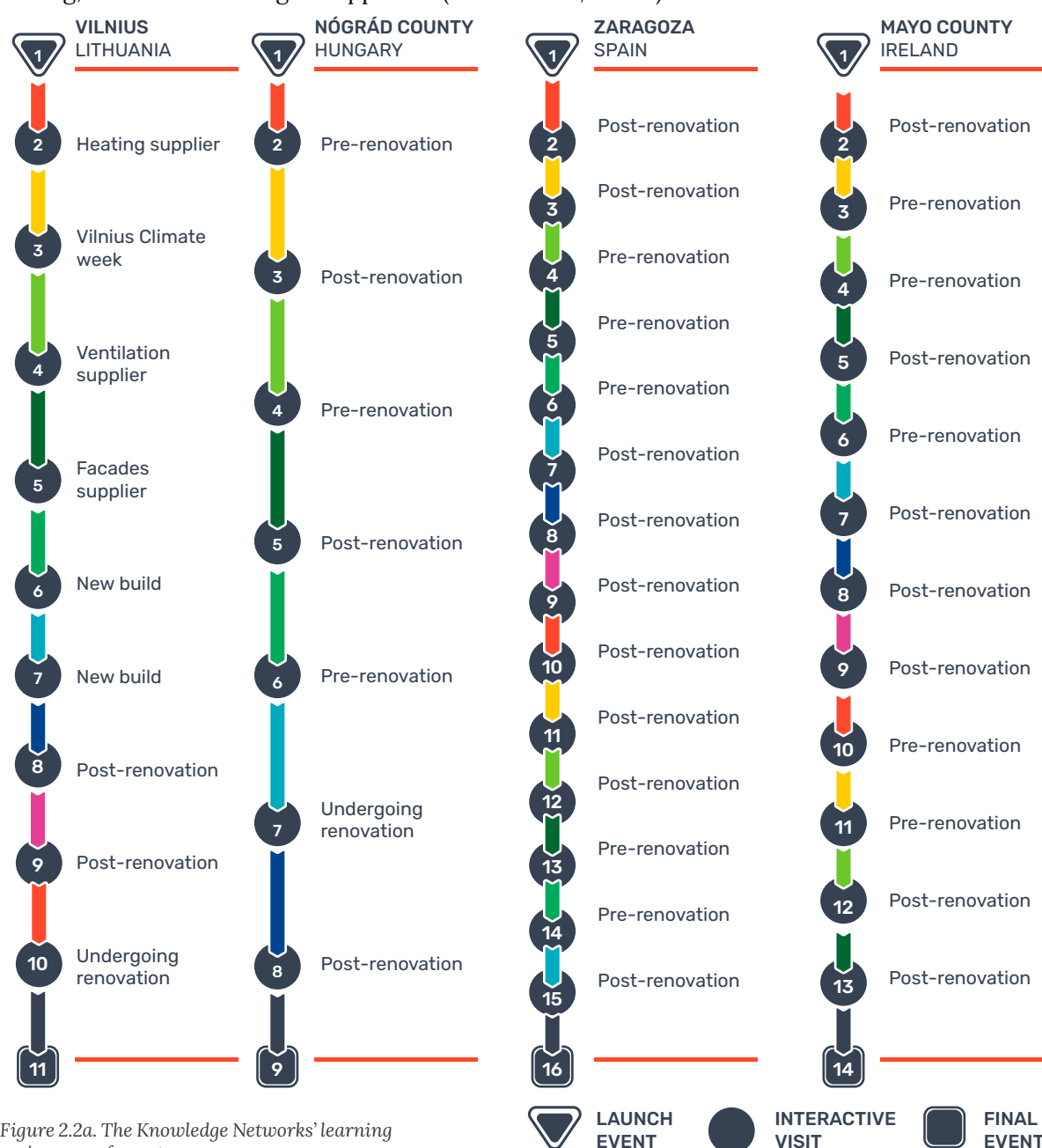


Figure 2.2a. The Knowledge Networks' learning journey of events.

Note: some of the activities took place on the same day or as part of a set of visits.

The insights in this report are based on the findings from 40 semi structured interviews with Network Members; 10 interviews in each of the four locations⁶. In selecting our interview participants, we aimed for a diversity of gender (a minimum of 4 participants who are not men, with a target of 6) and participant type (citizen and professional) (Figure 2.2b), as well as seeking out different Network event attendance rates. A detailed, per participant, breakdown of the interviews is provided in Table A1.2b, in the Methodological Appendix (Foulds et al., 2025b).

The 40 transcripts were thematically coded by a team of five, involving a collaborative and open analytic process that centred around the development of a reference codebook. The analysis adopted an iterative approach, involving both inductive and deductive elements. At each stage of coding, we selected cross-sections of the participant sample for inclusion. We recognise that knowledge is experiential, and structured by individuals' socio-demographic positions, and so we wanted our coding framework to include balanced exposure to different individual experiences of Network participation specifically and energy efficient renovation more generally (see Section 1.3, in the Methodological Appendix (Foulds et al., 2025b), for a step-by-step description of our approach).

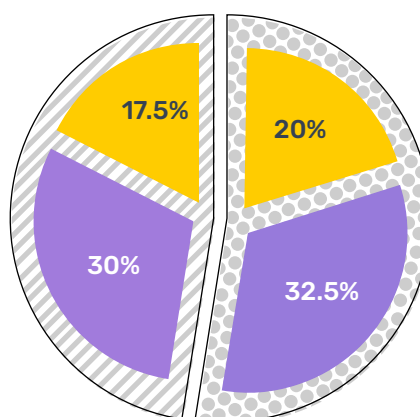
When quoting from our interview transcripts, we use a reference code to protect participant identities. Specifically, we use: LT to indicate Vilnius, Lithuania; HU for Nógrád County, Hungary; ES for Zaragoza, Spain; and IE for Mayo County, Ireland. Each interview has been allocated a number from 1 to 10, with this acting as a unique marker for each participant in that location. We have also chosen to include the participant's gender and stakeholder type, as these are important characteristics for us in contextualising our data and claims. An example would then be: "[IE9; Woman; Citizen]".

Participant type



Citizen 47.5%

Professional 52.5%



Gender



	VILNIUS LITHUANIA	NÓGRÁD COUNTY HUNGARY	ZARAGOZA SPAIN	MAYO COUNTY IRELAND
Woman citizen	● ●	● ● ●	● ●	● ● ● ● ●
Woman professional	● ● ●	● ● ●	● ● ● ●	● ● ●
Man citizen	● ● ●	●	● ● ●	—
Man professional	● ●	● ● ●	●	● ●

Figure 2.2b. Summary of headline characteristics of interview participants, per experiment location

⁶ The data is accessible via Zenodo at DOI: [10.5281/zenodo.15274546](https://doi.org/10.5281/zenodo.15274546)

3. Transformations in knowledge

This section focuses on the transformations in knowledge achieved through our Efficient Renovations social experiment stream, based on our analysis of 40 interviews with Network participants. Specifically, we discuss our findings through the following subsections:

- Experiment impacts: knowledge shared through the Network (Section 3.1);
- Experiment impacts: how the experiments shaped participants' renovation planning and decision-making practices (Section 3.2);
- Beyond individuals: how the experiments impacted wider communities (section 3.3);
- What made the experiments successful? (Section 3.4);
- Limiting experiment impacts: recruitment processes, activity design and resource (un)availability (Section 3.5);
- And finally, how gender and intersectional dynamics, representation and norms (Section 3.6), and renovation as a sociotechnical issue (Section 3.7), cut through all these transformations and transformational influences.

3.1. Experiment impacts: knowledge shared through the Networks

First, we examine changes or improvements in knowledge due to the experiments, focusing on the types of knowledge shared (or not shared) through the Knowledge Networks. Many participants mentioned an increase in their general awareness of renovation, but interview participants also identified a range of specific types of knowledge that they had developed or shared.

The type of knowledge most frequently mentioned was knowledge about technology, infrastructure and buildings. Often this was detailed information about specific renovation options, challenges and solutions. For example, one citizen said: *"I learned about insulation, how it can be put into lofts, how it can be put into roofs, how it can be put into walls"* [IE3; Woman, Citizen]. Renovations professionals also developed this kind of knowledge; for example, one said they learned about *"construction solutions and how they were implemented...and what accessibility solutions can also be used"* [ES2; Woman; Professional]. Within the Network, renovations professionals saw themselves as refining and deepening their knowledge, as well as sharing their existing technological expertise. Knowledge about administrative and financial aspects of renovation was also commonly shared. Often, this was knowledge about how to access particular subsidies and grants. For example, one citizen (who was new to renovations) said: *"I have learnt, because I didn't even know that there was such a thing as incentives"* [ES6; Woman; Citizen].

Professional participants also gained administrative and financial insights, for example on *"who to contact, where to go, what grants I might be able to apply for"* [HU1; Woman; Professional] or on how taxation may act as a barrier to renovations. One noted: *"What was most novel or interesting was the funding for these renovations...what was the process of applying"* [HU7; Man; Professional]. The complexity of administrative and regulatory systems means that maintaining a comprehensive and up-to-date expertise is a challenge, even for the most experienced professionals.

Participants also discussed the sharing of hands-on, practical and experiential know-how. This kind of experiential knowledge could be about renovations outcomes, such as costs and comfort, but also about renovations processes. One participant explained how the eco-tours helped her to “see the practical side of things” [HU1; Woman; Professional], such as:

“...how they experienced the practical execution of the renovation, what it was like for the family, how they had to adapt a little, or a lot, to the workers... how long it took, how difficult it was for them, and how much the renovation itself improved their quality of life.” [HU1; Woman; Professional]

Others similarly stressed how the eco-tours helped them “actually see” [IE5; Woman; Professional] what the experience of renovation is like in practice and “really see the result” [ES9; Man; Professional]; emphasising the importance of direct sensory experience. Another summed it up: “[t]here is nothing better than first-hand experience. It’s better to have someone who tells you about it in their own flesh than to read a thousand guides” [ES2; Woman; Professional].

Knowledge about social aspects and barriers to renovation was frequently mentioned; often these participants were renovation contractors who sought to gain a deeper understanding of priorities and needs within their target market. Knowledge was also shared about specific renovations professionals; this usually meant citizens telling each other about contractors they recommended for future renovations projects.

In a few cases, participants specifically noted that certain forms of knowledge were *not* shared, i.e. these kinds of knowledge were not gained by them or others, or were not relevant to them. In most of these cases, it was professionals mentioning that they did not gain much new knowledge from the Network, as they saw themselves more in the role of providing knowledge to others. See also Section 3.4 on what contributed to the success of the experiments.

3.2. Experiment impacts: how the experiments shaped participants’ renovation planning and decision-making practices

As well as impacts on knowledge, our study examined the experiments’ impacts on practices and actions at the individual or household scale. This includes actual implementation of renovations, but also impacts on intentions and planning. Most of the observed impacts were in this latter area of intentions and planning around renovations, in particular decision-making around technical and financial processes. (Though of course, impacts on renovation implementation may extend beyond the timescale of this study).

Some impacts on the implementation of renovations were reported, for example:

“It was actually at that meeting where [expert] presented and he gave us the facts and figures, and that’s what really swayed me from sitting on the fence to going for it [installing solar panels]” [IE9; Woman; Citizen]

This participant also chose to get a heat pump as a result of talking to people in the Network. Two participants [IE1; Woman; Citizen; and HU6; Woman; Professional] described how they had told friends and acquaintances about their experiences, and said that others had implemented renovations as a result.

One Network event at a museum was described by Lithuanian participants as being particularly effective: it “immediately ignited [my] brain” [LT4; Woman; Citizen] and led to this participant organising a meeting of tenants in their block to discuss implementing renovations. A professional

called the same event “memorable” [LT2; Woman; Professional] because it resulted in a successful renovation project being undertaken in a large building.

Many participants reported impacts on their renovation plans and intentions due to the experiments, for example: “I’ve learnt a lot thanks to these visits and we’re already thinking about doing a much bigger renovation” [ES10; Woman; Citizen]. The hands-on experience of eco-tours gave participants “new experiences and opportunities to see what others had renovated...[and] think about what we could do to make energy-efficient changes” [HU8; Woman; Professional].

The chance to meet building professionals was also helpful with planning and decision-making. One citizen learned about heating systems in a meeting, and followed this up by inviting an engineer to his home “to show us where the problems were” [LT3; Man; Citizen]. A professional said: “I met many, many people who have professional experience that I will be able to take advantage of...if I were to start this kind of retrofitting work in the future” [HU1; Woman; Professional].

This theme of developing useful networks was often mentioned. Both citizens and professionals mentioned the value and impact of the participation of diverse stakeholders in the events. For example:

“It has been very useful to be able to meet...diverse stakeholders who are working on housing renovation...Without this Network it would have been difficult...to approach a wide range of architects’ offices or the municipal housing and land company or families in vulnerable situations” [ES2; Woman; Professional].

However, there were challenges for those who didn’t have the agency to renovate, for example: “because I don’t own my own house, I can’t renovate it” [IE3; Woman; Citizen]. Some professionals also mentioned that impacts were limited by administrative and financial barriers beyond the experiments’ control.

3.3. Beyond individuals: how the experiments impacted wider communities

We now discuss the systemic impacts of the experiments, by which we mean impacts that go beyond the Network Members themselves. We consider how the experiments may have caused ripple effects (e.g. in learning) across wider societies. This section therefore demonstrates how the experiments’ interventions in know-how can enable change in systems and collectives (i.e. macro phenomena).

The most common means of driving systemic impacts was via influencing community and social connections. By community and social connections, we are specifically referring to how Network Members went on to share their learnings with friends, families, neighbours, etc. and/or community groups that exist outside of formal institutional structures. As was typical across the interviews, participants talked about how they “constantly discuss[ed] it with my friends” [HU5; Man; Professional] and were quick to discuss their Network experiences with “my family” [ES7; Man; Citizen] or even “other parents in school and in playschool” [IE9; Woman; Citizen]. Another participant even explained how they recently managed to convince someone to join a local renovation programme [HU6; Woman; Professional].

It was exactly this enthusiasm amongst our Network Members that similarly led to learning being further transferred to other local community groups, as illustrated by one participant:

“even without them [eco-tours] coming up, I’ll bring them up, because I’ll be buzzing from the last visit we had to a site and I’m like ‘oh, my gosh, you won’t believe what they have on the market

now' or 'there's this grant available' or 'there's that thing available...' I have been singing the praises about it" [IE2; Woman; Citizen]

In Vilnius and Zaragoza - where multi-apartment buildings were common and thus where residents' associations were key in approving and organising renovation initiatives - many interview participants reflected that they felt a duty to report back to their fellow building residents, to ensure that they were enabling learning opportunities:

"I was a kind of representative of the residents of my house. We have a lot of elderly people here and they still need to be explained in a calm way. They have questions, so I had to prepare every time, after this thing, what to tell them." [LT3; Man; Citizen]

Additionally, there were numerous examples of further systemic impacts arising from the Networks' activities, i.e. beyond community and social connections. We now briefly discuss three such examples. Firstly, participants described efforts to (in)directly influence local and regional authorities, as well as national policies and regulations, based on insights gained. For instance, some members were already working in key municipality-led decision-making bodies, which meant that there were direct opportunities to take their learnings into district-level planning initiatives (e.g. how a "Urban Planning Commission...[could seek] renovation of the neighbourhood" [ES1; Man; Citizen]). Secondly, participants "talked about these events" [LT2; Woman; Professional] with colleagues beyond government contexts, extending into Non-Governmental Organisations (NGOs) and their broader business networks. It was evident that many professional Network Members were also gatekeepers to key policy institutions - e.g. as direct members of NGO or lobbying networks - and thus were in prime positions to transfer local knowledge "to the national and European level" [ES2; Woman; Professional]. Thirdly, the experiments demonstrated an impact on wider business practices, with some participating professionals applying their learnings to support the growth and innovation of their own renovation-related enterprises. For instance, some professionals "shared contacts" [LT2; Woman; Professional] within their organisation as part of organising follow-on meetings with fellow Network Members.

All in all, it is therefore clear that the four experiments did lead to some energy efficient renovations actually being planned and/or implemented beyond the core Network memberships. For example, a "community group that are running the [community centre] hall...developed a project to renovate... and submit an application for a community grant" [IE6; Woman; Professional]. It also meant that various professionals participating in the Network were recommended across local networks and thereby exposed to more opportunities - indeed, many professional participants talked how they were pleased to be "getting work out of it" [IE7; Man; Professional].

3.4. What made the experiments successful?

Interview participants were extremely positive about their involvement in the Knowledge Networks, and identified a number of factors which contributed to their success.

Overall, involving diverse citizens via live, interactive events was key. People talked about how great it was to hear real people sharing their lived experiences, which felt like a valuable use of participants' time. One participant explained how this also reduced anxiety: "for the elderly... it cuts down an awful lot of fear if we're learning from our peers" [IE10; Woman; Professional].

As part of this, the efforts made by Network organisers to include and listen to a variety of people were recognised and appreciated. As one participant explained: "I absolutely loved the fact that we were from all different categories, groups, environments, settlements" [HU10; Woman; Citizen]. Many



a) Participants in Vilnius interacting with the external cladding on a renovated building; b) Participants looking at the thermal image of a building in Zaragoza and the thermal imaging camera

participants found the sense of a community coming together to help each other (rather than just individuals pursuing their own aims) very motivating:

"I can already see the gratitude and satisfaction of people...not only on an individual level but also on a collective level...of taking better care of their spaces. [It] gives them much more strength and drive" [ES5; Woman; Professional].

Some mentioned that by going to the houses of people from vulnerable communities, "you made them the focus" [ES5; Woman; Professional] and that conversations were focused on the real needs of people living in the buildings. This led to residents who outwardly seemed "passive" [LT8; Woman; Professional] feeling encouraged to get involved as they "got to know each other" and experienced "psychological enjoyment" [LT7; Man; Citizen].

This enjoyment was partly linked to the Network events being highly positive encounters. Professionals welcomed this sharing of "optimistic" [ES5; Woman; Professional] and positive stories related to climate change, rather than "doom and gloom" [IE10; Woman; Professional]. Visiting a well-renovated house was "joyful" [HU2; Woman; Citizen]. The format of on-site visits, where participants could see, touch, and play, were experienced as more engaging than more abstract "talks" or "guides" [ES10; Woman; Citizen]. Many talked about being "relaxed" and "comfortable" [ES6; Woman; Citizen] and the "family atmosphere" [HU2; Woman; Citizen] created, for example through refreshments and conversation. People felt uplifted by the events, and made new friendships and connections. There was a sense of warmth, of welcoming, and of being able to speak. We have written more later in this report (Section 4.2) about recommendations for the organisation of successful Knowledge Networks activities.

Next, and contrary to some of the 'anti-expert' rhetoric on social media, citizens appreciated having professional experts present and learning new from them. Interview participants highlighted how the involvement of professionals enabled them to easily discover information which could be quite inaccessible: *"the architect explained to us a bit about what the changes had been with respect to the renovation. And of course, they were things that I had never thought about before"* [ES4. Woman; Professional]. Several participants noted it was an "not very usual" [ES3; Woman; Professional] to have the opportunity to engage with builders and architects, and that it was fantastic *"to have somebody with that expertise giving up their time and sharing the knowledge with people that*

don't know as much" [IE6; Woman; Professional]. Professionals also felt the Network helped them "broaden horizons" [HU7 Man; Professional].

Finally, in all locations, there was much praise for the work Network organisers had put into making human connections, and following up with individuals:

"you are constantly writing letters and e-mails, and you worry for everybody, you call everybody, you ask everybody to come, you do the event... the maximum has been done here" [LT9; Man; Professional]

"you have taken great care to ensure that everyone has the same value, that is to say, equality in the end, in terms of being able to participate" [ES5; Woman; Professional]

In the Hungarian case, numerous interview participants singled out a particular "priceless" [HU10; Woman; Citizen] individual who was very skilled at working between the Roma community and key professionals such as local officials, and who "almost conducted the whole thing by herself in this county" [HU6; Woman; Professional].

Overall, participants missed the Networks when they ended:

"it was kind of sad when we had our last day and all, because like that's it. There's no more opportunity for a day off to go somewhere." [IE2; Woman; Citizen]

3.5. Limiting experiment impacts: recruitment processes, activity design and resource (un)availability

During the interviews, Network Members reflected upon what was less good about the experiments and what they felt could be done differently. We reflect now on four factors that were prevalent during these discussions.

The first factor considered to have limited the experiments relates to engagement and outreach, with this being referenced by several interview participants. Whilst most participants were positive about these aspects, some offered reflections on how the configuration and dynamics of the Network Member group could have been improved. Interview participants commented that not all the relevant stakeholders were present at the events: *"we would have liked to have seen more stakeholders participate in the Network"* [ES2; Woman; Professional] and *"although they were invited, it didn't include local decision-makers"* [HU4; Man; Professional]. When reflecting upon the characteristics of Network Members and those attending Network events, some interview participants commented that the experiments would have greater impact had they been able to better reach vulnerable households who would benefit from the activities undertaken.

Some interview participants also commented on how group dynamics prevented the experiments from reaching their full potential. Participants commented on challenges associated with bringing together individuals from different backgrounds, and how certain voices could be more dominant than others:

"each group had a dominant personality who responded better, who liked to give answers, others were very quiet and just listening" [HU8; Woman; Professional]

The second factor considered to limit the outcomes of the experiments was the format and delivery of the experiments themselves⁷. The logistics of coordinating Network activities and the

⁷ As noted in Section 2, experiments shared an overall framework that was pre-established, but within this, each Network had flexibility to design events tailored to local needs and Network Member interests.

scheduling of activities was discussed by interview participants. During these discussions, it highlighted how the lack of participation from individuals was not always due to lack of interest. Some Network Members reflected how the organised events did not align well with their schedules, with this affecting their participation. The different circumstances and priorities for different groups were also discussed, including professionals and energy vulnerable households. Regarding professionals, an interview participant from Hungary reflected:

“their busyness, their work, their lack of time, their involvement in several projects... this is not such a high priority that they would move other tasks to the back burner” [HU1; Woman; Professional]

Meanwhile, energy vulnerable households were considered by some to be *“thinking about the other things that are more pressing...they don’t have the capacity”* [IE5; Woman; Professional]. To increase opportunities to participate in Network activities, participants suggested enabling remote participation, recording videos of events, and scheduling activities further in advance.

Some participants reflected that the format of the activities themselves limited the experiments’ opportunities, particularly with reference to the lack of depth of discussion – either through the use of *“too many post-its”* [ES8; Man; Citizen] or due to the event being too big. There was also a reflection that smaller groups may facilitate the sharing of knowledge as presenters can be asked deeper questions.

The third factor limiting the impact of the experiments relates to knowledge, and the need to better balance the different needs and expectations of Network Members. Participants discussed the level at which information was pitched, with one participant from Lithuania commented that the:

“events were mainly for the people that already have a basis of knowledge to gain more information, not for the newbies... a beginner might not gain all the necessary know how” [LT1; Woman; Professional]

Participants also commented on the need to be mindful of how information is presented, and ensure clarity in the messages shared.

Finally, interview participants were aware of, and sympathetic towards, the wider contextual factors that have constrained the activities of the experiments. Reflections were made about the lack of resources available, the delays to accessing support and the current political climate.

3.6. Gender and intersectional dynamics, representation and norms

Gender is a cross-cutting theme for the SHARED GREEN DEAL project. This section focuses on gendered aspects of the renovation experiments. Despite the experiments’ focus on gender, and the overall success of a balanced representation, gendered perceptions, often driven by unconscious and subtle biases, undermined efforts for equity. As such, balanced gender representation is not enough; rather a focus on gender-responsive and intersectional approaches is necessary. Gender is not a stand-alone issue but associated with matters of age, socio-economic background and (professional and layperson) expertise.

There is a mixed picture regarding experiment participation across genders. During the interviews, a dominant perspective was that there was a gender balance in dynamics and representation during the experiments, e.g. suggestions that *“it’s been pretty equal in that respect...There has been a fairly equal and egalitarian participation”* [ES5; Woman; Professional]. However, some participants

unintentionally projected gendered social norms and stereotypes. For example, one participant's account suggested that when men dominated discussions, this behaviour was perceived as 'normal' and attributed to personality traits or national identity:

"there's a man who dominates...you have to accept that...is normal and I would not be able to distinguish that it is some kind of division between men and women [LT3; Man; Citizen]"

Furthermore, some Network Members felt that women were more engaged than men in the meetings. For example, in Zaragoza, there was a larger representation of women from vulnerable households.

Stereotyped roles related to homemaking and professional characteristics were prevalent across the social experiments. Women are considered the primary caregivers, responsible for, or even experts in, matters of home comfort, aesthetics, and the organisation of everyday life. These organisational responsibilities were projected onto renovation, whereby women managed the overall renovation process.

Furthermore, reference was made to the high participation levels of women in community events, with this relating to norms of their perceived availability, despite their care-related responsibilities. This assumption of women's availability suggests that care and reproductive work is still quite invisible for many experiment participants. Women were also expected to handle multitasking better than men and are therefore able to deal with such issues faster. These gendered expectations confirm literature indicating that women often carry the greatest mental load for multitasking at home, with this often being invisible (Dean et al., 2022).

There were gendered norms about technical expertise, most prevalent in older couples or families. In Zaragoza, older women often claimed lack of technical knowledge or a reluctance to address technical matters. Even in women-led, single-parent households, some Network Members felt they needed confirmation from a man (e.g. a brother as in one Hungarian case). Some women doubted their decision-making about technical issues or showed surprise when they understood technical matters. This gendered perception of technical expertise extended to some professionals, who claimed that despite women being more available to chat on site, they assigned the decision-making to men. Men were also more trusted to resolve technical issues, such as the responsibility of final decisions regarding renovation, even after negotiations with their family.

There were some gendered differences in renovation interests, such as how the home feels when making a change (e.g. replacing a heating system), with one woman suggesting that when you look *"at a central heating...a woman will ask: is it warm? A man will check that those pipes are put together properly"* [HU3; Woman; Citizen]. Furthermore, the Mayo County experiment showcased a large interest from women regarding undertaking renovation in the community - all the eco-tour hosts were women.

Across the renovation experiments, there were indications of the dominance of men within renovation professions professions, for example:

"Men tend to dominate among the professional participants, the contractors, and they are the ones who share construction and retrofitting experiences" [HU1; Woman; Professional]"

Expertise in the building industry also appeared gendered, with a common perception that men have more technical knowledge and expertise than women, e.g. a woman professional suggesting that they *"have experienced a certain difficulty as a female architect in front of fellow male architects"* [ES3; Woman; Professional].

Finally, there were instances of gendered language, including assumptions about the gender of certain professions or references to adult women as girls. This gendered language can indicate stereotypical perceptions of roles and performances in communities as well as unequal or biased respect towards professional expertise.

3.7. Renovation as a sociotechnical issue

The purpose of this section is to step back and be more reflective across the aforementioned themes, as we move away from Sections 3.1 to 3.6 (on findings) towards Section 4 (on final lessons and recommendations). Specifically, the reflections here emphasise the sociotechnical nature of the experiment experiences. By sociotechnical, we mean that social phenomena, such as communities, relationships and emotions, both shape and are shaped by technologies, such as buildings, infrastructures and devices. There is no such thing as a purely social or purely technical phenomenon. We would strongly argue that all the themes discussed are sociotechnical in nature, with our experiments shedding light on the sociotechnical nature of renovation. We illustrate our argument by briefly discussing three examples of how our experiments acted as sociotechnical interventions.

Firstly, our entire experiment stream was organised as an intervention in renovation as a social practice. By this we mean that we paid attention to how the doing of a renovation (i.e. the upgrade of one's home, with a focus here on energy performance) came with associated social meanings (e.g. environmentalism, status, modernity), as well as competences and skillsets (e.g. what the renovation options were, how to manage the paperwork, project management). The fundamental premise of the Knowledge Network approach is that buildings' energy efficiency is intertwined with societal influences, and we cannot upscale the delivery of technical renovations without recognising and working with these social aspects. These social dimensions were explored throughout our Networks' activities, including lively open discussions in the launch events and final events.

Secondly, running through our experiments was the idea of 'technical expertise', which was often mentioned by citizen participants in the interviews when talking about the offerings and roles of the professionals in the Network. Through the professionals' career experiences, they could provide citizen Network Members with seemingly objective and reliable advice on what the technologies were and how they would work. Yet, the context in which they were sharing this technical expertise was inherently social (as shown throughout Section 3), demonstrating the sociotechnical nature of renovation.

Thirdly, our experiments emphasised the worth of experiential knowledge, which was gained through Network Members practically interacting with material objects. The experiments enabled learning through doing, including through in-person engagement with people's homes and the devices and technologies within them – whether that concerned recently renovated homes, homes undergoing renovation, or homes that may be renovated in the future. In this way, learning was situated within material and technical surroundings, which provided concrete prompts for discussion and reflection. As well as these more discursive elements of learning, being in situ also enabled learning that drew on an individual's wider senses. For example, by touching, playing, tinkering, etc., with the renovation technologies, participants were able to anticipate what their possible 'renovated future' could look like. Learning was therefore not a simple matter of cognition, but an interplay of material-technical and social-psychological elements.

In sum, our experiments represent an intervention with the evolving sociotechnical dynamics of renovation. Essentially, social and technical considerations cannot be separated, and is a fallacy to think of one in isolation. Perhaps then, SHARED GREEN DEAL's 'social experiments' are more accurately 'sociotechnical experiments'.

4. Learning points and recommendations for policy and governance

This section builds on key insights about the experiments' success factors and limiting factors, as identified above, as well as on participants' own explicit recommendations. These learning points and recommendations are aimed at both policyworkers and practitioners who may want to support or run Knowledge Networks at any level. These recommendations, which we believe are the central takeaway of this report, are also summarised in the Executive Summary at the start of this report.

4.1. Value of a Knowledge Network approach

Based upon the experiences of the SHARED GREEN DEAL experiments, we have found a Knowledge Network approach to be valuable because it contributes to the following outcomes:

- **Knowledge Networks facilitate sustained and focused interactions between renovations professionals and diverse citizens:** Knowledge Networks create structured spaces where professionals and citizens can engage with each other, with encounters focused around specific themes (e.g. a particular technology or building). They also allow space for discussions to evolve, and for citizens to raise their own priorities. Since Knowledge Networks offer ongoing engagement (rather than a one-off event) they can foster sustained interactions that help to build trust, and facilitate a continuous, cumulative learning journey, which can help citizens as they negotiate the processes of planning and implementing renovation activities.
- **Knowledge Networks deliver actionable, up-to-date and place-specific knowledge about renovation processes:** Knowledge Networks create spaces for citizens and professionals to access information on technological, administrative, financial and regulatory systems, including technologies and techniques, grants and subsidies, tax and tenure, and planning regulations. Involving diverse local experts ensures that this information is up-to-date and relevant to the geographic area in question. Furthermore, Knowledge Networks create opportunities for sharing know-how for navigating administrative systems, with this knowledge extending beyond factual information. For example, achieving the necessary consensus for a renovation within a multi-family building, which can make or break a renovation plan.
- **Knowledge Networks enable know-how to be shared through direct encounters with residents who have lived experience of renovation:** The eco-tours organised through the Knowledge Networks provided individuals the opportunity to visit different types of homes in various stages of renovation. During these visits, participants were able to gain insight and know-how from citizens who had been through the renovation process. Insights shared are grounded within the citizens' experiences. Our findings suggest that people greatly trust and value other citizens' experience-based expertise, and appreciate face-to-face conversations with those who have experiences of renovation. Discussing details of others' renovation journeys,

and their eventual outcomes, helps potential renovators to visualise, clarify and feel confident about their own future plans.

- **Knowledge Networks build a sense of community that motivates and supports renovation journeys:** Knowledge Network participants said that they felt motivated and supported due to their participation in a shared endeavour, as well as having a sense of connection to their community. The sociable and welcoming dynamic of the Knowledge Network activities facilitates this (see Section 3.4 on what contributed to experiment success). Participating in local, in-person, ongoing events as part of a Knowledge Network can have a major impact on citizens' sense of inspiration, motivation and continuing commitment to renovation efforts.
- **Knowledge Networks foster a 'multiplier effect' through flexible and evolving connections:** Knowledge Networks can grow quickly via word-of-mouth, since each participant (citizen or professional) has their own contacts who they can engage with and recruit. Knowledge Networks offer a flexible approach, since they do not have a fixed size, and membership is open to all. They can also shift their emphasis (e.g. the focus topics of their workshops and talks) to meet the evolving priorities of their members. This ensures they stay relevant and useful. The impact of a Knowledge Network also reaches far beyond its members, as shown in Section 3.3 on impacts beyond individuals: knowledge can be shared with Members' friends, family and colleagues, and via members' wider connections, can inform the work of professional networks, businesses and governmental authorities.

4.2. Recommendations for a successful Knowledge Network

These recommendations are intended to guide organisations considering funding or implementing a Knowledge Network; both policyworkers and practitioners. For further detail on implementation, including gender and inclusion, see Aggeli et al. (2025)⁸.

- **Deliver each Knowledge Network through an established community partner:** A Knowledge Network needs a local organisation to act as a hub. This organisation should already be well-embedded in the specific area, so as to understand the place, population and local needs, and have a track record of engaging diverse groups, especially vulnerable people. As well as being trusted and well-connected, this organisation needs capacity and resourcing to deliver an ongoing project.
- **Co-ordinate across locations:** If the Knowledge Network approach is to be applied beyond a single location, this requires co-ordination. This co-ordinator role can be fulfilled by a regional, national or international organisation, who can support the local hub organisations through, for example, advising on national/international issues that may affect the area, helping with the development of funding strategies, and facilitating opportunities for local partners to inform national/international policy. Such deliberately-designed programmes or frameworks can help achieve a lot in a short space of time. This upscaled approach also ensures useful learnings are shared across locations.
- **Connect with gatekeepers and wider organisations:** Knowledge Networks need to build good relationships with 'gatekeepers' who can help them engage with particular groups,

⁸ During the Study tour event in Vilnius, a set of recommendations for building a Knowledge Network for efficient renovations were put together. These were generated through a co-creation process, initiated some weeks before the event and aimed to communicate clear practical guidelines for other practitioners, citizens or policyworkers who intend to generate a similar network. The set of recommendations are to be found in Aggeli et al. (2025). The process of developing these recommendations will be reported in a journal paper.

including vulnerable people. These gatekeepers may be organisations or key individuals. Knowledge Networks also need buy-in from a range of organisations, so as to access support on different systems relevant to renovation, e.g. local, municipal and regional authorities; health and social work agencies; non-governmental organisations and housing providers, as well as professional networks (see below).

- **Engage and enthuse renovations professionals:** The active participation of diverse professionals from across the renovation sector (and relevant associated sectors) is critical to the success of a Knowledge Network. Professionals can be effectively recruited through peer-networks, and the activities should be designed to meet their needs (as well as those of citizens), for example, with opportunities to build their contacts, connect with potential customers and demonstrate their products and services.
- **Provide one-stop shops to advise citizens:** Given the complexity of the various technical, administrative and financial systems involved in renovation, citizens need holistic, joined-up information that is tailored to their specific situation and renovation-stage. While websites and phone services can be helpful, many citizens value direct in-person meetings with advisors at local venues. Crucially, this should be an ongoing service, not a one-off event.
- **Facilitate eco-tours and home visits:** As well as advice from professionals, a key element of Knowledge Networks is the opportunity to encounter real-life renovations in different kinds of buildings and at different stages. Discussing others' experience of renovation journeys, and the know-how they have developed, is hugely helpful to citizens as they visualise and plan their own renovations.
- **Sustain long-term Knowledge Networks:** To maximise their impact, Knowledge Networks need to be developed and sustained over a period of years. This is vital to build trust and to engage vulnerable people, including those in energy poverty. Ongoing Knowledge Networks can offer valuable support to citizens *after* their renovation is completed too, such as post-intervention checks and advice on maintenance.
- **Embed gender justice and inclusion at every stage:** Participants value an inclusive approach, which fosters positive feelings about the Knowledge Network and its endeavours. It is also important to avoid reproducing existing inequalities. Therefore, inclusion needs to be built into every aspect of the Knowledge Network: the recruitment of participants (both citizens and professionals), the design and logistics of events (such as time and locations), and the way that activities are facilitated to ensure that all voices are heard. The Network needs to remain open and flexible so that it is accessible and transparent to others who are not (yet) members.

4.3. Wider policy implications

To deliver successful Knowledge Networks, it is also important to address wider policy contexts at various governmental levels, including municipal, national and European scales. Key recommendations for policyworkers at these levels include:

- **Engage with diverse knowledges:** Policyworkers need to recognise, value and use the knowledge and know-how of both citizens and professionals within the renovation sphere. Currently, little focus is placed on people's experiential know-how around renovation. Policyworkers can learn from local Knowledge Networks to gain a better understanding of the real-world drivers and barriers to efficient renovations.

- **Provide clear and consistent financial support for households, especially those in energy poverty:** There is a need to upscale the provision of subsidies and grants for renovations, and ensure these are well-targeted and consistent. If criteria fluctuate year-by-year, or are not clearly communicated, this makes it very difficult for advisors and citizens to access them. Energy poverty needs to be established as a cross-cutting policy priority.
- **Invest in ongoing advice provision:** Equally important is sustained resourcing for the provision of advice to citizens. Subsidies are useless if the relevant groups do not know about them, or do not have the know-how to navigate complex application processes. Advice can be provided through governmental and/or non-governmental bodies, but needs to be accessible, comprehensive and trusted.
- **Take a joined-up approach:** Policyworkers need to examine the intersections between renovation goals and other policy frameworks, especially those around tenure and taxation, which may act as barriers to efficient renovations, and take action to address inconsistent policies.
- **Draw on Knowledge Network approaches** within related energy policy agendas. For example, policy and practice around Energy Communities and Positive Energy Districts could benefit from the learnings reported here.
- **Invest in research on Knowledge Networks and engage researchers in policy processes:** Research across disciplines, including the Social Sciences and Humanities, can ensure policy is grounded in rigorous and in-depth understanding of the challenges, lived experiences and sociotechnical dynamics of renovation practices.



5. Conclusions

This report has presented the findings from the Efficient Renovations social experiments conducted as part of the SHARED GREEN DEAL project. The Efficient Renovations experiments focused on the design and implementation of Knowledge Networks as a tool for supporting renovations. Our four experiment sites found that the Knowledge Networks were highly effective in sharing diverse types of knowledge, including technical, administrative, experiential, and social knowledge.

Overall, the findings suggest that the largest impact of the experiment at the individual and household level was on intentions and planning around renovations, in particular decision-making around technical and financial processes. Some direct impacts on the implementation of renovations were also reported.

The main systemic impacts related to how Network Members shared their learnings with their support networks and social connections (e.g. friends, families, neighbours, members of local community groups). There often seemed to be genuine enthusiasm from all participants, to discuss what happened during the events. For the professionals specifically, many exploited their role as institutional gatekeepers, in sharing their Network event experiences to influence wider policy and business positions (e.g. municipality committees, lobbying networks, inside their own organisations).

The format of Network activities was key to their success, bringing together diverse citizens and committed professionals in positive, hands-on events. Further, the ongoing efforts of the local partners implementing the social experiments to build meaningful relationships with individual Network Members was essential.

Key factors limiting the success of the experiments related to recruitment processes, the design of the events themselves, and the (lack of) resources available to support retrofit activities. Participants provided suggestions on how these limiting factors could be addressed in future activities. The experiments focused strongly on gender equity and were successful in achieving balanced representation in the Networks. However, gendered perceptions and recognition of expertise, often driven by unconscious and subtle biases, to some extent undermined those efforts for equity. An overarching insight is that balanced representation is not enough, but rather, a focus on gender-responsive and intersectional approaches is necessary.

It was apparent throughout the experiments that social and technical dimensions were entangled, and we would argue that the experiments exemplify a sociotechnical approach to renovation. In particular, we observed how: renovation as a practice; technical expertise; and experiential knowledge, all were products of social and technical influences that iteratively co-developed each other.

Based on these findings, we suggest several implications for further research:

- We highlight the need for further research on issues around know-how, lay/professional expertise, learning, and knowledge circulation within the context of efficient renovations. This study has highlighted the importance of these issues, but deeper understanding of the hierarchies of expertise and how they play out within renovation practice would be valuable.
- Energy poverty remains a crucial issue across Europe and beyond. However, research has traditionally struggled to engage with people in energy poverty, and this was a challenge for our study. There is a need for further research specifically on the sharing of know-how with and by people living in energy poverty, and the challenges, benefits and best practices for work in this field.

- Following from this, further evidence is also needed on rural and urban energy poverty. This issue emerged from our interviews (which covered both types of setting) as important, but we have not had scope to fully explore it here.
- There is also an important evidence gap around buildings that do not fall neatly into the category of residential, commercial or industrial buildings, such as schools and care homes for elderly people. Identifying and recruiting organisational partners from such settings was an initial goal for this project, but proved unfeasible in the timeframe and scope. Such settings remain a major gap in the field of renovations research.

The SHARED GREEN DEAL social experiments suggest a range of implications for governance, as detailed in Section 4. As well as investment in joined-up, consistent and targeted programmes of financial support and advice for households seeking renovations, we highlight the importance of integration between research and policy. It is vital that governance approaches are grounded in rigorous and in-depth understanding of the challenges, lived experiences and sociotechnical dynamics of renovation practices.



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