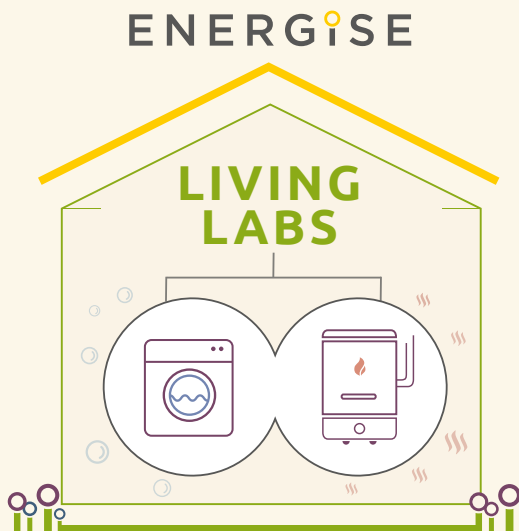


ENERGISE LIVING LABS

METHODOLOGY, EXPERIENCE AND LESSONS LEARNED



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ENERGISE
EUROPEAN NETWORK FOR RESEARCH, GOOD PRACTICE
AND INNOVATION FOR SUSTAINABLE ENERGY

grIndependent
Institute

ENERGISE LIVING LABS

METHODOLOGY, EXPERIENCE AND LESSONS LEARNED

ENERGISE DELIVERABLE 7.12

Project brochure
on Living Labs methodology



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INTRODUCTION

ENERGISE is concerned with developing a greater understanding of household energy use as socially embedded, with a view to achieving overall reductions. Energy use is entwined in our everyday lives and in our daily activities. We are constantly using energy – to light and heat our homes, to wash, to store food and cook meals, to power our phones, televisions and other appliances, and so on. Yet most people rarely consider their energy use beyond any superficial level. Much of our energy use is tied up in routinised activities, which we have become accustomed to facilitating with energy on demand. We flick a switch without a second thought, knowing that the light or the radio will turn on. We take a shower, confident that hot water will be readily available. Our heating system might switch on automatically, without any personal intervention required. On one level the problem may seem straightforward – by adopting more sustainable practices, we can reduce our energy use and related carbon emissions. But once we scratch below the surface, we quickly discover that practices are inherently complex, deep-rooted, culturally engrained, and difficult to change.



ENERGISE uses cutting-edge social scientific methods and techniques to help us understand how and in what way people use energy, and to what effect. To do this, we adopted a 'Living Lab' approach involving over 300 households across 8 European countries. This involved working with participants in their own homes with the aim of directly observing existing practices surrounding household energy use and systematically record efforts to adopt more sustainable practices. This booklet provides details on the design and implementation of ENERGISE Living Labs. We discuss lessons learned and reflect on the usefulness of our methodology and how this might be improved in future efforts. The process has been extremely insightful, not only for our participants and project partners, but also for us as researchers. We hope that you also find the material useful and are prompted to learn more about ENERGISE and our methodologies and find inspiration to try novel approaches in other settings.

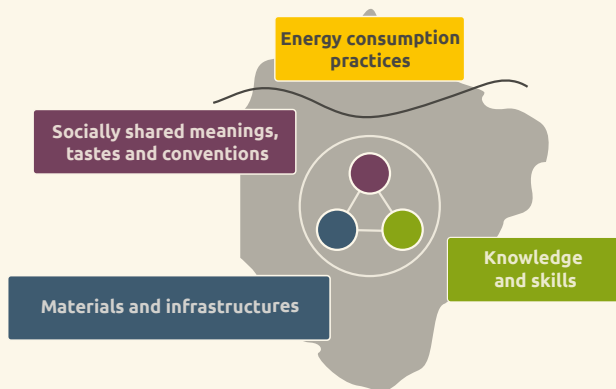
Best wishes : *The Energise Team*



GENERAL DESCRIPTION OF THE ENERGISE LIVING LAB METHODOLOGY

ENERGISE adopted the living lab methodology in order to test novel ways to perform everyday practices together with the households in their real-life surroundings. Living laboratories, or living labs, provide a space for (bottom-up) experimentation, involve different actors (such as researchers, energy experts and households) as co-creators, and facilitate systematic monitoring and learning within the project.

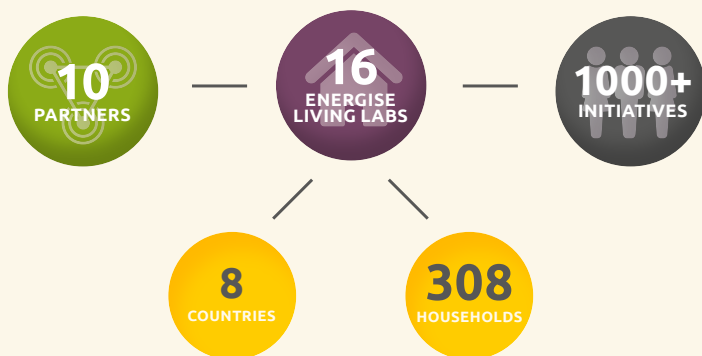
The main aim of **ENERGISE Living Labs (ELLs)** was to promote sustainable energy use in households and communities, while acknowledging the context-dependence of the change. The starting point for the design of ELLs was the ENERGISE conceptual framework that approaches energy use as a material



expression of people's performance of everyday practices and associated cultural conventions (Rau & Grealis 2017). ELLs employed practice-based approaches to reduce energy use in households while co-creating knowledge on why energy-intensive practices are performed and how they depend on the context in which they are performed. ELLs therefore recognise the significance of more or less durable combinations of practices, shared and performed by particular units of social organisation, such as



households or communities. **ELLs focus on how to change practices and their constituting elements** (i.e. consisting of materials, meanings, and competencies), **while embracing the idea of sufficiency**, which accounts not only for absolute reductions in resource usage, but also challenging everyday and habitual practices. They are thus not merely about making current practices more efficient, but rather aim to address the underlying dynamic of the practice that drives energy demand.

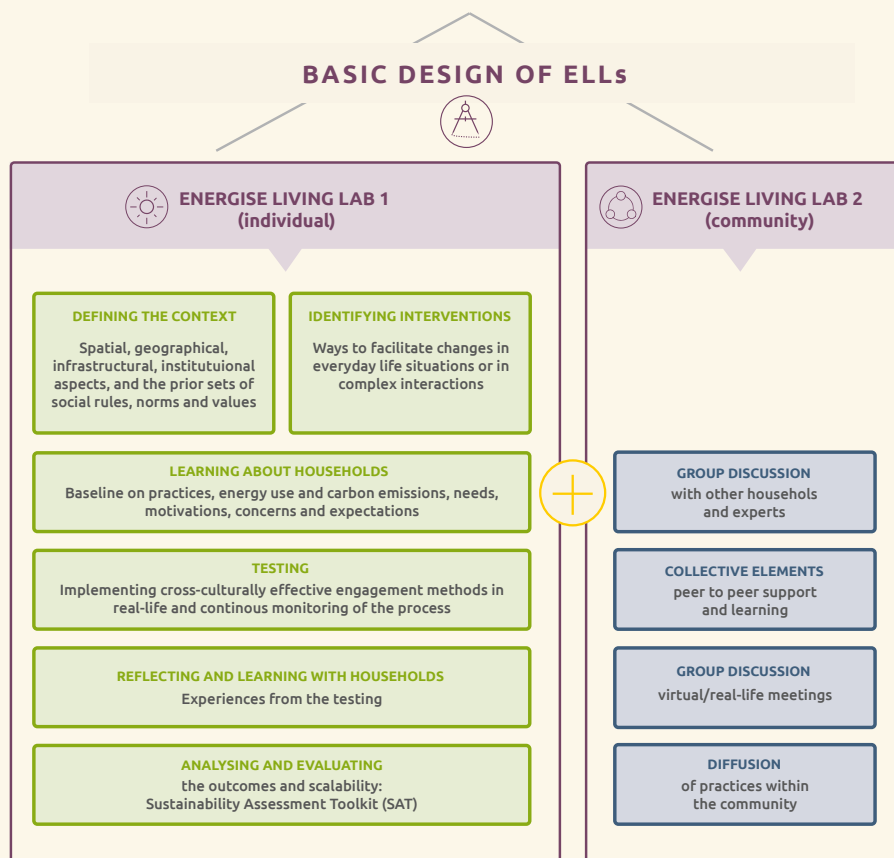


Building on the conceptual framework, the ELL design was further informed by:

- the ENERGISE database and typologies of sustainable energy consumption initiatives ¹,
- prior research on reasons for variations in several energy-related practices and on the influence of material, institutional, organisational and social aspects of the effectiveness of energy saving interventions,
- previous experience on practice-based living labs and similar initiatives, as well as co-creation workshops, which also aimed to ensure wider societal acceptability and achievability of the ELLs.

A Sustainability Assessment Toolkit (SAT) provided guidelines for evaluation and assessment of the Living Labs. Altogether 16 ELLs, engaging 308 households, were implemented in eight European countries in late 2018.

¹ To find out more about the database, please visit <http://www.energise-project.eu/projects>



Basic design of the ELLs

The basic design of ELLs consists of six phases:

- Drawing on the ENERGISE conceptual framework (Rau & Grealis 2017), ELLs start with **definition** of the contextual aspects, and social and material conditions underlying practices, and the recognition of energy usage as embedded in everyday life (Phase 1).
- In the **identifying interventions** phase (2), a set of potential changes in practices were co-designed on the basis of findings from the database of sustainable energy consumption initiatives and previous research.

- In the **deliberation** phase (3), we assess the baseline of energy use, and discuss and learn about the practices related to energy use together with participating households, as well as about the households' needs, motivations, concerns and expectations towards the practice change.
- In the **testing** phase (4), the engagement methods identified as cross-culturally successful are utilised in real-life as the households try to change their routines. As the participants attempt to integrate the new practices into their routines to see if and how they take hold or reveal new issues, it is important to track this process by monitoring households' activities throughout the ELL, to observe the interconnections and potential rebound or other effects due to the changes.
- After the challenges, households meet in a **reflective meeting** in which we discuss their experiences (Phase 5).
- The final phase (6) of the ELLs focuses on **evaluation** of the output, outcome and impact of ELLs.

In each country, two ELLs were implemented: ELL1 for individual households and ELL2 for households within a community context. Collective elements in ELL2 included sharing thoughts, ideas, strategies and experiences, as well as other interaction in a social media group between the two group discussions before and after the challenges. These aimed to provide peer support (and also positive pressure) for the participants in ELL2, as these dynamics were found to be important in previous sustainable energy use initiatives.



The two interventions implemented in ELLs focused on reducing the amount of direct energy used for (1) **space heating** and (2) **washing laundry** at home. This is

due to space heating having the biggest share of overall energy use in households across Europe (65%)² and the pressing need to reduce the amount of energy used for heating homes, in addition to other solutions such as use of renewable energy sources. Another intervention focuses on washing laundry, which is heretofore less studied, despite being socially and culturally embedded in patterns of daily life. Although laundry contributes to a relatively small share of overall direct household energy use, the significance of these kinds of daily tasks has been growing due to an increasing number of household appliances and their use in European countries. In addition to washing clothes and other textiles, laundry is related to a whole range of household activities, each with a sustainability impact, including shopping and storing clothes and laundry-related products, drying and ironing clothes, and so forth. The combination and exploration of practices of laundering and heating facilitated an interesting research design that also allowed a focus on the ways these sets of practices are intermingled in daily life through collective arrangements on a household level as well as through perceptions of comfort and cleanliness.

The engagement method selected was a **challenge**.

- In the domain of laundry, the aim was to **reduce washing laundry** by half.
- In heating, the challenge was to **reduce the indoor daytime temperature** to 18 °C.

The participants were also allowed to define their own targets based on their situation in life (e.g. somewhat higher indoor temperature for families with small children). Households were also provided two boxes filled with materials (i.e. challenge kits) to prompt discussions, tips and insights (rather than



² Source: Eurostat, 2016

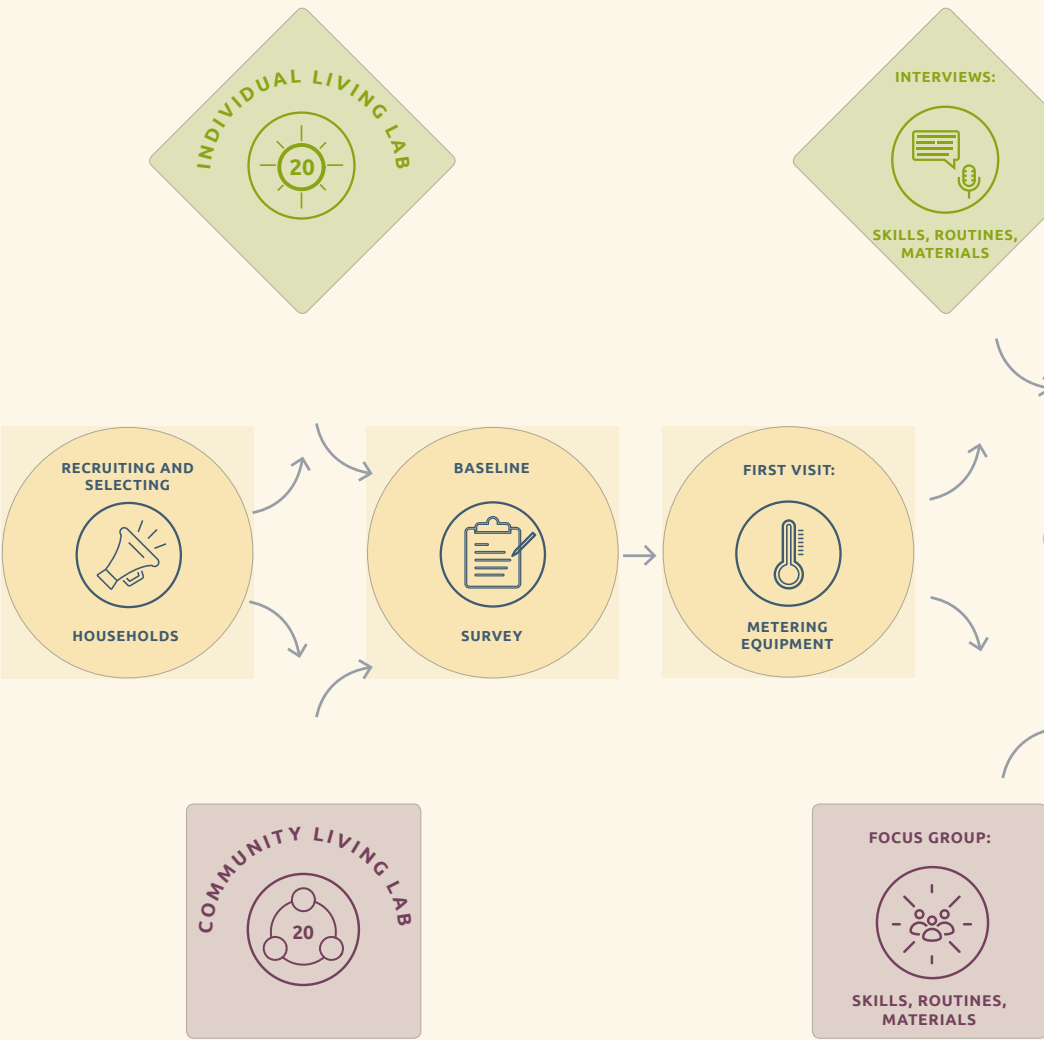
prescriptions) to support the challenges and create a dynamic among household members (such as pre- and dry cleaning tools and products and stain removers for laundry challenge and warm drinks and woolly socks for heating challenge).

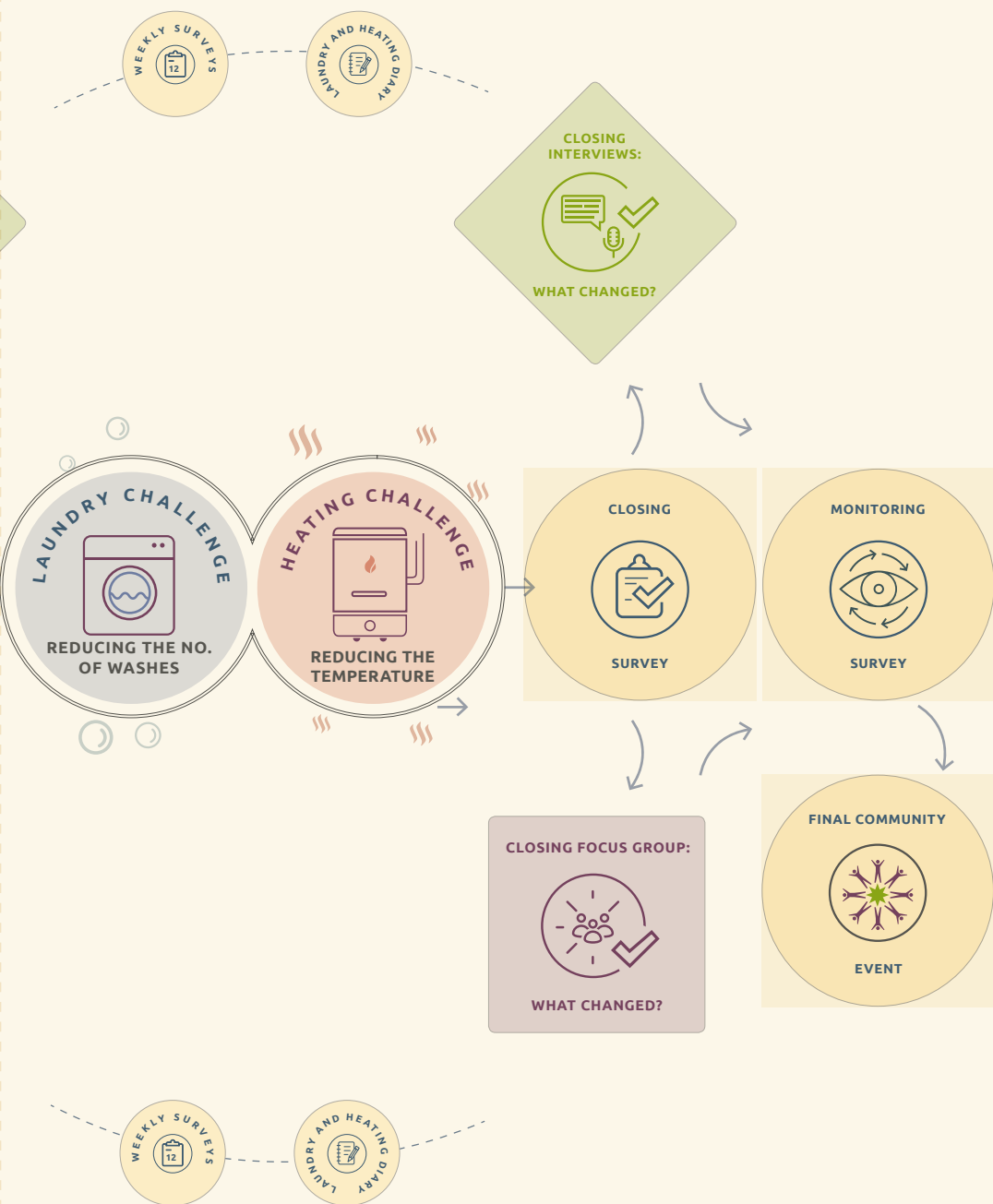
The basic design introduced above provided a “backbone” for implementing and monitoring ELLs. In order to be able to make comparative research on ELLs within and across countries, it was important that each ELL followed the following requirements:

1. Each country recruits a similar number of households in both ELL1 and in ELL2
2. ELL2 has additional collective elements that separate ELL1 from ELL2
3. ELL1 and ELL2 are kept separate and cannot be mixed before the end of the roll-out
4. Households experiment within the same, pre-defined domains in each ELL
5. Both ELLs in each country start with the same interventions
6. Each ELL follows the steps agreed by the ENERGISE team and outlined in an ELL guidebook
7. In each ELL, the monitoring and evaluation follows the steps outlined in the SAT (Sustainability Assessment Toolkit)
8. Each partner documents their actions during the ELLs and follows ethical guidelines



The ELL process:

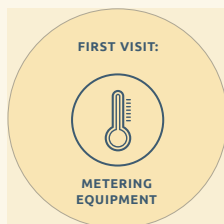






THE STEP BY STEP IMPLEMENTATION OF THE ENERGISE LIVING LABS

After recruiting the participating households, we first asked them to fill in a baseline survey about their heating and laundry practices.³



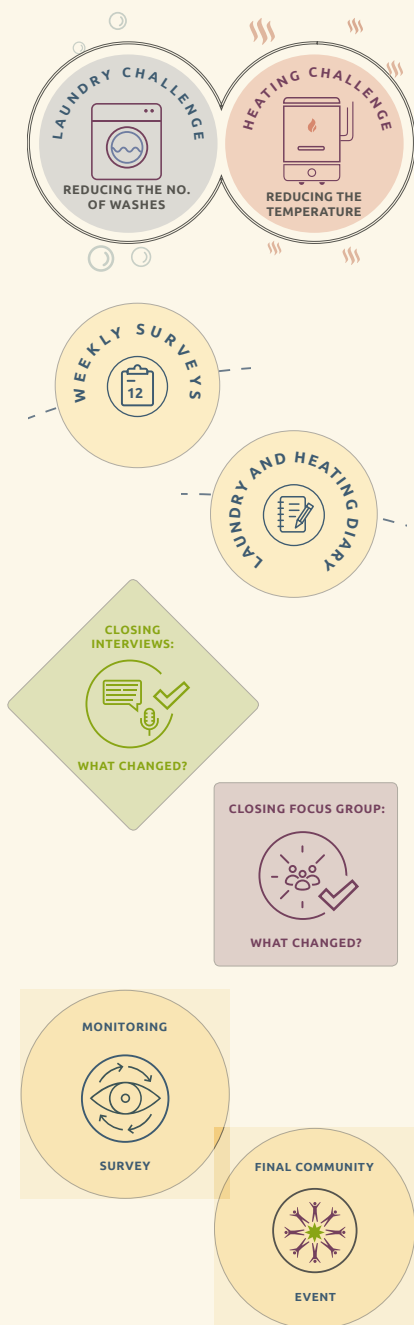
We provided the households with the required **energy meters and thermometers** in their homes and provided them **diaries** to monitor their laundry and heating practices. The households monitored these practices during an approximately three-week baseline period.



The active experimenting phase of ELLs was launched by a **deliberation meeting** with individual households (in ELL1) and collectively (in ELL2) that was intended to facilitate reflection around habitual and normative practices, rendering explicit what is often left implicit and not discussed, and to co-create knowledge on how and why practices are performed as they are. Monitoring energy use during the baseline measurements supported the deliberation. At the end of the deliberation meeting the ELL challenges – **the laundry and heating challenge** – were introduced to the households as a means to question the underlying assumptions on how to perform practices, and to think about ways to change practices. We also discussed with the households about the forthcoming challenges and *how* and *why* they consider it achievable and/or reasonable – or *why not*.



³ All ELL materials are available on the ENERGISE website at www.energise-project.eu/livinglab_materials



With additional inspiration from **challenge kits and saving tips**, during the challenge periods the households were encouraged to develop ways to achieve the preferred level of comfort in reduced temperature (such as wearing more and warmer clothes, not heating unused rooms or using some of the rooms less).

During the ELL challenges, households (in both ELL1 and ELL2) shared their experiences by responding to **weekly surveys** sent to them. Participants were also asked to continue filling in the **diaries**. In addition, the collective elements (in ELL2) included sharing thoughts, ideas, strategies and experiences in a social media group.

After the challenges, the participants had a chance for **reflection** (individually in ELL1 and collectively in ELL2) and share their experiences on how they utilised both the mechanisms they developed during the challenges, as well as the tips and the material support and how they could (and why they should) continue with the new or changed practices also on a longer term.

Finally, a **follow-up survey** was sent to all households approximately three months after the end of the challenges, to find out about possible longer-term changes in practices. Also, all ELL participants and local stakeholders were invited to **closing events** where results were shared and discussed, and the completion of the ELLs celebrated.



IMPLEMENTING THE ENERGISE LIVING LABS IN 8 COUNTRIES

DENMARK



The Danish ELLs in brief

- **Implementation lead:** Aalborg University (AAU)
- **Implementation partner:** Roskilde Municipality
- **Main features of ELL1:**
 - 18 households from Viby Sjø
 - a community of place with most households living in detached houses
- **Main features of ELL2:**
 - 20 households from Trekroner
 - a community of interest, the residents of Trekroner defining themselves as a group of community-builders
- **ELL challenge period:**
15 October to 2 December, 2018



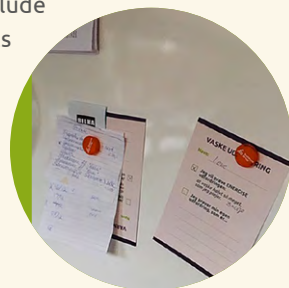
What makes the Danish case unique

The small size of the Danish implementation team, consisting of the same two researchers throughout the implementation, was fruitful to establish a continuous and trust based relationship with the participants. As a result, the team could take on a pragmatic approach to framing and supporting the challenges in order to increase the potential for persistent change (also after the project).



Challenges encountered in Denmark and tackling them

As with many long-term projects, especially those that include disruptions in everyday life patterns, the ELL participants experienced some concerns over how to cope with the challenges. In particular the female participants found that an indoor temperature of 18 degrees was way too cold, and thus unacceptable in the long run.



Success stories and emerging opportunities in Denmark

Most of the Danish ELL participants experienced that participating in the ELLs had been fun, challenging and educational. Several participants mentioned that the length of the process had been beneficial in terms of trying out new things, and getting used to the challenges.

Participants, on average, reduced laundry cycles by almost 40% and reduced average temperature in living rooms by 1.5°C.

As a result of a successful ELL process, one of our ELL2 participants decided to write about his experiences with participating in the ELLs. In the local Facebook group called “Alt om Trekroner” (holding more than 4000 members) he posted about the project:



What do participants think?

“It has been anything but normal.” (6-year-old participant)

“It was ‘Mette’ who entered us into the project, and to be honest, I felt it was kind of... to begin with I didn’t feel this was particularly cool. But I think differently about it now, and I actually feel this has been really good. I mean, well, I can see we’ve actually changed some things”

“Of course, I think people think, “I have the right to not freeze in my own home [...] Of course it is a (human) right... but when you think about it... as we do here, now... then of course we know that we could also just wear some warmer sweaters.”



Finnish ELLs in brief

- **Implementation lead:** University of Helsinki (UH)
- **Implementation partners:**
Posintra, City of Helsinki
- **Main features of ELL1:**
 - 19 households living in single-family homes in Porvoo
- **Main features of ELL2:**
 - 18 households living in an apartment building in the Merihaka district in Helsinki
- **ELL challenge period:**
15 October to 2 December, 2018



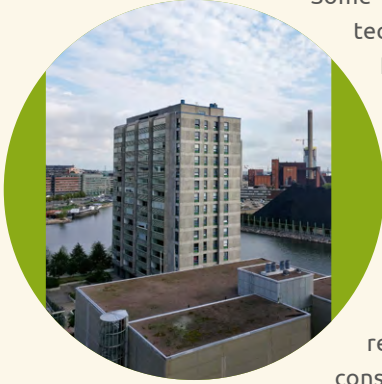
What makes the Finnish case unique

The choice of households aimed to reflect two typical Finnish practice cultures related to home heating, one of the key areas in which challenges were developed. In Finnish apartment buildings, heating systems are managed collectively by the housing company (corresponding to a condominium association) and there is no individual heat billing. Hence, apartment building dwellers represent hard-to-reach groups, and the UH team decided to engage them collectively, proving the possibility to search for collective solutions to the heating challenge, at least in the long term. On the other hand, single-family home dwellers face a very different situation, with relatively large energy bills and diverse types of heating systems.



Both ELLs gained good media coverage. In particular, a story in the leading daily newspaper considered the idea of attempting to live at 18°C in Merihaka, Helsinki, rather dramatic.

Challenges encountered in Finland and tackling them



Some participants were perhaps expecting more technological solutions, yet toward the end of the Living Labs these people appreciated our interest in daily practices as well. On the other hand, some participants were already rather frugal with home heating and laundering: here, the challenge was to find reasonable ways in which they could still improve. In the apartment buildings (ELL2) and even in some of the new single-family homes (ELL1), it was difficult to reduce temperatures due to physical/technical constraints.

Success stories and emerging opportunities

Even though the participants did not reach the goals set in the challenges, indoor temperatures were reduced by about 1°C without any evident loss of comfort (and indeed, some participants felt the lower temperatures were healthier). This corresponds to a decrease in energy demand for space heating by about 5%. If this could be scaled up to Finland as a whole, it would make a difference for national carbon dioxide emissions.

It was also nice to notice that people changed their views on laundering. Whereas many had considered laundering and ironing a virtue, many were relieved to realise that a more relaxed approach to cleanliness is a merit from an environmental perspective.

What do participants think?

At their closing seminar, the UH team had a panel discussion for the participating households. One of the ladies said:

"It was quite nice and interesting to have a professor from Helsinki come and discuss my laundry routines for an hour. Laundry isn't usually a thing that anyone is interested in."





The German ELLs in brief

- **Implementation lead:**
Ludwig-Maximilians-University (LMU)
- **Implementation partner:** Energiewende – Oberland (EWO)
- **Main features of ELL1:**
 - 20 households from the town of Weilheim
- **Main features of ELL2:**
 - 20 households from two neighbourhoods clustered in Murnau and the nearby village of Iffeldorf
- **ELL challenge period:**
15 October to 2 December, 2018



What makes the German case unique

Significant effort was made to develop good relations with the participant households; a significant amount of time was spent getting to know the participants during each contact session with a special emphasis on the first meeting. A minimum of two ENERGISE team members were present at each contact meeting (with both a male and female member present in almost all cases). The lengthier surveys were filled out with the participants in person and this had the effect of stimulating a natural conversational exchange. It was felt that this was an important part of the engagement process and that it aided future contact sessions.

Challenges encountered in Germany and tackling them

The most significant challenge experienced was with regard to finding suitable meeting times for the community living labs (ELL2) where everyone could attend. This proved extremely difficult with the result that 2 separate focus group sessions had to be implemented. Even then, while all households attended at least one group meeting, full attendance for all group meetings was not achieved.

Success stories and emerging opportunities

The households generally were very happy with the defined structure of the study and liked the balance in terms of intensity of practice between the two areas of energy use of heating and laundry. Particularly in the area of laundry, a considerable number of households reported that they had significantly re-evaluated what was necessary both in terms of washing temperature and frequency. Additionally, a number of households reported spin-off effects, i.e. that taking part in the project also made them start to think about making changes in other areas of consumption such as water use and waste generation.



As part of the LMU ENERGISE team's recruitment strategy, press releases were issued to local newspapers with a front page article "Wer macht mit?" in the local Kreisbote for Weilheim-Murnau (circulation 47,000) greatly assisting recruitment efforts and for creating general awareness of the presence of the ENERGISE project in the locality.



What do participants think?

"It was very interesting. It was good for us, to see... we would participate again, if another project comes up. Because it increases the awareness. Usually, living your everyday life you forget a lot of things."

"We were very aware of all kind of sustainability issues. But if you focus on certain topics, as we did with the challenges, you get even more sensitive. Although you think you cannot do more, you discover little things."





The Hungarian ELLs in brief

- **Implementation lead:**
GreenDependent Institute (GDI)
- **Main features of ELL1:**
 - 21 households living in or close to the town of Gödöllő in Central Hungary
- **Main features of ELL2:**
 - 20 households, also living in the town of Gödöllő
- **ELL challenge period:**
8 October to 25 November, 2018



What makes the Hungarian case unique

In Hungary, all participating households were recruited using the same approach and were then divided into ELL1 and ELL2 with attention to ensuring similar socio-economic composition. GDI carried out the ELLs with its own team, without an implementation partner, so the Hungarian team was relatively big. Still, to ensure the same welcome to the ELLs, all households were visited by the same person at the beginning.

ELL2 participants were invited to an additional group meeting as well as to a group set up on social media to facilitate group development processes and the sharing of experience.



Challenges encountered in Hungary and tackling them

Relatively few participants undertook the common challenges and decided to come up with their own challenge. This was especially so in the case of the heating challenge as reducing to 18°C seemed too challenging over four weeks given that Hungarian households generally like to have warmer homes. In addition, during the beginning of the heating challenge there was no real need to heat homes, as

the weather was milder than usual. Some participants expected more technological information in the ELLs and as a result found it more difficult to change their practices. But with time they learnt to appreciate the challenges, especially with the help of the energy meters and challenge kits.

Success stories and emerging opportunities

Change of practices as well as a reduction in the number of laundry cycles and indoor temperature occurred in almost all participating households. On average, an overall 10% saving in energy use was achieved.

Eight participants decided to continue their engagement in GreenDependent's EnergyNeighbourhoods programme, and the ELL experience is getting integrated into the local community through the media and invitations to local events.

What do participants think?

"We agreed to the common [heating] challenge, to reduce to 18°C, which was quite a brave decision for us. So far, we haven't reached it, but we're not giving up, we'll get there by the end of January. At the moment we're at 19.5 - 20°C, but there's still some potential. The challenge period was too short for us to reach 18°C; we'd have needed more time to get there."

"People tend to think climate change depends on agriculture, industry and transport, but it depends on individuals, to experience this is a very good feeling. [...] I can influence certain things, regulate in a way that it is better globally."

"I had a great time at the group events. The questions and tasks were good as they helped me become even more conscious about my energy use and focus more on my use. I think paying attention to these kinds of things has become part of my everyday life, thank you."



IRELAND



Irish ELLs in brief

- **Implementation lead:** National University of Ireland Galway (NUIG)
- **Implementation partners:**
 - Tipperary Energy Agency (TEA) for ELL1
 - Local school for second level education for ELL2
- **Main features of ELL1:**
 - 20 households recruited by TEA using their newsletters and social media sites
- **Main features of ELL2:**
 - 18 households, the majority of them located around the local school
- **ELL challenge period:**
22 October to 9 December, 2018



What makes the Irish case unique

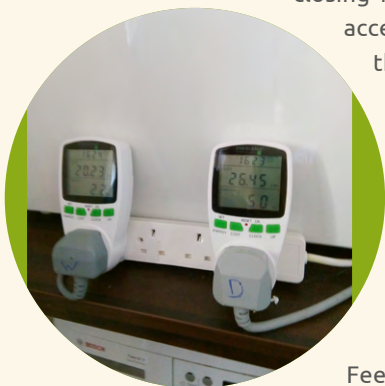
The NUIG ELL team was small, with one researcher primarily responsible for ELL implementation. This provided familiarity and continuity for the participants and was effective in developing trust-based relationships. The

NUIG team chose to start the recruitment close to the start of the ELLs, as they felt too long a recruitment phase could mean that some participants might disengage from the study. Their recruitment method was through gatekeepers in the communities, as these were generally small tight-knit rural communities and a trusted intermediary was beneficial for access. Both ELLs included hard-to-reach groups and a mix of household profiles (demographics, size of dwelling, location).



Challenges encountered in Ireland and tackling them

Recruitment was a challenge and participants were slow to enlist. Nonetheless, there was a high retention rate with only one participant not completing the closing interview at the end of the Living Lab. Physical access to households was also problematic due to their rural location and the large distances to travel to some households. This made logistics of visiting all households within a short time difficult and closing interviews were started earlier to account for this.



Success stories and emerging opportunities

Feedback from participants was very positive and most households felt participation had a positive impact on their lives. One household reduced their indoor temperature from 24°C to 17/18°C, calculating that they would save approximately €2,000 per year. Another household were delighted with the help in reducing laundry and halved their weekly number of washes from 14 to 7.

What do participants think?

"It just makes sense to try and put on a few extra layers if you're cold, you know."

"Well, definitely there was more time to ourselves than previously. There was less stuff hanging around the house... the place was like a laundrette most of the time you know."





The Dutch ELLs in brief

- **Implementation lead:** Maastricht University, ICIS
- **Implementation partner:** Op het Zuiden
- **Main features of ELL1:**
 - 20 households living in or close to the city of Maastricht
- **Main features of ELL2:**
 - 14 households, most of them tenants in apartment complexes in the city of Roermond
 - Community of place with households already comparatively active and hence used to interacting
- **ELL challenge period:**
22 October to 9 December, 2018



What makes the Dutch case unique

In terms of team composition, only two researchers (one for ELL1 and one for ELL2) visited participants at home, which fostered a trust-based relationship with the participants (no drop-outs). A foresight and design company had the lead of organising and hosting the two ELL2 focus group meetings.

BOEK						
Tijd	Geometrie	Beelding	Temperatuur	En-stand	Weterveld	Opmerking
Wt	Geometrie	Beelding	Temperatuur	En-stand	Weterveld	Opmerking
Wt	Geometrie	Beelding	Temperatuur	En-stand	Weterveld	Opmerking
05-10	7	OMA	VT	40	N	?
06-10	14.14	M.B.	VT	40	N	8.25
06-10	14.14	M.B.	VT	60	N	11.97
07-10	11.14	M.B.	HT	30	N	13.20
07-10	11.14	M.B.	VT	30	N	13.89
07-10	9.30	M.B.	VT	40	N	14.95
10-10	12.00	M.B.	VT	40	N	14.58
13-10	14.30	M.B.	VT	30	N	15.08

WAS

Naam: *Margriet Eijja Fomand*

☒ Ik zal de ENERGISE was challenge proberen: het aantal weken dat ik mijn wasbeurten halveren

☒ Ik zal een persoonlijke was challenge proberen:

VERWARMING

Naam: *Danny Geyl Fomand*

☒ Ik zal de ENERGISE verwarming challenge proberen: de verwarmings temperatuur verminderen met 1 graden

☒ Ik zal een persoonlijke verwarming challenge proberen:

Challenges encountered in the Netherlands and tackling them

A major challenge emerged when the local implementation partner that the ICIS team took a year to find could no longer participate due to unforeseen developments. Luckily, their initial partner referred them to a new partner who was very eager to support ICIS with helping to circulate their invitation for households.

Another more practical challenge, which was foreseen by the ICIS team, was to ensure the continuous engagement of participants during the three months following the first visits, including baseline measurements and the two challenges.

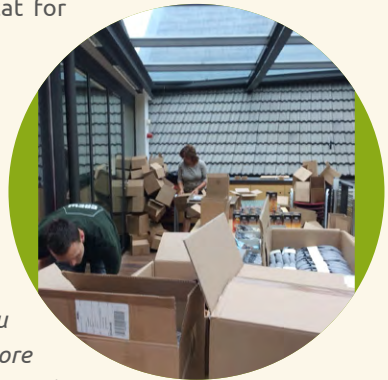
Success stories and emerging opportunities

Most of the Dutch participants were able to reduce their indoor temperature and were able to change their perception of heat/cold/comfort to adjust to a lower indoor temperature. Of course, there were also some participants who reported that lowering the indoor temperature to 18°C was too 'extreme' and only managed a marginal reduction in relation to the baseline measurements. Overall, participants were successful in reducing the frequency with which they temporarily adjusted their thermostat for the purpose of comfort.

What do participants think?

"Now that we set the thermostat to 18 degrees, we notice that if you use a blanket when sitting on the couch in the evening, it is actually very comfortable. Especially if you are busy the temperature is completely fine, but also when you use a blanket in the evening, you do not need more [than 18 degrees]. We make sure to cool down the house in the night, but with more modern houses they sometimes say it is more efficient to keep the temperature constant."

"I did do a little less laundry, however, then I realised the laundry was piling up in an overflowing hamper, so it was not sustainable."



SWITZERLAND



The Swiss ELLs in brief

- **Implementation lead:**
University of Geneva (UNIGE)
- **Implementation partners:** Terragir and Urbamonde
- **Main features of ELL1:**
 - 20 participants, both single and multiple household members from across the city of Geneva
- **Main features of ELL2:**
 - 16 participants, including families and single households
 - Households living in a cooperative building
- **ELL challenge period:**
15 October to 2 December, 2018



What makes the Swiss case unique

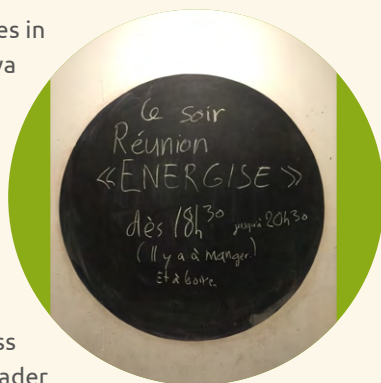
Shared laundry rooms in buildings are quite common. The UNIGE team therefore included households who use these shared facilities, in addition to private laundry machine ownership. For the ELL2 households, the Swiss team was able to host the focus groups in their building, as there is a dedicated space for community events, which meant that children of all ages participated in the discussions.

Challenges encountered in Switzerland and tackling them

The main issue was to engage a 'community of place' for ELL2, which led us to work with a cooperative building, where residents are already involved in collective decision-making around everyday life. The second issue was to reduce indoor temperatures in a particularly warm Autumn/Winter period; some participants expressed frustration at not being able to go low enough, when it came to achieving the target of 18°C.

Success stories and emerging opportunities

The ENERGISE Living Labs have led to overall changes in how laundry and heating practices play out in Geneva households, contributed to reduced energy usage, and had positive spill-over effects as a result. Thanks to a press release that was circulated before the challenges started, the Western Switzerland Television Station followed a household before and after the challenge, which resulted in a short appearance in the evening news. The press attention given to ENERGISE in the Swiss context was a way to amplify the experiment to a broader public.



What do participants think?

One participant explained that she would not change her habits at the end of the challenge:

"And then you think: 'When is it going to be over?'. And actually, when it is over, you don't change back. You continue to not do the washing. Which is very nice as well."

While another explained the overall positive experience of the household, in participating:

"Yes, well, also to be happy to take a step in the right direction, towards something more... better for the environment."



UNITED KINGDOM



UK ELLs in brief

- **Implementation lead:** Kingston University
- **Implementation partner:**
Energise Sussex Coast
- **Main features of ELL1:**
 - 20 households with some variety with respect to socio-economic group in Hastings and St Leonards on Sea (south coast of England)
- **Main features of ELL2:**
 - 13, including lower income households in Hastings and St Leonards on Sea
 - All ELL2 participants belong to the same faith group
- **ELL challenge period:**
ELL1: 15 October to 2 December, 2018 **ELL2:** 22 October to 9 December, 2018



What makes the UK case unique

The collective living lab (ELL2) engaged members of a local faith group. Recruitment of these participants required close collaboration with the local implementation partner (Energise Sussex Coast), which had pre-existing links with the local Imam.

Challenge(s) encountered in the UK and tackling them

One specific challenge was cultural; ELL1 had mainly white British participants (including only one ethnic minority), whereas ELL2 comprised first and second generation immigrants - members of an islamic faith group. ELL2 was split into two sub-groups on gender lines for focus groups, which had an effect on the overall level of interaction and communication. Communication with ELL2 participants was not always as effective as desired, partly because a number of participants preferred to be contacted by text message rather than via email; the Kingston team set up bulk text messaging to do this cost-effectively. Another challenge concerned the location of ELLs, which is remote from Kingston/London area where the research team is based.

Success stories and emerging opportunities

Participation in the study led to significant changes in heating awareness and practices of the UK participants. Most of them were able to reduce the indoor temperature and still feel comfortable and warm enough. As a result of the laundry challenge the number of weekly wash cycles decreased. Participants started to assess what needed washing more carefully. Some participants pointed to the time-saving benefits of the laundry challenge. The use of washing machines changed in some households (e.g. more use of shorter or energy-efficient programmes, lower temperatures, doing full loads). Many participants are committed to continuing with the new practices, as the benefits were obvious to them.



What do participants think?

Overall, the project was regarded as useful, interesting and enjoyable.

"It was so worth our time. The time, money and energy we will now save will live with us for our future!"

"I suppose what the study's really done is it has reinforced in me things that I knew I should be doing or that I would temperamentally I'm inclined to do, but sometimes you just forget."

"It was good to see how we could reduce the number of washing machine loads per week and how we coped with the temperature of the house being lower. We enjoyed the challenge!"

One ELL2 participant stated that the challenge kit given to participants *"raised awareness, made us all talk about it [energy use] and see how we can benefit from [the project]."*



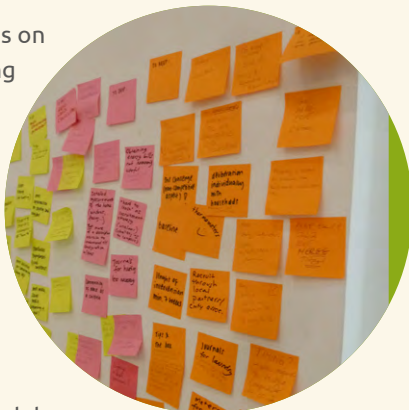


WHAT DID THE ENERGISE TEAM LEARN FROM IMPLEMENTING THE LIVING LABS?

In this section, we present some of our reflections on implementing the ENERGISE Living Labs, and living labs in general. To read a more detailed reflection, please see the last section on References, further reading and information where we include details of our related publications.

Issues that need to be considered carefully before organising living labs

- It is important to bear in mind that the **pre-defined overall aims and objectives** of living labs as well as the expectations and requirements of the funder(s) have a large impact on how much influence researchers and implementers can have on how the living labs are planned and executed.
- The **aims need to be very clearly defined beforehand**. Living labs will be different depending on whether their aim is to understand practices, change practices, perform an intra- or cross-country comparison, reduce consumption, or any combination of these or other objectives.
- The aims also determine the **selection of households**. Often, it is useful to involve various socio-economic groups, e.g., in order to be able to make comparisons. However, groups that vary too much might make comparison challenging, for example this was the case with ENERGISE Living Labs where different hard-to-reach groups and communities were involved in different countries, e.g. a faith-based community in the UK and a residential community in Denmark.
- In relation to **communities**, it is important to clarify what is meant by a community. For example, a community of place or interest? A community with pre-existing interactions within the group or a community created specifically for the living lab?
- When working with **hard-to-reach groups**, it is very useful to at least consult with an NGO or association working regularly with the group, and in the best case to involve such an actor in outreach and implementation.



- Before starting a living lab, it is advisable to carry out **stakeholder** mapping to find out
 - Who has an impact on energy use in the particular context we are working in?
 - Who is likely to use the outcomes of the living labs?
 - Who can help in reaching and engaging our target group?
 - Who can help in communicating and disseminating our results, etc.?
- Once the stakeholders are mapped, it is important to consult with them and, if possible, involve them in the implementation. For successful cooperation, it is important to discuss boundaries and roles.
- When designing **intervention and monitoring tools and methods**, it is important not to plan with either too few or too many tools and methods in order to avoid overburdening participants as well as overlaps in data collection from various sources, unless the aims are to compare the accuracy, usefulness, etc. of the methods. Naturally, the aims of the living labs and the needs of implementers and stakeholders will also have an impact on the tools and methods used.



Elements that the ENERGISE team would recommend in future living labs

- A critical aspect of the interactions with households was about **not moralising people**, not telling people how to behave, but rather providing guidelines, suggestions, tips and (critically) new things and material arrangements (e.g. the challenge kits).
- The majority of ENERGISE partners were from researcher institutes; thus, it was very useful for the team to find and work with **local implementation partners** that were different energy intermediaries (local governments, NGOs, energy agencies, etc.). This cooperation was found to be vital for the success of the ENERGISE Living Labs. Local implementation partners also help embed the living lab locally, and can also contribute to its longer-term impact.
- As for the engagement method, including **challenges** that participants were asked to try out was a very useful design element in the ENERGISE Living Labs. The challenges were general enough so that they could be

implemented in very different contexts, and at the same time provided a rupture for participants in everyday life situations, in a limited time period.

- The **low-tech nature of the challenges** was also considered an important and positive feature by participants, implementing partners and researchers. They were easy to understand as well as to implement.
- In relation to challenges, it is important to mention that participating households were **not pressured to meet the challenges**, but rather asked to see how they can or cannot do them in their specific circumstances: what are the factors that support and what are the ones that hinder meeting them? Is meeting them still within their comfort limits? Can they adjust their comfort related limits to meet them?

However, it is useful to remember that even with this flexibility in mind, some participants felt eager to meet the challenge and were somewhat discouraged when they did not succeed. Thus, continuous communication and feedback to avoid dropouts as a result is vital.

- In addition to having challenges in the design of the ENERGISE Living Labs, having baseline and deliberation phases with accompanying simple tools was also found to be important.

- The **baseline period with simple tools** such as an energy meter and thermometer as well as laundry and heating diaries really helped participants map and understand their daily practices and energy consumption. They also encouraged reflection on practices.
- The **deliberation phase** (individual interviews and focus group discussions in the case of ENERGISE) was critical, in that it was designed to discuss everyday practices as well as the normative dimension of laundry and heating.



- Finally, it is very important to include a **final celebratory and reflective event** at the end of the living lab to provide an opportunity for participants, implementers and stakeholders to meet, reflect on the living lab, consider ways forward as well as to celebrate the shared learning and achievements.

Things that the ENERGISE team would consider doing differently

- In the ENERGISE project we worked with individual and community living labs in each country. Although they both have advantages, **community or collective living labs** provide unique opportunities for peer support and learning, creating a sense of encouragement and community. They are also more resource-efficient to implement.
- Unless required otherwise by project aims, we would **reduce the variation in the target group** (e.g. socio-demographic characteristics) for a particular living lab to allow for more comparison between living labs.
- In the ENERGISE Living Labs, each household was equipped with thermometers as well as a **temperature logger**. The loggers were there for research purposes only, to help monitor indoor temperature. If not vital for reaching project aims, we would not use them in the future as they are not needed for participants and are resource intensive.
- In the ENERGISE Living Labs, two focus domains were selected, heating and laundry. During implementation, this was found to be a limitation as some of the participants were already rather energy efficient in one or both of these domains. In the future we would consider **leaving the selection of the domains more open** to, on the one hand, discussion with stakeholders and participants, and on the other, co-design with participants, and modify the tools in the baseline and deliberation phases accordingly.



- In a future living lab, especially if domains are pre-defined, we would focus more on the **justification provided for the challenges**: why were these particular challenges selected? What would happen if every household in a country/in Europe changed their practice as suggested by implementers? Thus, in addition to helping participants understand why they are asked to do a particular challenge, we would also consider scalability issues.
- A four week focus on each challenge in the ENERGISE Living Labs was considered mostly sufficient, particularly for laundry. Still, many participants and implementation partners remarked that it would have been nice to **have a longer period to experiment with and achieve the challenges**, especially in the case of heating where a dramatic reduction of indoor temperature may prove too challenging over a short period. Timing is also particularly important for heating, as outdoor temperatures have a significant impact on heating practices.
- Finally, in a future living lab the ENERGISE team would concentrate on **further developing the collective aspect of the living lab**. This would mean developing tools and activities to foster group development processes and group dynamics as well as to facilitate community engagement and interactions within the group.







REFLECTIONS ON IMPLEMENTING THE ENERGISE LIVING LABS IN BULGARIA AND SLOVENIA

ELLS IN BULGARIA



Bulgaria is a very interesting and at the same time quite challenging arena for possible future implementation of ENERGISE Living Labs. The most important aspect that would need to be taken into consideration is the energy poverty – according to EU Energy Poverty Observatory and Bulgarian National Statistical institute, 41% of Bulgarian households are not able to keep their homes adequately warm and 29% have arrears on utility bills. Although electricity prices are less than half of the EU average of 0.2041 Euro per kWh, incomes are also well below the EU28 average. Energy costs (heating, water, electricity and fuel) represent about 15% of household expenses – the second largest share of the household budget after food (31%). A steady rise in energy prices has been a strong incentive for taking different energy efficiency measures, but poverty and low incomes are also a considerable obstacle as the majority of households are not able to invest in modern energy efficient appliances or thermal insulation of homes. As a consequence, many Bulgarian residential buildings are under-heated, and, therefore, the potential for energy saving is quite small. In order to reduce their energy expenditure, low-income households routinely decrease their level of comfort. An additional reason why many Bulgarian homes are too cold in winter and too hot in summer is the old age and very low quality of a large number of buildings.

Studies on energy behaviour and practices of Bulgarian households are very scarce, but the existing research points towards two major tendencies. Firstly, over the past decade many of the less well off households (elder persons living alone, single parents with children, families with three or more children) turned to cheaper, but less efficient and more polluting heating sources. Those living in detached houses and in rural areas mostly switched to wood and (to a lesser extent) coal, while many of those residing in multi-household apartment blocks disconnected themselves from the district heating networks and started to use cheap electric heaters. Regardless of the heating source, such households often heat only one or two of the most commonly used rooms, and in the coldest months of the year, the temperature in these homes is rarely higher than 18°C. From this perspective, the ELL challenge of asking the households to reduce their indoor temperature to 18°C

would not make much sense, as they already live in cold homes and have developed many strategies to cope with this everyday situation – including various tips proposed by the ENERGISE project and which make sense in countries where energy poverty is a less pressing concern. Secondly, many of the better-off households have turned to renewable energy sources (biomass, solar panels and geothermal energy) and modern technologies for thermal insulation in order to become more independent from the unpredictable energy policies in the country and the rising electricity prices. Although the reasons are different, the 18°C challenge might be tricky to implement in such households as well, especially if they are located in new buildings with good energy performance, as in many cases, the 18°C can be maintained throughout winter with minimal energy consumption (except during extraordinary cold days). Nevertheless, implementing ENERGISE Living Labs in such households could be interesting and effective, as based on experience from Hungary householders residing in well-insulated buildings often overheat their homes and therefore unnecessarily consume too much energy.

In general, however, it can be predicted that in both cases households would easily fulfil the challenge, although it would remain questionable how much the challenge would actually affect their daily routines and influence their energy practices. The more relevant consideration for Bulgaria would be how to help the energy poor households to improve their thermal comfort without increasing their energy use and expenses.

Not much has been written about Bulgarian social norms in laundry. The limited studies indicate that in relation to the number of wash cycles, and energy and water consumption for washing, Bulgarian households do not differ from other EU countries. In general, having an orderly and clean appearance is a strongly embedded social norm, and most Bulgarians would be quite reluctant if asked to compromise. A short survey⁴ on a popular family online forum shows that in households with children, 5-8 washing cycles per week are a norm. This information indicates that an ENERGISE laundry challenge asking households to considerably reduce the number of their washing cycles has large potential. There is obvious room for improvement and optimisation, but based on the opinions expressed in the above mentioned forum, changing Bulgarian laundry norms might be a rather challenging endeavour.

In conclusion, it may be noted that for many Bulgarians, the outside appearance is often more important than what goes on behind closed doors. Hence, they might be more willing to respond positively to the heating challenge (taking into account the concerns about how relevant would the 18°C challenge actually be in the Bulgarian context) and

4 Колко пъти седмично перете в пералнята? (How many times a week do you wash in the washing machine?) (2013). bg-mamma portal, <https://www.bg-mamma.com/?topic=712985>

remain rather reserved towards the laundry task. When designing and planning living labs in Bulgaria, it is also worth noting that Bulgarian householders are often very eager and active participants in top-down initiatives, especially those that include a gaming or a competitive element of energy saving.

ELLS IN SLOVENIA



When it comes to implementation of energy efficiency measures for households in Slovenia, there are numerous initiatives that focus on individual behaviour change, collective approaches to behaviour change, or changes in everyday life situations. Approaches or research projects that use living labs or a similar methodology are scarce, although they do exist. The REACH project focuses on energy poor households in particular, while EnergyNeighbourhoods2 also focuses on households. Network of “Living Labs” for Energy Efficiency and Renewable Energy Sources (EnergyViLLab) is concerned with local authorities, companies and universities, and the European Real Life Learning Lab Alliances (EURL3A) focuses on the introduction of Living Lab approaches in higher education⁵.

At the current time, in Slovenia there is a significant problem of energy poverty, which is becoming increasingly important and therefore the focus when working with households is shifting to those that are socially vulnerable. Energy poverty in Slovenia today is primarily linked to the social and economic status of the households and to the poor state of buildings (characterised by low energy efficiency, old and unfurnished buildings), and less to the liberalisation of energy prices as in some other post-socialist/communist countries. Improvements in thermal insulation are usually concentrated in the better-off sections of the population, while the less well-off are less able to invest in improving the energy efficiency of their dwellings.

Within sustainable energy initiatives identified in Slovenia in the context of the ENERGISE project, there is some attention paid to the socio-material specifics of energy use. Energy efficiency is high on the agenda of several initiatives, as is energy poverty. One visible characteristic of initiatives that target energy poverty is that many of them work with such households in a variety of forms, from working towards providing home audits, energy advice, awareness raising, understanding of energy and heating bills, and/or participatory workshops on energy saving.

⁵ Please see more details in the ENERGISE database available at <http://energise-project.eu/projects>

Home audits present an approach with similarities to living labs, and was the approach used in the project REACH. An energy adviser visited an energy poor household and during the first visit, the adviser made an energy audit of the household and studied its habits. Based on these inputs, tailored advice was given to each household in order to empower them to reduce energy and water use. Apart from advice, the households also received free energy and water-saving devices that helped them to make further savings. At the end, an evaluation questionnaire was prepared and inputs from households were gathered. The analysis indicated that the visits and advice managed to influence people's mindset regarding energy use – at least in the short term. Households appeared to care more about energy and found it important. They also cared about their personal gain in terms of a lower energy bill. Households that were visited followed some of the tips given by the advisers (i.e. use saving bulbs and tap aerators, unplug chargers and transformers when not in use, etc.); several tips people were already doing before (i.e. turn out lights in empty rooms, taking showers instead of baths, etc.) while only a few tips were not followed (i.e. lower temperature for the washing machine, regulate temperature in the fridge, etc.).

In regard to the ENERGISE Living Lab (ELL) approach with its focus on laundry and indoor temperatures, the REACH case showed that social norms in laundry are relatively easy to change, but it can also be noted that laundry was not seen as the central focus of measures for saving energy. Practical measures and research focusing on laundry norms or habits are scarce, and the majority deal with the energy efficiency of appliances – i.e. washing machines – and not with social norms or behaviour. Households in Slovenia would potentially be more susceptible to most other areas for energy savings – lighting, heating, water heating, efficient appliances – than laundry norms and practices. Therefore, it would potentially be interesting and insightful to apply the ELLs in Slovenia, which would open up new spaces for experimentation.

As for reducing the indoor temperature to 18°C in the winter - which was the common ENERGISE heating challenge –, in most cases in project REACH it was seen as inappropriate. The lowest temperature that would be comfortable for households was considered to be 20-21°C, in many cases even higher. Nevertheless, there were several cases where households could not afford to heat their homes adequately. For that reason their indoor temperature was 18°C or less, but when asked if they would like to have it warmer, all of them agreed. Here, the ELLs would also be beneficial as a means of testing limits to consumption and challenging collective conventions around energy use, particularly given the relatively high indoor temperatures currently considered as desirable in the Slovenian context.



CONCLUDING THOUGHTS: WHY IS IT USEFUL TO ORGANISE PRACTICE-BASED LIVING LABS?

Practice-based living labs, like the ENERGISE Living Labs, can serve many purposes:

- They create experimental spaces that help understand as well as inspire change in household energy use,
- They create small-scale, safe spaces to work towards more sustainable energy use and consumption in an interactive way and involving different stakeholders, such as researchers, implementers/intermediaries and households (or other target groups) in the process,
- They help inspire not only understanding and change, but also learning for all stakeholders involved,
- They help confirm and validate existing good practices, and activate so far passive knowledge on sustainable lifestyles (as reported by ENERGISE Living Lab participants).



As highlighted in our preliminary analysis results, practice-based living labs have the potential for inducing change in various ways, often across several practice elements (i.e. representation of social norms, skills, material arrangements):⁶

- In the case of cleanliness and doing laundry changes may occur, for example, in
 - what cleanliness means to participants,
 - why participants decide to wash a piece of clothing,



⁶ For detailed analysis results please visit the ENERGISE website (<http://www.energise-project.eu/deliverables>) and consult our deliverable 5.2: Report on analysis of ENERGISE Living Lab data.

- how participants manage to reduce their washing need through applying various methods,
 - how participants use their washing machine,
 - the level of awareness participants have about the energy consumption of having clean clothes, or
 - the actual energy consumption of doing laundry.
- In the case of indoor comfort and heating homes changes may occur, for example, in
 - the perception of what constitutes the ideal and acceptable indoor temperature in various rooms during various times of the day,
 - the level of awareness related to indoor temperature and the many factors that influence indoor comfort,
 - the understanding and use of heating systems and their elements including the thermostat, thermostatic valves, doors and windows,
 - how participants deal with lower temperatures and the various practices they apply to keep warm without having to turn the heating on, or
 - heating-related energy consumption.

Finally, as the example of ENERGISE Living Labs show, practice-based living labs can involve households along with multiple stakeholders in **experimenting with and learning about energy sufficiency**. By doing so they prove important tools in the low-carbon energy transition.



REFERENCES AND FURTHER READING

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- Rau, H. & Grealis, E. (2017) [Framework document for ENERGISE team: Everyday practices, cultural conventions and energy use: researching new opportunities for reducing domestic energy use in Europe](#). ENERGISE, Deliverable 1.2.

About the ENERGISE Typologies of Sustainable Energy Consumption Initiatives:

- Jensen, C., Goggins, G. & Fahy, F. [2017b. Construction of Typologies of Sustainable Energy Consumption Initiatives](#). ENERGISE, Deliverable 2.4.

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Published article:

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To view and search the database, please visit <http://energise-project.eu/projects>

About the ENERGISE Living Labs methodology and implementation:

Background report:

- Laakso, S., Heiskanen, E. & Matschoss, K. (2017) [ENERGISE Living Labs background report](#). ENERGISE, Deliverable 3.2

Published article:

- Heiskanen, E., Laakso, S., Matschoss, K., Backhaus, J., Goggins, G., & Vadovics, E. (2018) [Designing real-world laboratories for the reduction of residential energy use: Articulating theories of change](#). GAIA, 27(S1), 60–67.

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- Heiskanen, E., Laakso, S. & Matschoss, K. (2018) [ENERGISE Living Lab evaluation and assessment manual](#). ENERGISE, Deliverable 3.5.

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About the step-by-step implementation of the ENERGISE Living Labs including the ELL materials (e.g. surveys, interview guides, materials distributed to participants):

- Laakso et al. (2019) [Online tools and user community for scaling up ENERGISE Living Labs](#). ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, ENERGISE, Deliverable No. 3.6.

Or visit the ENERGISE website at <http://energise-project.eu/livinglabs>

About the collective conventions and material arrangements, across the eight ELL countries:

- Sahakian, M., Naef, P., Jensen, C., Goggins, G. and Fahy, F. (2019) Challenging conventions towards energy sufficiency: Ruptures in laundry and heating routines in Europe. ECEEE Summer Study 2019 Proceedings.

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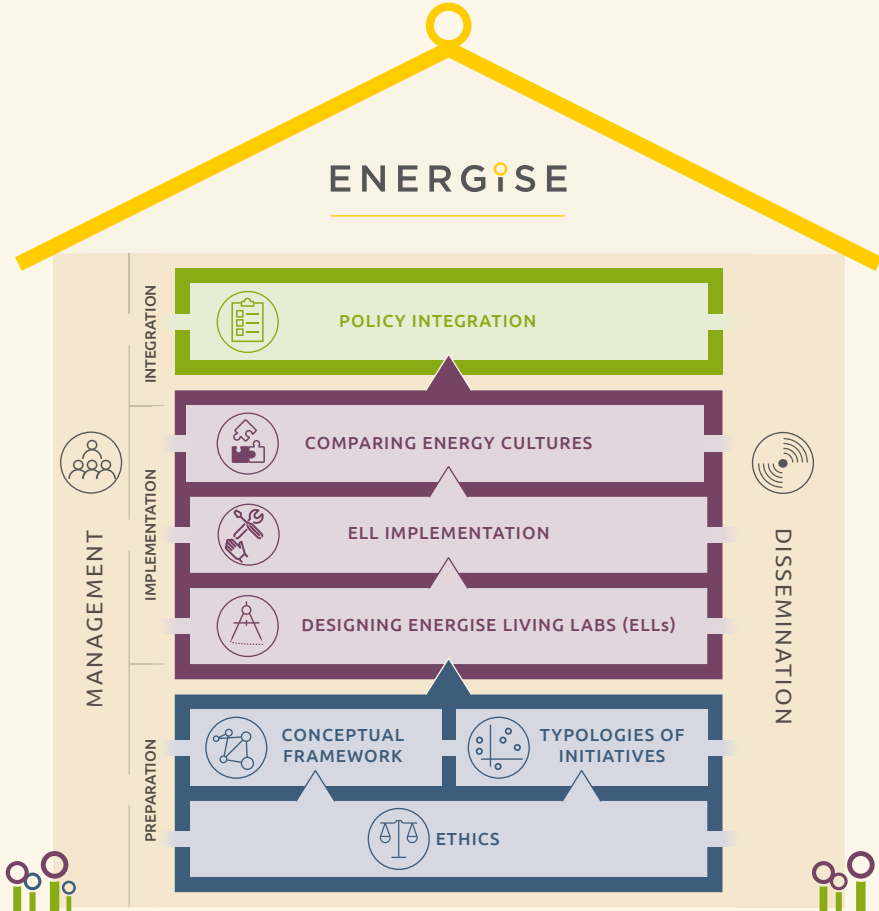
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To read about our **analysis and comparison** of the ENERGISE Living Labs conducted in the eight countries as well as related **policy implications**, please visit the Deliverables (<http://energise-project.eu/deliverables>) and Papers (<http://energise-project.eu/papers>) sections on the ENERGISE website (<http://energise-project.eu/>)!

FOR FURTHER READING, PAPERS AND MATERIALS, PLEASE VISIT
<http://energise-project.eu/projects>

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