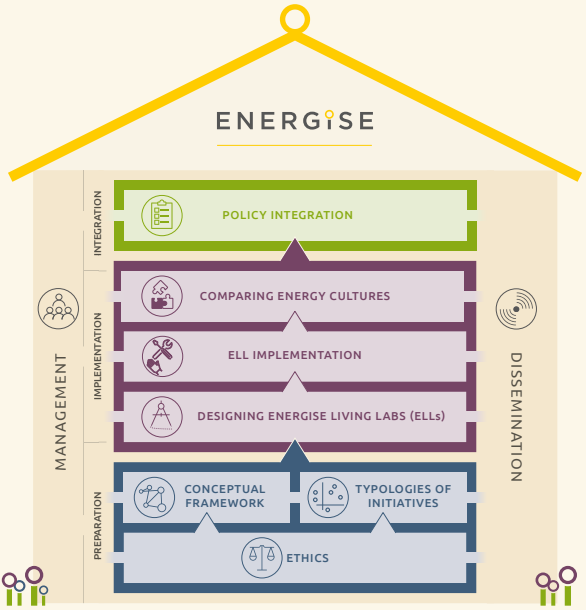
THE ENERGISE PROJECT SUMMARY HANDBOOK

INVOLVING HOUSEHOLDS IN ENERGY CHANGE



ENERGISE

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

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Edited by **Edina Vadovics**, **Frances Fahy**, **Gary Goggins**
English language proofreading by **Gary Goggins**
Reviewed by: **Marko Hajdinjak (ARC Fund), Eva Heiskanen (UH), Marfuga Iskandarova, (KUL), Charlotte Louise Jensen (AAU), Senja Laakso (UH), Marlyne Sahakian (UNIGE), Veronique Vasseur (UM)**

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Further information about the ENERGISE project can be found at www.energise-project.eu or please contact the ENERGISE Team at info@energise-project.eu.

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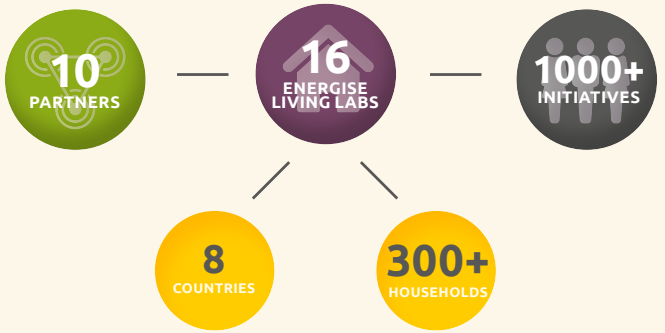


TABLE OF CONTENTS

INTRODUCTION

We are living in a rapidly changing world, where complex societal challenges such as climate change, inequalities, and unsustainable resource use are putting unprecedented pressures on our social and environmental systems. Addressing these urgent challenges requires radical changes in patterns of production and consumption at a pace and scale beyond what has been previously achieved. More than ever, robust scientific research and practice on transformational change is needed to promote a societal shift toward sustainable practices. It is now widely acknowledged that technological advancement by itself is not going to deliver the reductions in carbon emissions required to meet international obligations under the Paris Agreement to restrict global warming to 1.5 °C. Social and cultural change is and will be a key component in promoting a sustainable future.

The ENERGISE project makes an important contribution to understanding what role households can play in transformations towards using energy more sustainably in domestic spaces. Working directly with academics, householders, practitioners, businesses and policy-makers, the project has been instrumental in developing a greater understanding of how and why people use energy in their everyday lives, and to what effect. This handbook provides an overview of the ENERGISE project from theory development, through to practice, and further reflections on lessons learned for policy, research and practice.

Throughout the ENERGISE project, we have drawn on cutting-edge social scientific methods and techniques to help us develop a better understanding of how and in what way people use energy, with specific focus on thermal comfort (heating homes) and cleanliness (washing laundry). We began by analysing over 1000 sustainable energy consumption initiatives focusing on households across 30 European countries, toward developing innovative typologies and informing the empirical component of our project. We then adopted a 'Living Lab' approach working with over 300 households across 8 European countries. Through the ENERGISE Living Labs, we engaged households in participatory research and deliberations in order to challenge and contest social norms and habitual practices tied up with energy usage, with the overall aim of adopting more sustainable practices.

THE ENERGISE THEORETICAL FRAMEWORK

The ENERGISE project adopted a practice-theoretical approach to try to better understand how changes in household energy use happen (Rau & Grealis, 2017). Rather than treating energy as simply a product that households consume, ENERGISE viewed energy use as a result of habits and routine practices that household members regularly engage in such as heating, cooking, cleaning, entertainment, or travel. It is important to understand why and in what way people perform (and indeed continue to perform) these practices, as this may reveal opportunities for change, resulting in reduced energy use in the future.

The reasons for adopting a particular practice may not always be immediately apparent to an outside observer. Taking the example of laundry, it is relatively easy to see people throwing laundry into a laundry basket, filling up the washing machine before drying and folding their clothes. We can easily observe the necessary equipment and resources they engage with in relation to laundry (clothes, washing machine, water, etc.) and that they have the skills to perform the practice (i.e. knowing how to use the laundry equipment). What is more difficult to ascertain, however, is why some people perform the practice in a certain way, e.g. deciding the appropriate wash temperature or determining when something actually "needs" to be washed and ready to wear. Similarly, in relation to heating, there may be manifold reasons behind people's choice of an "appropriate" temperature. They may have been taught how to do their washing from a parent, friend or housemate or taught themselves either by trial and error or through educating themselves from available sources (magazines, online articles, etc.). Furthermore, different people can have significantly different perceptions when it comes to determining when an item of clothing needs to be washed. In fact, it is possible to observe cross-cultural differences in laundry routines across Europe and globally.

People also have different requirements or standards of dress in varying social situations. These standards or expectations may change according to the cultural conventions associated with certain groups that expect or demand members to dress in a specific way. These 'practice cultures' can exist at various social or organisational scales including community groups, educational institutions and workplace environments. For example, salespersons or other "white collar" professions may have very different expectations or standards ('dress code') than "blue collar" or service workers. This also applies to a change in life circumstance such as moving in with a partner or having a family when the expectations and standards of individuals in the household may clash. For example, members of a household may differ in their expectations of indoor temperature, which in turn requires compromises to be made in relation to space heating. Individuals may also have different standards or expectations in other areas such as mobility, washing, cleaning, or travel, all of which may be significantly challenged upon membership. Similarly, the arrival of children (another major life event) can confer membership of yet more groups or communities with their own cultural conventions and expectations such as school groups, activity clubs or associations. In this way, an individual's performance of a practice is heavily influenced by the different cultural conventions held and put into practice by the various groups that the individual belongs to. In fact, even households can develop their own practice culture, of which many elements may be reproduced and/or carried on by the next generation.

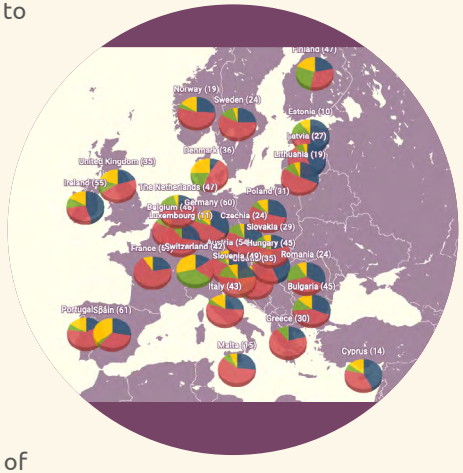
By understanding the hidden reasons behind the performance of energy-related practices, ENERGISE asks to what extent energy-intensive practice cultures can be challenged with a view to reducing the frequency or intensity of energy use. Through the innovative use of living laboratories, ENERGISE developed and tested a number of options to challenge practice cultures in two pilot areas, namely heating and laundry, under real-life conditions.

TYPOLOGIZING SUSTAINABLE ENERGY CONSUMPTION INITIATIVES

European sustainable energy consumption initiatives are multiple and manifold, with various foci, scopes and approaches. As ENERGISE seeks to contribute to and substantiate not only sustainable consumption research, but also sustainable consumption initiatives and practice, it is important to take stock of existing initiatives and their framings. As part of the work coming out of ENERGISE, the ENERGISE team therefore researched, reviewed and typologized 1000+ European Sustainable Energy Initiatives (SECIs), all of which comprise the ENERGISE SECI open access database[1].

In order to identify and assess SECIs and details about their scope, aims and outputs, several phases of data collection were designed and undertaken over the course of six months. The first phase of data collection involved developing the database of over 1000 SECIs across 30 European countries (EU28, Norway and Switzerland), which together comprise a multifaceted overview of the vast variety in scope, scale and objectives, types and methods of interventions and outputs of SECIs. In order to undertake an overall identification and assessment of the SECIs, a database template was developed through which specific aspects of each SECI could be explored and described. The total of 30 analytical categories developed and incorporated in the template were inspired by conceptual frameworks and analytical interests of ENERGISE, with specific attention to establishing a framework that would enable empirical inquiry related to how and to what extent particular 'contexts' of energy consumption were considered in the SECIs. Categories were also defined to explore the SECIs in terms of whether, and if so, how, they take social practices as targets for intervention for sustainability, rather than individual behaviour, 'choice', or technical innovation alone. Thus, the database template partly enabled an exploration of the 'problem framings' within which actors (including initiators, partners, funders, etc.) in the SECIs might operate. Throughout the development process, the database template went through extensive feedback cycles among all ENERGISE partners, ensuring that the diverse experience and expertise of the ENERGISE consortium would be utilised. For practical reasons, and to ensure consistency, all categories were described in a short and instructive way, to make sure that the aim and intention of the category was as explicit as possible for the purpose of data collection.

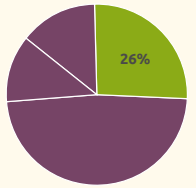
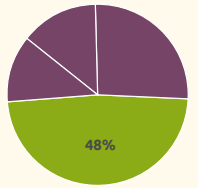
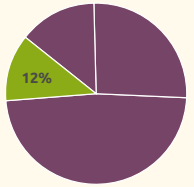
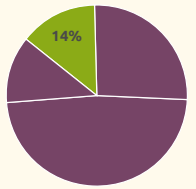
The construction of the comprehensive open access database of SECIs is thus closely connected to the construction of typologies of SECIs as reported on in Jensen et al. (2017, 2018). The database displays how the identified SECIs have been categorised according to the Problem Framing Typology (PFT). The dataset in the database is designed as a map that is intended to be a user-friendly device that provides an overview of SECIs in Europe. In particular, the map shows the variety in scope, content and approach in the identified SECIs. The map is not intended to be exhaustive in representing European SECIs, but is intended to be representative. It is meant to be a resource for a wide range of people to use, as it:



1. provides a systematic overview of the myriad energy consumption initiatives across Europe;
2. provides insights into predominant ways in which energy consumption challenges are framed (problem framings);
3. is a tool for researchers and policy makers to explore similarities and differences across the objectives and aims of SECIs, and
4. presents examples of how SECIs can be framed when taking into consideration a broader range of social, cultural, material and institutional aspects of change related to household energy consumption.

The main function of the ENERGISE open access database is therefore designed to (1) display 1000+ SECIs that actively involves households in change processes, as well as to (2) display ENERGISE' typological categorisation of the SECIs. The ENERGISE open access database does not, however, represent an evaluation of the merits or otherwise of any particular SECI.

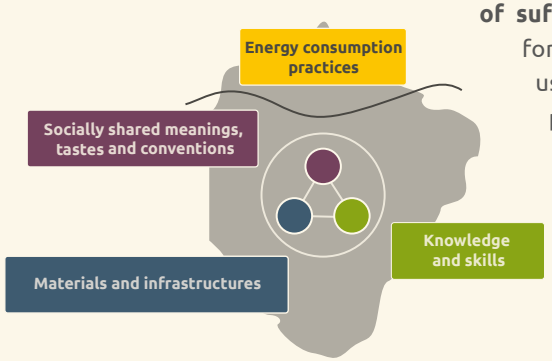
1 You can view the ENERGISE database at http://energise-project.eu/projects

CATEGORY	DESCRIPTION	EXAMPLE	EXAMPLE SECIs FROM ENERGISE DATABASE	NUMBER OF ASSESSED SECIs WITHIN THIS CATEGORY
Changes in technology	This problem framing assumes that changing levels in energy use is a matter of technological change and optimisation.	Optimising existing products so they become more energy efficient; technical innovation; focusing on large-scale technical changes from fossil fuel to renewable energy.	iBroad (Austria) Frigoslag - Fridge event (Belgium) Top Produkte (Eco Top Ten, Germany)	282 SECIs out of a total of 1067 
Changes in individual behaviour	This problem framing assumes that changing levels of energy use is a matter of changing individuals' behaviour in terms their (personal) energy use, and their attitudes and choices related to energy efficiency.	Information campaigns or nudging approaches that seek to convince the individual about rational use of energy, or to adopt more energy efficient lifestyles.	EnerGbg (Bulgaria) Campaign promoting sustainable lifestyles (Hungary) SAVE-E (Denmark)	514 SECIs out of a total of 1067 
Changes in everyday life situations	This problem framing assumes that changing levels of energy use is a matter of changing material components, images/norms and competences related to specific areas of daily life. Some initiatives include elements of energy sufficiency.	Understanding, challenging, engaging with and enabling (new) meanings, skills and material arrangements related to various everyday life situations. These can be connected to practices such as cooking and showering.	B.L.E.D (Belgium) Kreative Restkuecke (Austria) Kierrätyskeskus, 4V (Finland)	124 SECIs out of a total of 1067 
Changes in complex interactions	This problem framing assumes that changing levels of energy use is a matter of changing complex interactions between several areas of household related activities, professions and sectors. Occasionally, initiatives underpinned by this problem framing build on notions of energy sufficiency. This includes assuming that 'social organisation' is the key target for change, and that water, heat and energy consumption happens because of certain ways of organising daily life across domains, sectors and practices.	Targeting systems of energy provision, configurations of energy demand, including various actors involved in (re)procuring certain dynamics of existing or new systems of production and consumption.	City of energy – Société 2000 watts (Switzerland) Granollers en Transició (Spain) Energies-uffizienz (Germany)	147 SECIs out of a total of 1067 

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 understands energy use as a consequence of the performance of the many different habits and routines that people engage in on a regular basis such as heating, cooking, cleaning, entertainment, travel, etc., rather than a simply a (material) product that households consume. 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 recognised 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 focused 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 practices and socially shared conventions. They were thus not merely about making current practices more efficient, but rather aimed 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 (see the previous chapter);
- 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;
- interviews, discussions and co-creation workshops with experienced practitioners from the participating countries, which also aimed to ensure wider societal acceptability and achievability of the ELLs;
- feedback from the ENERGISE Expert Panel.

A Sustainability Assessment Toolkit (SAT)[2] provided guidelines for evaluation and assessment of the Living Labs. Altogether 16 ELLs, engaging more than 300 households, were implemented in eight European countries in late 2018.

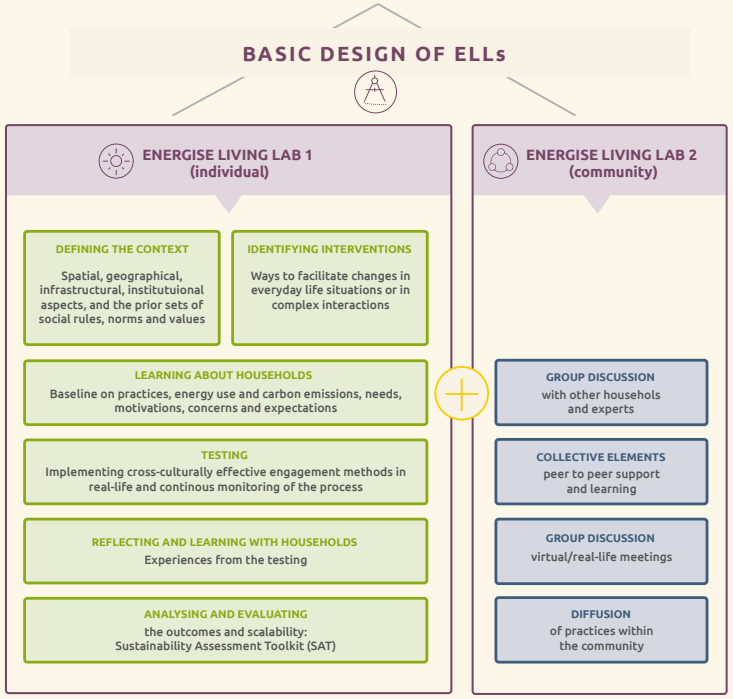
Basic design of the ENERGISE Living Labs

The basic design of ELLs consisted of six phases:

- Drawing on the ENERGISE conceptual framework (Rau & Grealis 2017), ELLs started 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, previous research and practitioner experience on interventions that are likely to work in diverse contexts.

2 See details in Heiskanen, E. et. al. (2018) ENERGISE Living Lab evaluation and assessment manual. ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Deliverable No. 3.5

- In the **deliberation** phase (3), we assessed the baseline of energy use, and discussed and learned 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[3] were utilised in real life as the households tried to change their routines. As the participants attempted to integrate the new practices into their routines to see if and how they take hold or reveal new issues, it was 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 met in a **reflective meeting** in which we discussed their experiences (Phase 5).
- The final phase (6) of the ELLs focused on **evaluation** of the output, outcome and impact of ELLs.



3 Please see Laakso, S. et. al. (2017) ENERGISE Living Labs Background Report. ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Deliverable No. 3.2 or Heiskanen, E. et. al. (2018) Designing real-world laboratories for the reduction of residential energy use: Articulating theories of change. GAIA, 27(S1), 60–67.

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 online interaction through social media, and two face-to-face group discussions, before and after the challenges. These elements aimed to provide peer support and collaboration 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 homes. These focus areas were selected for various reasons. First of all, space heating has the biggest share of overall energy use in households across Europe (65%)[4] hence 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. The other intervention focused 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

4 Source: Eurostat, 2016

arrangements on a household level as well as through perceptions of comfort and cleanliness.

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

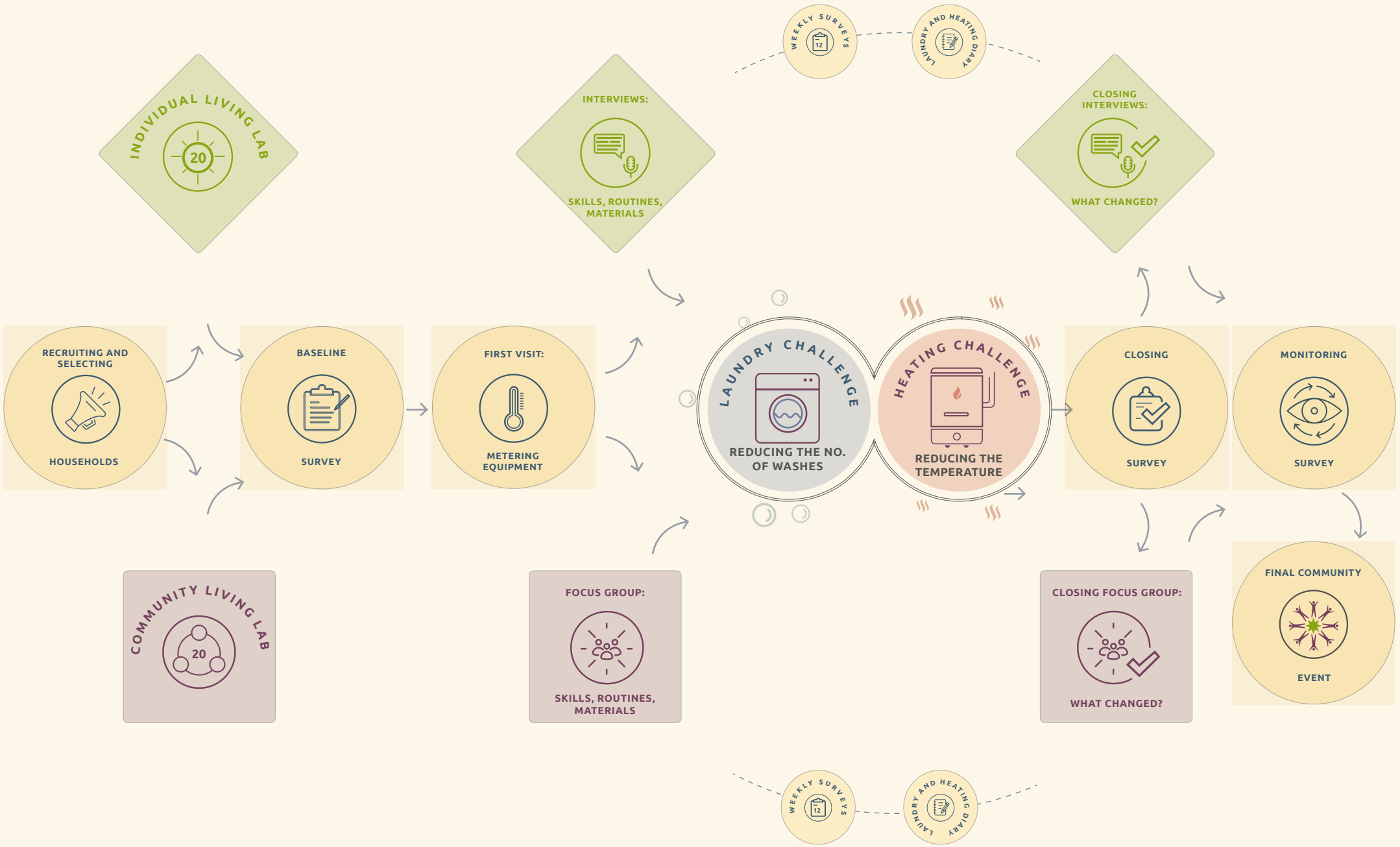
- In the domain of laundry, the aim was to **reduce washing laundry** by half.
- In heating, the challenge was to **reduce indoor temperature to maximum 18°C.**

When requested, the participants were able 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 (i.e. challenge kits) filled with materials to prompt discussions, tips and insights (rather than prescriptions) to support the challenges and create a dynamic among household members (such as 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 implementation in each country followed the following requirements:

1. recruit a similar number of households in both ELL1 and in ELL2;
2. include additional collective elements in ELL2 to distinguish it from ELL1;
3. organise ELL1 and ELL2 in a way that participants in the two ELLs should not interact or meet until the end of the challenge period;
4. invite households to experiment within the same, pre-defined domains (i.e. heating and laundry) in each ELL;
5. include the same interventions in both ELLs, i.e. invite participants to participate in the same challenges and provide similar materials;
6. organise ELLs so that they follow the steps agreed by the ENERGISE team and outlined in an ELL guidebook;
7. monitoring and evaluation should follow the steps outlined in the SAT (Sustainability Assessment Toolkit);
8. document actions during the ELLs and follow ethical as well as data protection guidelines.

The ENERGISE Living Lab process:



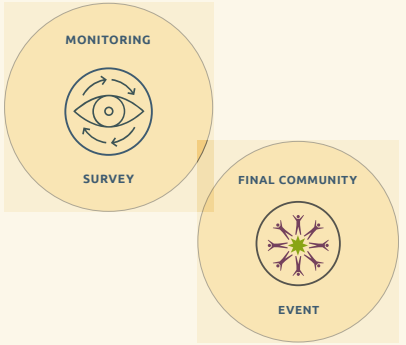
THE STEP BY STEP IMPLEMENTATION OF THE ENERGISE LIVING LABS

After recruiting the participating households, we first asked them to fill in a baseline survey about their heating and laundry practices.[5]

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*.

5 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.

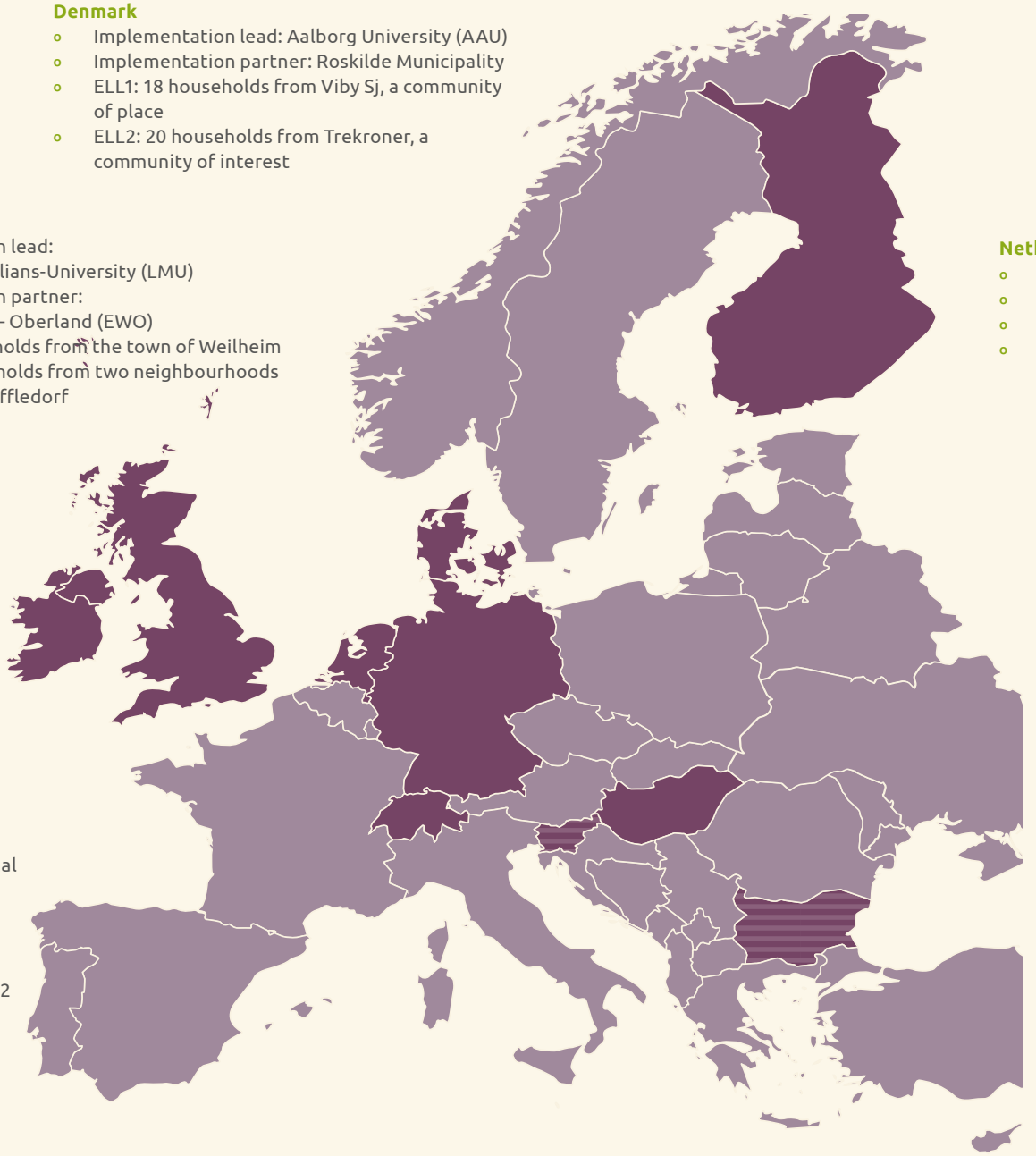
ENERGISE Living Labs were implemented in 8 European countries: [6]

Denmark
- Implementation lead: Aalborg University (AAU)
- Implementation partner: Roskilde Municipality
- ELL1: 18 households from Viby Sj, a community of place
- ELL2: 20 households from Trekroner, a community of interest

Germany
- Implementation lead: Ludwig-Maximilians-University (LMU)
- Implementation partner: Energiewende – Oberland (EWO)
- ELL1: 20 households from the town of Weilheim
- ELL2: 20 households from two neighbourhoods in Murnau and Iffledorf

United Kingdom
- Implementation lead: Kingston University
- Implementation partner: Energise Sussex Coast
- ELL1: 20 households from Hastings and St Leonards on Sea
- ELL2: 13 households belonging to the same faith group in Hastings and St Leonards on Sea

Ireland
- Implementation lead: National University of Ireland Galway (NUIG)
- Implementation partners: Tipperary Energy Agency for ELL1 and local school for ELL2
- ELL1: 20 households, a community of interest
- ELL2: 18 households, a community of place



Finland
- Implementation lead: University of Helsinki (UH)
- Implementation partners: Posintra, City of Helsinki
- ELL1: 19 households living in single-family homes in Porvoo
- ELL2: 18 households living in an apartment building in Helsinki

Netherlands
- Implementation lead: Maastricht University (ICIS)
- Implementation partner: Op het Zuiden
- ELL1: 20 households from Maastricht
- ELL2: 14 households from Roermond

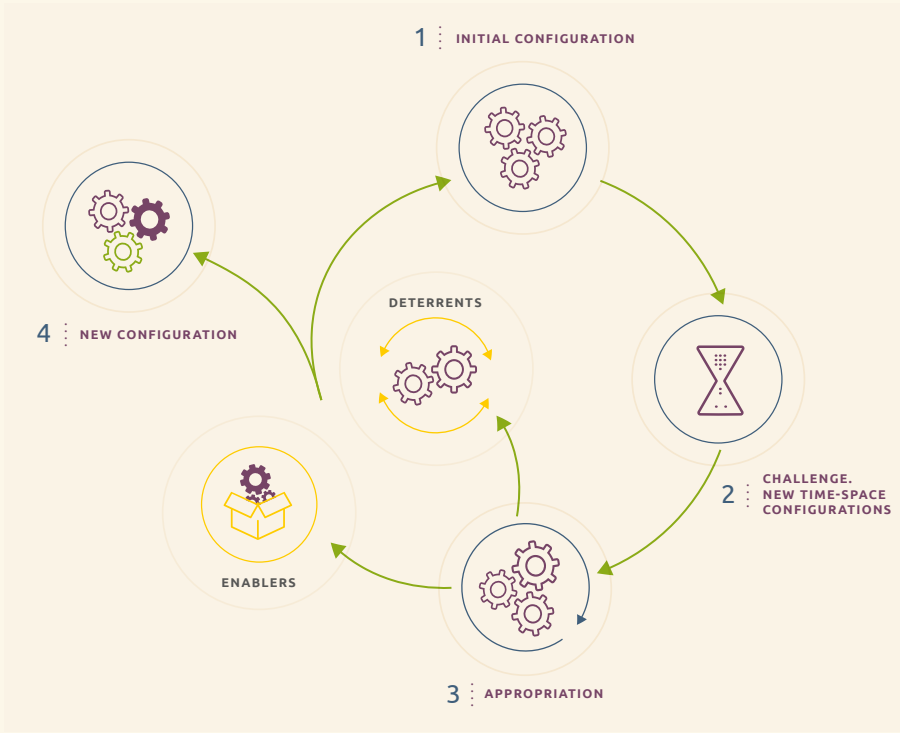
Switzerland
- Implementation lead: University of Geneva (UNIGE)
- Implementation partners: Terragir and Urbamonde
- ELL1: 20 participants living in Geneva
- ELL2: 16 participants living in a cooperative building in Geneva

Hungary
- Implementation lead: GreenDependent Institute (GDI)
- ELL1: 21 households from Gödöllő in Central Hungary
- ELL2: 20 households, also from Gödöllő

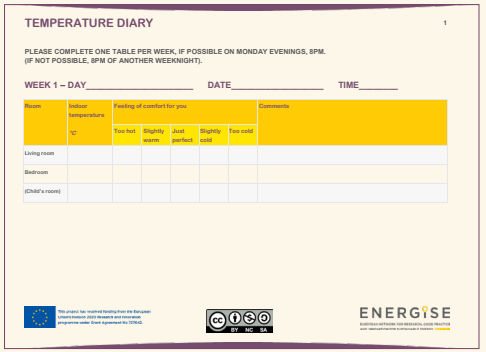
6 To learn more about how the ENERGISE Living Labs were implemented in each of the countries, please read our publication ENERGISE Living Labs – Methodology, Experience and Lessons Learned (D7.12), available from the ENERGISE website.

KEY RESULTS OF THE ENERGISE LIVING LABS

The ENERGISE Living Labs were analysed according to four stages, as illustrated in the figure below. First, we examined the **initial configuration** of practices in households, looking at various elements including existing habits and routines, and satisfaction with the current system of practices. The second stage of analysis concerned the **challenges** selected by households. We considered different issues such as what were the chosen challenges (common or tailored to the individual), emotions, discussions and dynamics around the challenges, and reactions to the challenges. Next, we considered how households **appropriated** the challenges and if they felt appreciation or irritation with them. Here, we analysed which elements of practices changed, and what practice configurations changed in relation to **deterrents and enablers for change**. Importantly, we understand deterrents and enablers as elements of practices, rather than 'external' barriers and levers. Hence, deterrents and enablers are always complex, inter-related and context specific. Finally, we analysed the **new configuration** of practices resulting from participation in the ELLs. In particular, we focused on continuing practices, the potential reconfiguration of practices, satisfaction from participating in the challenges, learnings from the challenges, sufficiency measures, and spillover and rebound effects.



Stages of Living Lab appropriation by households


TEMPERATURE DIARY

PLEASE COMPLETE ONE TABLE PER WEEK, IF POSSIBLE ON MONDAY EVENINGS, 8PM.
(IF NOT POSSIBLE, 8PM OF ANOTHER WEEKNIGHT).

WEEK 1 – DAY_____ DATE_____ TIME_____

Room	Indoor temperature °C	Feeling of comfort for you					Comments
		Too hot	Slightly warm	Just perfect	Slightly cold	Too cold	
Living room							
Bedroom							
(Child's room)							

ENERGISE

Heating challenge

In analysing the **initial configuration** we observed that certain households are already engaged in a number of actions in the home towards reducing indoor temperatures, such as turning down the thermostat, airing out rooms, adjusting the heating settings separately in each room, and heating bodies rather than spaces (e.g. putting on an extra layer of clothing rather than turning up the thermostat). However, achieving the target (18°C in most cases) meant that people also needed to learn or appropriate new ways of keeping warm (note that 5% of households engaged in the Living Labs were already living at 18°C or lower, in their living rooms).

During the challenge we were able to identify several **deterrents and enablers for change in relation to heating**. These elements, summarised in the tables below, are very much inter-related.

Deterrents for change in relation to heating:

MATERIAL ARRANGEMENTS AND TECHNOLOGIES	COMPETENCIES, BELIEFS AND SKILLS & ROUTINES AND HABITS	SOCIAL NORMS AND REPRESENTATIONS
The heating system; whether people have a handle or not on their heating system and an ability to reduce temperatures **conveniently and effectively** (through complex hydraulic floor heating systems, for example, or through radiator dials and thermostats). The lack of availability of **other heating sources**, such as a fireplace or stove. Being in an apartment where your unit is **heated by others** (i.e. heat transfer between adjacent apartments). Starting from an already **low baseline**.	**Health issues** constraining everyday life, such as arthritis, often in relation to **elderly people**. Being engaged in activities that render people **relatively immobile** in homes. **Resistance towards layers**, such as blankets, socks, and other ways of keeping bodies warm; preference for dressing down, when at home. Difficulties experienced when **negotiating indoor temperatures with other people**, when in the home. Difficulties in **controlling drafts and humidity levels**.	A social consideration for **guests and young children**, as well as (to a lesser extent) a consideration for the wellbeing of pets. Not wanting others to be uncomfortable. Caring for more vulnerable people/beings. **Social representation around being dressed down at home** and thus being more undressed than outdoors (enjoying the feeling of walking barefoot or sleeping in the nude, for example). General sense that **18°C is too low as a target** (shared by many households). **The "right to have a warm home"**, or beliefs around entitlement.

Enablers for change in relation to heating:

MATERIAL ARRANGEMENTS AND TECHNOLOGIES	COMPETENCIES, BELIEFS AND SKILLS & ROUTINES AND HABITS	SOCIAL NORMS AND REPRESENTATIONS
A **controllable heating system** (with thermostats and/or radiator valves that people can manoeuvre). **Thermometers**, so long as they are tied to a goal which is meaningful to people (such as the 18°C target). Starting from a **high baseline**. **Having a fireplace** or other source of heat in the home, which people can actively control. **Use of layers, for people or homes**: clothing or blankets to heat people; use of draft excluders, blinds, curtains and doors to create warmer, bounded spaces.	Being able to **monitor and regulate indoor temperatures** towards a set goal (thermometer and diary usage). Feelings of being **part of a common challenge**, shared by numerous households. Excitement towards experimentation. **Ability and desire to do things differently**, such as add more layers (clothing or blankets), do physical exercises in the home, drink hot beverages, take warm showers/ baths, play games. **Ability to negotiate/ compromise** with other family members. **Understanding** how the heating system and its components work (boiler, radiators).	Associating lower temperatures with **sleeping better at night**; better and healthier sleep. Recognising that people **experience indoor comfort very differently**, and accepting this variability. Engaging in **discussion and deliberation** with research team member(s), and these deliberations continuing with others (friends and family).

Examining how **new configurations** stabilised, we found that most households reported that they were able to **reduce indoor temperatures by at least 1°C**, with many households stating that this is possible without feeling un-comfortable at the lower temperature (and some reduced even more). While there were significant variations in the amount of changes experienced in relation to indoor temperature settings, a reduction of 1°C appears to be a reasonable goal for all – based on average temperatures recorded prior to the challenges. Most participants were also comfortable with lower temperatures in bedrooms, as compared to living areas.

Laundry challenge

The **initial configuration** represents the average number of wash cycles recorded by a household and average temperature settings, and associated sorting, drying (hanging or by machine), and folding, ironing, as relevant. Thus, laundry represents a series of actions that people engage in, which are sequential and represent a certain rhythm in daily lives, either routinised or not. These actions had to change towards a reduced number of laundry cycles (most of the time, by half), for the challenge period.

During the challenge we found across countries that people have the ability to overcome emotions of anxiety and find ways to get used to living with unwashed laundry over longer periods of time. We identified specific **deterrents and enablers for change in relation to laundry**, across different interrelated elements of practices.

Deterrents for change in relation to laundry:

MATERIAL ARRANGEMENTS AND TECHNOLOGIES	COMPETENCIES, BELIEFS AND SKILLS & ROUTINES AND HABITS	SOCIAL NORMS AND REPRESENTATIONS
Limited space for drying laundry or storing slightly-worn clothing. Having **young children** tended to increase wash cycles, generally. **Small-format washing machines**, which can lead to doing more laundry cycles. Starting from a low baseline, in terms of few laundry cycles per week. In single-person households, **not having sufficient underwear** and other clothes to last two weeks, for example.	**Caring for pets, children, elderly**, or people with allergies or sickness. Not wanting dirty clothes to pile up around the house, which leads to **feelings of being un-tidy or having a messy home**. **Practicing half-loads** **Not feeling like it matters if you reduce laundry,** as the energy consumption is insignificant compared to global problems. **Mis-use of laundry programmes** or misunderstanding of eco-efficiency functions.	Belief around hygiene and a need to have freshly washed/ clean **clothes that are in close contact with the body** (underwear, socks). Concern over social norms (e.g. at work) against **wearing the same clothes for two days in a row**. Not wanting to smell, or to **appear un-clean or smelly to others**. Expectation around washing **newly purchased clothes**.

Enablers for change in relation to laundry:

MATERIAL ARRANGEMENTS AND TECHNOLOGIES	COMPETENCIES, BELIEFS AND SKILLS & ROUTINES AND HABITS	SOCIAL NORMS AND REPRESENTATIONS
Monitoring the energy use of washing machines, so long as this relates to a given goal (reduced laundry cycles and associated energy use). Having **fewer household members** (except in single-person households). Having preferences for higher initial temperature settings; higher wash cycles per household members **(starting from a high baseline)**. 	Ability to **monitor laundry frequency and energy use** towards a set goal (energy meter, in some instances, and diary usage). Ability to have f**uller loads**, and ability to mix different clothing colours and types together. Ability (and space) for **airing out clothes at home**. Distinguishing **home clothes from out of home clothes; circulating worn/ used clothes**. **Letting go of control**: letting dirty clothes pile up, or finding ways to keep them out of view (additional laundry baskets). Ability and willingness to **try other ways of keeping clothes clean** (e.g. brushing, stain washing). **Experimenting** with temperature regimes and cycles. Engaging in n**ew criteria for buying clothes** (in that they would be low maintenance for washing)	Coming to terms with **washing less and not feeling un-clean**; particularly in relation to bedding. Sense of **freeing up time** for other things (in some cases), or **freeing up the mental load** (feelings of what chores need or ought to be done, generally gendered as feminine chores), Engaging in **discussion and deliberation** with research team member(s), and these deliberations continuing with others (friends and family). 

In stabilising **new configurations** of practices, almost all households were able to reduce by one laundry cycle per week, without feeling un-clean or experiencing inconvenience. While there were significant variations in the degree of changes experienced in relation to wash cycles, this one cycle change is a reasonable goal – assuming a mean household size and an average number of wash cycles to begin with.

A key finding across the households was that the four-week period was sufficient for stabilising a change in routines, at least in the short term (as documented in the monitoring survey results, captured 3 to 4 months after the challenge). By the end of the laundry challenge, many people expressed the sentiment that they continued to do things differently (as compared to the start of the challenge), and that they may have become normalised.

Summary

Giving people space to go outside of their comfort zones through these forms of experimentation created opportunities for people to try out new approaches to everyday life, in a set space and limited time period, towards a goal. We presented the challenges as a **social learning process, and not a competition**. The objective was to learn together, with an explicit focus away from 'energy saving' as the sole aim, through a deliberative and reflexive process. In relation to laundry and heating, we compiled a summary of the different **deterrents and enablers for each**. In some households the ability to regulate indoor temperature (and to complete the challenge or achieve a lower temperature target) was conditioned by the type of heating system, thus giving people less ability to engage in energy reductions in relation to heating. This was a significant deterrent. Conflicts and tensions between family members are also deterrents towards engaging in both challenges. Thus, social relations and everyday interactions are an important element to account for, as they determine the standards and expectations people will strive to meet, as well as the social dynamics they negotiate in and beyond the home – with family members, guests, and peer groups, for example.

The role of different devices for **measuring temperatures or the energy use of laundry equipment** was found to be an important enabler, along with the completion of weekly survey and diaries, but we bring an important nuance to the notion that these devices are enablers in and of themselves. People found them useful in so far as they were meaningful to a goal they had set themselves, i.e. the ELL challenges, and as a way to reflect on their own routines. In addition, and maybe more importantly, people did not solely learn at the interface of these measuring devices, they also learned from their experiences, or what we call 'sensory feelings' in spaces. People could read temperature settings, but also experience them, with bodies adapting to the change. As expected, people came to recognise that there is not one standard temperature that is valid for all people, in all spaces. In relation to laundry, some people generally took on a more sensorial approach to smells and stains, and developed a new relationship to feelings of cleanliness. We thus argue that people's senses were fully engaged in learning how to reduce energy use.

To complete both challenges, ELL participants had to expend effort and make important sacrifices, while realising that over time, it is possible to change practices and reduce consumption without giving up too much of a sense of overall wellbeing. Analysing how new practices took hold across the countries, we noticed that there was also an evolution in the emotions: feelings of being 'more or less fine' and 'relaxed' tended to increase as the weeks went by, perhaps indicating that people were adapting to change. We found that generally, there was a period of anxiety for some people at the start of the challenge, which was then diffused, suggesting perhaps that people had to come to terms with a period of uncertainty and social change.

More generally, we found that it is possible to design and implement initiatives aimed at reducing household energy usage by changing practices, rather than people. The ELLs placed an explicit focus on elements of practices, including material arrangements, people's skills and competencies, as well as meanings or representations of social norms.

Overall, we found that through the ELLs, and for most of the households across Europe who participated in the study, **reducing indoor temperatures by 1°C in the heating season and reducing laundry by one cycle per week** is possible, without comprising convenience and comfort[7]. In some cases, reductions were even more significant, and in many instances, changes were maintained for three

7 While we recognise that all sectors of society have a role to play in energy transitions, not solely households, we found that when it comes to households, absolute reductions in temperature settings are possible – assuming that households have an observed indoor temperature that was higher than the targeted reduction of 18 degrees. The average temperatures recorded prior to the challenge were closer to 20 degrees. Thus, we exclude from this finding households who were already experiencing low indoor temperatures, whether out of preference and habit, or due to energy poverty in terms of accessing affordable energy.

months after the challenges. The following table displays the self-reported average quantitative change as a result of the ELLs:

Average changes in reported temperatures and laundry cycles during ELLs

CHANGE IN TEMPERATURES		CHANGE IN WEEKLY LAUNDRY CYCLES		
LIVING ROOM	BEDROOM	FOR ALL HOUSEHOLDS	FAMILY OF 2	FAMILY OF 4
From 21.1°C to 20.1°C	From 20.0°C to 18.6°C	From 4.2 to 3.1	From 4.3 to 3.2	From 4.1 to 3.0
1°C less	1.4°C less	1.1 cycles less (26% reduction)	1.1 cycle less (26% reduction)	1.1 cycle less (26% reduction)

Data source: weekly surveys; averages taken before challenges, and during challenges

Our findings demonstrate that **reductions in energy use are possible when people are given the time and space to question their usual practices**, as they experiment with departing from what could be considered the norm and try out ways of doing things differently. This approach is in stark contrast to approaches centred on individual or technological change, which we have shown to dominate initiatives aimed at more sustainable forms of household energy use across Europe, and which fail to address the complex interactions and social norms that make up everyday life.

For a detailed summary of research methods and results, please consult Deliverable 5.2[8], and/or the country reports, available from the ENERGISE website[9].

8 Sahakian, M. et al. (2019) Report on the analysis of ENERGISE Living Labs data across all eight participating countries. ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable No. 5.2.

9 Please see at http://energise-project.eu/livinglab_country_reports

LESSONS LEARNED AND RECOMMENDATIONS FOR POLICY, RESEARCH AND PRACTICE

One of the aims of the ENERGISE project was to integrate, synthesise and translate ENERGISE findings for public- and private-sector decision-makers and practitioners, delivering research-led recommendations for further advancing the Energy Union. Thus, the primary outcome of ENERGISE concerns the recommendations that the ENERGISE team have formulated for various stakeholders, including lessons learned for EU and national policy for deploying and/or upscaling ENERGISE Living Labs (ELLs) as well as researchers and practitioners for planning and implementing sustainable lifestyle projects.

Lessons learned and recommendations for policy

The policy integration aspect of ENERGISE was supported by a Policy and Decision Forum, formed at the start of the project and comprising representatives from ENERGISE partners (the Programme Board) and the project's Expert Panel[10]. Three component tasks, defined as Policy Integration, Synthesis of Findings and Translation of Findings, formed the programme of work.

1. Integration of Social Science Energy Research with Policy

In order to develop a Policy Integration Framework, the researchers undertook a review of the integration of Social Science and Humanities (SSH) with EU energy research and policy-making in the context of the 8 ELL countries and the EU[11]. The focus was on the value of social sciences and interdisciplinarity in energy research and action research projects that facilitate change, and the contribution that SSH can make to understanding the transformation of household energy use, which is fundamentally 'socio-technical' in nature. The research team reviewed funding for SSH energy research in Europe and various ways in which environmental and energy-related research and policy integration may be achieved[12]. The concept of

10 For information on the ENERGISE Expert Panel, please visit http://energise-project.eu/partners/expert-panel

11 See D6.1 and D6.4 at http://www.energise-project.eu/deliverables

12 See also Genus, A. et. al. (2018) Imaginaries and Practices: Learning from 'ENERGISE' About the Integration of Social Sciences with the EU Energy Union. In: Foulds, C. and Robison, R. (2018) Advancing Energy Policy. Lessons on the Integration of Social Sciences and Humanities. Palgrave.

'imaginaries' was employed to analyse the current state and possibilities for future SSH energy research integration with policy-making.

The review shows that the potential of SSH remains unfulfilled. The reasons for this are rooted in the dominant imaginary and problem framings employed by policy-makers, funders and others, regarding the nature and role of social science energy research. The prevailing imaginary supports a policy focus on technical efficiency and individual choices made by consumers (see also pg. 8-9., our analysis of initiatives). This is echoed in research funding which undervalues qualitative social sciences and emphasises science, technology and engineering research and positivist, quantitative social sciences. The key recommendations here are:

- New imaginaries of energy policy and the contribution of SSH research should be articulated and adopted, in order to improve the contribution of SSH energy research to tackling EU and member state energy challenges.
- Policy-makers and funders should devise and fund research and other initiatives which further articulate new imaginaries and how they might be implemented and diffused.
- Policy and other actors should together expand and transform the discursive space, in which the foci and processes of energy demand reduction policy-making and research are debated. SSH research can shed light on how best to accomplish this.

2. Synthesis of Findings

The framework provides a foundation for further synthesis and translation of project findings for policy. Based on the analysis of SECIs and reflections on the design and implementation of ELLs, the *Guidelines for Developing and Implementing National and Local Energy Consumption Interventions* were produced[13]. Here the key messages include:

- Sustainable energy consumption initiatives need to be based on different theories of change, emphasising energy use practices and sufficiency of consumption, rather than efficiency and changing individual behaviour or technologies.
- There is a need to strengthen evaluation of, and peer-to-peer learning from, sustainable energy consumption initiatives across Europe.
- New problem framings and imaginaries can enhance the design and implementation of effective sustainable energy consumption initiatives in the EU. These require support from policy-makers and funders for their further development and application.
- More research is needed to assess energy living labs as experimental, transformative spaces that may enable testing and feedback on policies still in their developmental phase, or comparison of different approaches and methods.

3. Translating Findings for Policy

The analysis of ELL data allowed the elaboration of recommendations for policy in relation to domestic energy consumption and the implementation of sustainable energy consumption initiatives. These are listed below.

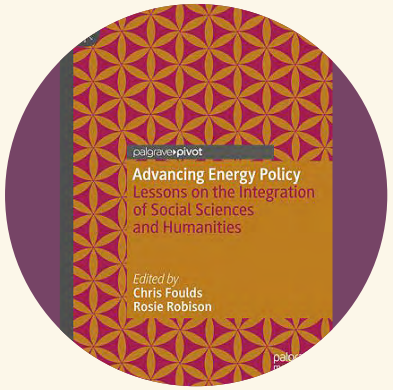
- *Energy use practices and policy approach:* Socio-cultural factors and implementation context play important roles, suggesting that EU policy needs to be more sensitive to social and cultural differences and take differences in context into account.
- *The role of daily practices, habits and routines:* Policy makers should employ a new perspective of energy policy design based on a good understanding and appreciation of practices, habits and routines and their influence on household energy use.
- *Sufficiency:* The concept of sufficiency in relation to energy consumption brings to the fore a more fundamental understanding of people's needs. It

13 See D6.2 and D6.5 at http://www.energise-project.eu/deliverables

opens a window on practices that might have been left closed by energy efficiency programmes, and instigates changes that might not be achieved by efficiency schemes alone, e.g. by shifting the focus to domains of 'cleanliness' and 'thermal comfort' instead of more traditional efficient energy use.

- *Energy consumption reductions and CO_2 savings:* Initiatives like the ENERGISE Living Labs have great potential over the longer-term to make an impact on household energy use in different European countries, and thus on CO_2 emissions. Even seemingly small changes in daily practices, like reducing the temperature set on the central heating thermostat or the number of weekly washes done, can be of great importance were each and every household to adopt them.

- *Amplification:* The notion of 'upscaling' as a policy objective may need to be rethought; amplification represents an alternative that relies upon institutionalisation of similar projects through design and implementation in a context-sensitive manner, rather than through transfer of a generic template to new sites. Amplification can also occur through the viral effect of discussion and circulation of ideas amongst participants and their social networks.
- *Local policy making (cities, regions):* Local authorities can play a crucial role in the implementation and diffusion of energy living labs. ENERGISE provides tools for local authorities for diffusing the results and to conduct further similar initiatives; these can be tied with local climate initiatives (e.g. to become a carbon neutral region), sustainable or smart cities initiatives.



The ENERGISE Living Labs brought into focus the need to move away from a tendency to rely upon technological development, energy efficiency, and individual behaviour and choices. Instead, policy-makers should give prominence to sufficiency-based measures and social practices of energy use, as well as to the contributions that active energy users can make. New imaginaries and policy framings that incorporate these approaches should be invoked in national energy policy-making and for advancing the EU Energy Union.

Recommendations for research and practice

Below we summarise some of the most important lessons learned for future planning and implementation of future sustainable energy consumption and lifestyle projects. Specific reflections on the multiple ways in which practice-based living labs have the potential for inducing change and their significant role in the low-carbon energy transition are discussed further in some of our other publications.[14]

1. Changing practices, not people, nor technologies

According to our analysis of over 1000 initiatives aimed at sustainable energy consumption in households across Europe, a vast majority focus on changing individual behaviours or individual technologies (see pg. 8-9.). These approaches have not proven sufficient to date and based on the research conducted, the ENERGISE team propose the following:

- The focus on efficiency and finding purely technological solutions needs to be replaced by or at least embedded in a focus on practices and collective approaches.
- Changing practices can be achieved when people are given a space and time for experimentation both at the individual or household, and at the community level.

14 Please visit the **Publications menu** on the ENERGISE website to find our publications. In relation to this topic, we specifically suggest consulting the following:
Vadovics, E. and Goggins, G. (Ed.) (2019) **ENERGISE Living Labs – Methodology, Experience and Lessons Learned**. ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Deliverable No. 7.12
Sahakian, M. et. al. (2019) **Report on the analysis of ENERGISE Living Labs data across all eight participating countries**. ENERGISE – European Network for Research, Good Practice and Innovation for Sustainable Energy, Grant Agreement No. 727642, Deliverable No. 5.2.

- Engaging people in new ways of doing – laundry and heating, in the case of ENERGISE – is impactful in terms of reducing energy consumption, but also in terms of potential positive spillover effects for reducing the consumption of other resources, increasing wellbeing and building communities.
- Giving people time and space for experimentation, and creating spaces for reflexivity, involving different actors such as households, associations, and researchers, can be very effective for discussing and debating what tend to be tacitly accepted norms and assumptions around consumption practices.

2. Encouraging cooperation between different actors is important for change

In ENERGISE, cooperation at different levels and between different actors or stakeholders was incorporated in the project design and this proved to be a very important tool for learning as well as inducing and maintaining change.

- Researchers actively and successfully cooperated directly with households to learn about and modify current heating and laundry practices.
- Researchers cooperated with local implementation partners on the one hand to fine-tune and locally adapt the ENERGISE Living Lab methodology, and on the other to reach households.
- Cooperating with such implementation partners (e.g. a local municipality, an NGO working with a specific target group such as large families or an imam) is also a useful tool for working with hard-to-reach households and to embed the initiatives locally (for more on this, see below).

- ENERGISE also engaged and cooperated with stakeholders in the field of sustainable energy (e.g. see the members of the ENERGISE Expert Panel[15]) throughout the project to make sure that the project builds on state-of-the-art information, uses the most relevant methodology and its results will be applicable after the project concludes.
- Engagement and cooperation with media, both traditional and social media, are important tools for more effectively communicating the outcomes and scaling out and up sustainable lifestyle initiatives. Cooperation with media is also needed to demonstrate low-carbon lifestyles, to show that they are diverse and are doable by anyone.

3. Drawing out, supporting and further developing already existing good practices

Change towards low-carbon lifestyles is not only about creating new practices but also about acknowledging and supporting already existing ones.

- The ENERGISE approach to working with households through involving them in living labs allowed for already existing low-carbon and sufficiency practices to be recognised, thus participants not only learnt and helped develop new ways of performing everyday practices, but also received encouragement for continuing with already existing sustainable behaviour.

15 To learn about the members of the ENERGISE Expert Panel please visit http://energise-project.eu/partners/expert-panel

- Recognising existing good practices also contributed to peer-to-peer learning, an important element of change, and a recognition that researchers and local implementation partners (municipalities, NGOs, etc.) are not the only sources of information and good practice. Their role is also to act as facilitators and catalysts of change.

4. Embedding initiatives to allow for continued change, experimentation and the spreading of good practices

Finally, it is important to underline the significance of embedding initiatives like the ENERGISE Living Labs locally in order to contribute to their longer-term impact. The fact that local partners and/or implementation partners have been known in the local community made the recruitment of participants easier and also helped to keep them involved in the programme. Some partners[16] offered opportunities for ELL participants to stay engaged in sustainable lifestyles programmes, where their longer term commitment, activity and further change is managed more easily and becomes part of a natural process.

Embedding the initiatives locally also helps reaching and working with hard-to-reach groups as well as spreading practices to groups not usually reached and involved in sustainability initiatives.

5. Incorporating and developing a collective element

In ENERGISE we implemented individual (ELL1) and collective (ELL2) living labs (see pg. 12-13. for details). Although the ENERGISE Living Labs do not provide conclusive evidence that the collective format is more effective, from some of the participating countries there is an indication that the group format is more motivating for many participants. This is supported, for example, by the reported positive aspects of participating in group meetings that provided confirmation of sustainable lifestyles practices, learning opportunities as well as a sense of belonging to a group of like-minded individuals for participants. Furthermore, households can express frustration in performing sustainable practices while having to bear witness to others acting in unsustainable ways, which can be highly demotivating and even lead to negative effects (giving up, consuming more, etc.). Working in and being part of a group helps overcoming such frustration and also helps people see that they are not on their own.

It is important to recognise the importance of social or peer groups in learning, and thus also in questioning current unsustainable norms, recognising and/or creating new ones, inducing and maintaining change. However, there is need for more research and development of methods and tools as to how these processes can be best built on and facilitated for the low-carbon energy transition.

To summarise, ENERGISE demonstrated the advantages and disadvantages of the living lab approach for studying energy consumption, its applicability to different contexts, possibilities for scaling up and/or amplifying (e.g. addressing different socioeconomic groups). Policy-makers, researchers and practitioners should consider the following:

- The creative and policy learning potential of context-sensitive initiatives, such as energy living labs, is high and warrants further investigation and development.
- The living lab method is well-suited for in-depth study of energy use practices; comparative and experimental studies can demonstrate the relative effectiveness of individual vs collective measures to reduce domestic energy consumption, or in relation to engaging different social groups (e.g. the 'hard-to-reach', minorities, and consumers who are less conscious of their energy use).
- However, energy living labs similar to those conducted in ENERGISE maybe resource-intensive, demanding time, funding and expertise.
- In order to be successful, living lab initiatives need to be tailored to the specific contexts of implementation.

16 For example, in Hungary, please see details in the Hungarian country report: Vadovics, E. and Pap-Szuromi, O. (2019) ENERGISE Living Lab Country Report - Hungary. ENERGISE, Background study to Deliverable 5.2. GreenDependent Institute, Hungary

REFLECTIONS FROM THE COORDINATOR

Working with over 30 researchers from ten partner countries across Europe and exploring the variations in practices and energy use among our own researchers, let alone our research participants and partners, has been a fascinating journey. We gratefully acknowledge the support of the European Union's H2020 Research and Innovation programme (under grant agreement number 727642) which enabled us to undertake a really comprehensive exploration of a cutting edge research topic. Researching alongside a diversity of agencies, organisations, NGOs and universities across Europe presents both opportunities and challenges that differ in many ways from leading national level projects. This project offered us all a valuable opportunity to research in the area of energy practices and to take a project from theory (development of a conceptual framework), through to practice (working in households and communities) and furthermore to impact.

Reflecting on what impact the ENERGISE project and findings might have for the European Union and specifically the EU's Energy Union Strategy, our project:

- identifies and demonstrates that individual and collective practices and approaches can reduce dependency on imported energy and diversify supply.
- informs policy-making on the role, relative significance and interactions of technological, market, socio-economic, gender and behavioural factors conducive to, or inhibitive of, such practices and approaches.
- identifies policy implications and options at national and EU levels that will foster amplification of such practices and approaches.
- identifies and exhibits individual and collective practices and approaches that reduce dependency on high-carbon energy sources.

The three year ENERGISE project has been extremely fruitful, producing a range of outputs and deliverables (book and journal publications, policy reports, posters, energy challenge toolkits, etc.) for a variety of audiences. In particular the ENERGISE Living Lab process has been extremely insightful, not only for householders, but also for us as researchers. We hope that you also find the material we have produced useful and are prompted to learn more about ENERGISE and our methodologies.

REFERENCES AND FURTHER READING

About the ENERGISE Conceptual Framework:

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About the ENERGISE database and typologies of Sustainable Energy Consumption Initiatives:

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TO READ ALL THE ENERGISE POLICY BRIEFS PLEASE VISIT
http://www.energise-project.eu/policy_briefs

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FOR FURTHER READING, PAPERS AND MATERIALS, PLEASE VISIT
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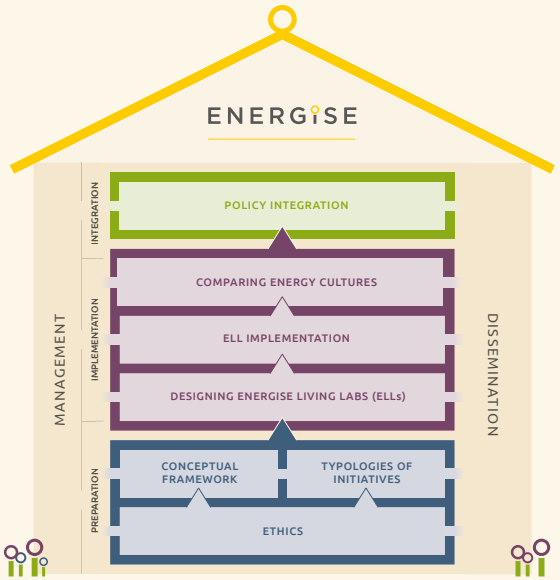

ENERGISE partners	Logo
National University of Ireland, Galway (NUIG), University Road, Galway, Ireland Web: http://www.nuigalway.ie Email: frances.fahy@nuigalway.ie	OÉ Gaillimh NUI Galway
Aalborg Universitet (AAU), Fredrik Bajers Vej 5, Aalborg 9220, Denmark web: http://denmark.energise-project.eu/ email: cjensen@plan.aau.dk	AALBORG UNIVERSITY DENMARK
Kingston University London (KUL), Kingston Hill, Kingston Upon Thames KT2 7LB, United Kingdom web: http://uk.energise-project.eu/ email: a.genus@kingston.ac.uk	Kingston University London
Universiteit Maastricht (UM), Minderbroedersberg 4-6, Maastricht 6200 MD, Netherlands web: http://energise-lab.nl/ email: energise@maastrichtuniversity.nl	Maastricht University
Université de Genève (UNIGE), 24 rue du Général-Dufour, 1211 Genève 4, Switzerland web: http://switzerland.energise-project.eu/ email: marlyne.sahakian@unige.ch	UNIVERSITÉ DE GENÈVE
GreenDependent Institute (GDI), Eva utca 4, Godollo 2100, Hungary web: http://www.energise.hu email: info@greendependent.org	grEndependent Institute
Ludwig-Maximilians-University Munich (LMU), Geschwister-Scholl-Platz 1, Muenchen 80539, Germany web: http://germany.energise-project.eu/ email: energise@lmu.de	LMU
Focus Drustvo Za Sonaraven Razvoj (FOCUS), Maurerjeva Ulica 7, Ljubljana 1000, Slovenia web: http://www.focus.si email: tomi@focus.si	focus
Applied Research and Communications Fund (ARC Fund), Alexander Zhendov Street 5, Sofia 1113, Bulgaria web: http://www.arcfund.net/ email: marko.hajdinjak@online.bg	ARC FUND
Helsingin Yliopisto (UH), Yliopistonkatu 4, Helsingin Yliopisto 00014, Finland web: http://finland.energise-project.eu/ email: eva.heiskanen@helsinki.fi	UNIVERSITY OF HELSINKI

www.energise-project.eu

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