SONNET

Building common urban futures: City Labs for urban energy transitions

D4.8: City Lab guide: 'Co-creating SIE city labs: harnessing the potentials of SIE for cities'

February 2022

Photo by AlXiao from Getty Images, accessed via Canva Pro

The **So**cial **I**nnovation in **E**nergy Transitions (**SONNET**) project SONNET brings diverse groups together to make sense of how social innovation can bring about a more sustainable energy system in Europe. Through a diversity of methods, it explores how social innovation has contributed to making our energy sources, use, and production cleaner, as well as how social change help reduce our carbon footprint in the future. For more information, visit sonnet-energy.eu.

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This City Lab Guide draws on contributions from all SONNET partners. This is explained in more detail in the Guide's final section. A list of all SONNET partners can be found on the back cover of this publication.

Layout
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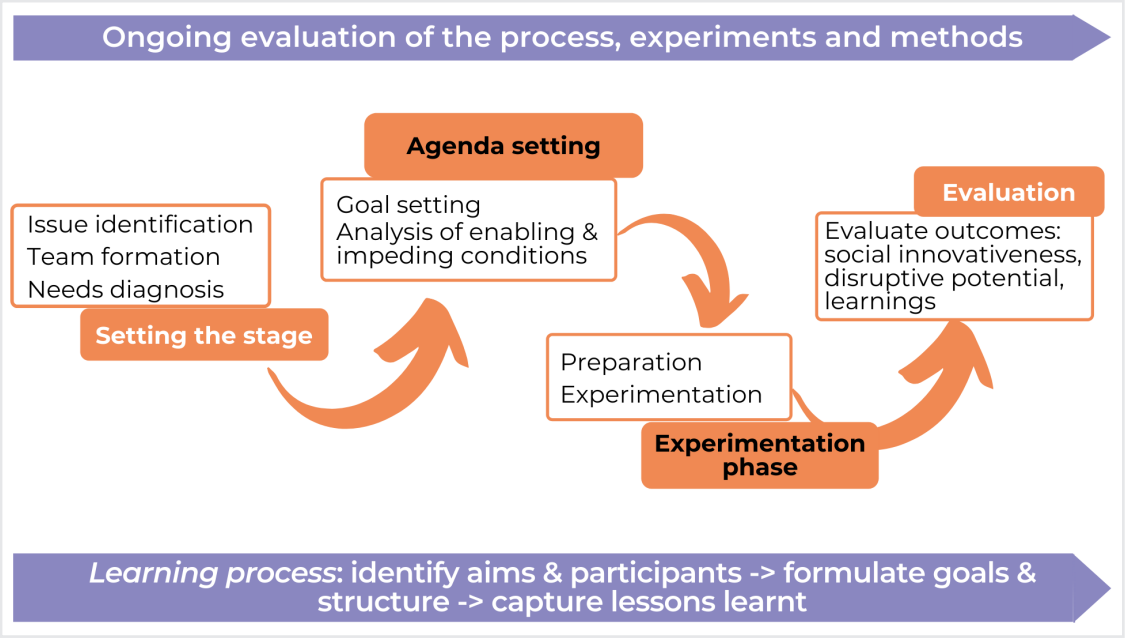
How to use this guide

We are excited to hand this guidebook to those looking for new ways of engaging in urban sustainable transitions. Local authorities, citizens and NGOs, local entrepreneurs, and academics interested in new ways of collaborating with their city administrations may find inspiration in this guide. City Lab methods – also known as Living Lab or Urban Labs – offer an opportunity to co-create and test new ways of dealing with urban challenges, to explore cities' potential, and to support their strategic goals. Based on the rich experience of six City Labs conducted in six different European countries[1] , we demonstrate how this method may be used specifically to develop social innovations for sustainable and just energy transitions.

As the SONNET City Labs were conducted during the COVID-19 pandemic, the guide also offers insights on how to navigate through difficulties caused by such an unexpected shock, which forces participants to look for new ways to achieve agreed upon goals.

We hope that with this guidebook, city representatives will be ready to set up and conduct their own City Labs, even if they have no previous experience with this form of governance innovation. To reach this goal, first, we introduce **basic information on the City Lab method**, and the concept of social innovation in energy. We shortly discuss how cities may use City Labs to discover ways to support local and just energy transitions. Then, we offer a **short checklist** allowing to assess whether the City Lab approach is suitable for your city. Finally, we present a more detailed description of the **four main phases** of the City Lab process: "Setting the stage", "Agenda setting", "Experimentation", and "Evaluation", enriched by **examples** drawn from the six SONNET City Labs.

1 The SONNET (Social Innovation in Energy Transitions) project brings diverse groups together to make sense of how social innovation can bring about a more sustainable energy system in Europe. Six cities and six research institutions in Europe are using techniques – like 'City Labs', case studies, citizen surveys and more – to figure out how we can help make sure that social innovations accelerate the transition from the use of fossil fuels to a more sustainable energy system. The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 837498. (https://sonnet-energy.eu/)



The four phases of the City Lab process

To make it easier to browse the guide, certain content in the "The four phases of the City Lab process" section is colour-coded.

General descriptions of the four phases (which are: setting the stage, agenda-setting, experimentation, evaluation) are not colour-coded. However, additional information and examples are labelled as follows:

– **TOOLS AND TECHNIQUES** used by SONNET cities that facilitate goal accomplishment,

– **EXAMPLES OF CHALLENGES, SURPRISES, AND SUCCESS** from SONNET City Labs,

– **SOCIO-ECONOMIC, SOCIO-POLITICAL, AND SOCIO-CULTURAL ASPECTS** that are likely to emerge at each phase of the City Lab process,

- **LESSONS LEARNT** from the process,

- examples of how City Lab managers may **REACT TO UNEXPECTED EVENTS** that disrupt goals and/or processes (e.g. the COVID-19 pandemic).

1. Introduction to the City Lab method and social innovation in energy

What are City Labs?

City Labs are participatory platforms where local governments collaborate with diverse stakeholders to learn about and exercise new ways of dealing with urban challenges. They test and experiment with innovative methods and tools in a real-world setting to better understand and shape societal transformations. They usually engage citizens, not only as observers or participants, but as co-creators of innovation processes. Thus, City Labs are about city-led actions aimed at collaborative problem-solving and facilitation of experiential learning.

As the regular work of the city units tend to be focused on assigned departmental tasks, this rarely leaves much space for testing new possibilities. City Labs are here to change that: they are based on co-creation and collaborative experimentation. Creating new rules of collaboration around a shared goal, they enable city administrations to get more involved with different stakeholders and test new ways of identifying issues of concern and potential solutions. Involvement of diverse stakeholders allows for creation of solutions that are better aligned to their needs, and use the dispersed knowledge located beyond the City Hall. To sum up, City Labs allow us to engage in an open-ended, experimental project, analyse its results, and – if promising – decide to introduce a larger change in the city's institutional landscape.

City Labs are often project-based and externally funded or co-funded. But, in appreciation of their results, some cities have decided to establish a dedicated unit or team to work on successive City Labs. This approach fosters development of know-how and building networks which are important for swifter and smoother implementation of the lab projects. If you are to implement City Lab for the first time in your city, you may need an external source of funds. That may come from European schemes or national funds aimed at fostering citizen engagement, good governance, social innovations, or experiments for sustainable transition.

What are social innovations in energy?

This guide is based on experiences from Labs aiming at facilitation, development, and support of **social innovations in energy (SIE).** This and the following sections provide some basic information on the subject. Along with technological changes, energy transitions require societal changes. Innovating in the energy sector is not only about developing bold new technological solutions like bladeless wind turbines, underground hydropower systems, solar panels from food waste. It also involves social aspects, developing new ways of **doing**, **thinking**, and **organising** energy – these are social innovations in energy (see box below).

Examples of SIEs include, among others, local energy production and consumption, collaborative organisation of eco-efficient housing, action against specific energy pathways, non-profit and for-profit consulting focused on energy efficiency, participatory energy dialogues, or new investment and finance mechanisms that support energy transitions.

In SONNET, we have analysed 500 examples of social innovations in energy across eight European countries:

New ways of DOING are practices related to energy technologies and the physical composition of the energy system, such as producing, supplying, or storing energy or heat, installing energy technology, or acting for or against political agendas.

New ways of THINKING are forms of knowledge and framings including values and perceptions such as "raising awareness" about energy, campaigning for or against political agendas or transferring knowledge and skills.

New ways of ORGANISING refers to governance and organisational structures within initiatives and within the energy system, for example constructing a dialogue, incubating ideas and solutions, or facilitating change of behaviour.

The concept of SIE implies that when things are done, thought of, or organised in a new way, social relations change accordingly. Those social relations vary depending on types of interactions between actors: cooperation, exchange, competition, conflict.

	 Cooperation	 Exchange	 Competition	 Conflict
 Doing	Local energy production and consumption Cooperative energy production and consumption Collaborative eco-efficient housing	Local peer-to-peer electricity exchange	For-profit services and technologies	Action against specific energy pathways
 Thinking	Advocacy for specific energy pathways	Energy education Non-profit consulting Peer-to-peer learning	For-profit consulting	Campaigns against specific energy pathways
 Organising	Participatory energy dialogues Participatory experimentation and incubation	Platforms for direct energy transactions Investment and finance mechanisms	Energy gamification and nudges	Networks against specific energy pathways

Wittmayer, J. M., Hielscher, S., Fraaije, M., Avelino, F., & Rogge, K. (2022). A typology for unpacking the diversity of social innovation in energy transitions. Energy Research & Social Science, 88, 102513

How can City Labs support social innovations in energy?

The definition and table above give a broad overview of the topic. When applied in practice, the concept of social innovation is adjusted to the needs of a specific process. For example, in one of the SONNET cities, SIE was understood as "projects and experiments done by citizens and organisations, which are facilitated by the local government, instead of the government taking control of telling citizens and organisations what to do."

Many SIEs may thrive on the city level and support cities' energy and climate ambitions. They promise a boost for energy transition which goes beyond top-down, centrally steered policies, and they project and embed energy transitions in local interests, values, and lifestyles. City administrations can take an active role in facilitating SIEs. However, engaging in a creative and experimental process is usually challenging under the tight rules of authorities' day-to-day operation. City Labs deliver organisational models enabling city administration to host and nurture co-creative and innovative processes aiming at sustainable energy transitions.

City Labs harness the potential of local urban actors – from the city administration, to NGOs and local companies, to inhabitants – and use it to co-create local solutions for energy transitions.

What are SONNET City Labs?

This guide is rooted in knowledge and experience from preparing, facilitating, and evaluating six City Labs conducted in six SONNET cities.

For more information about the outcomes of these City Labs, please refer to our **Energy Read #3** at sonnet-energy.eu/project-outputs.

The **City of Antwerp** dedicated its SONNET City Lab to reducing energy poverty in vulnerable households across the city. To achieve this goal, the city explored four solutions to fight energy poverty: creating energy communities; renting energy-efficient appliances to vulnerable households; providing renovation coaching and funds to retrofit houses; and retrofitting former social housing to rent to low-income families.

The goal of the SONNET City Lab in **Basel** was to support more sustainable individual behaviour with a mobile app that encourages users to reduce their CO2 footprints by changing climate-relevant behaviours.

In its SONNET City Lab, **Bristol City Council** focused on the question: how can crowdfunding be used as an investment activity to collectively raise the capital to install energy efficiency measures in the local community buildings? The City Lab assessed the value of the energy efficiency works that needed to be undertaken in the community buildings and investigated the possibility of using a Community Municipal Bond (CMB) mechanism to fund them.

The main goal of the SONNET City Lab in **Grenoble** was to experiment with diverse, innovative methods to foster change in energy behaviours and promote energy sufficiency. The Lab worked together with three groups that use municipal buildings: associations, the local administration, and schools.

The SONNET City Lab in **Mannheim** focused on novel governance arrangements to enhance social innovation in energy in a chosen district of the city. The aim of the lab was to foster collaboration between diverse stakeholders, strengthen dialogue within the city administration and encourage citizen participation.

The SONNET City Lab in **Warsaw** focused on achieving energy savings by monitoring energy use in private apartments and providing personalised recommendations about everyday choices to reduce energy consumption.

2 City Lab reports are available on the SONNET website, sorted by city: https://sonnet-energy.eu/citylabs

Checklist to assess whether a City Lab is a good approach for you

Is a City Lab approach right for my community? The questions below may help you to decide if the City Lab is the right approach to be adopted in your city.

Political and institutional support

To ensure that the process and outcomes of the City Lab have long-lasting effects, and that enough resources are dedicated to the planned tasks, the lab should get considerable political and institutional support.

A	Political and institutional support	yes	no
Q1	Can you think of at least two high ranked officials who would support the initiative?	☐	☐
Q2	Can you think of at least two city council members (preferably from opposing parties) who would support the initiative?	☐	☐
Q3	Are there any formal documents (policies, projects, strategies) that would provide background and justification for the creation of a participatory platform like a City Lab?	☐	☐

If you answered "yes" to all the questions, you may assume that your City Lab would enjoy the strong institutional support.

If you answered "yes" once or twice, you could start a City Lab, but put a special effort into building institutional and political support from the very beginning.

If you answered "no" to all the questions, you should probably start with preparing the background through communication, education, and political lobbying for advanced forms of participation.

Networks

The City Lab approach offers a great opportunity to strengthen your collaboration with local and trans-local partners, but it is much easier to kick-off the project if you can build on already existing relations.

B	Political and institutional support	yes	no
Q1	Can you think of NGOs, businesses, neighbourhoods already developing initiatives in a given field (e.g. energy), for whom participation in the lab would be a priority?	☐	☐
Q2	Can you get in touch with experts from other cities, academia, or other organisations who have experience with City Labs or similar formats and could support you with advice?	☐	☐
Q3	Can you think of (an) organisation(s) with whom you can jointly apply for external funds to conduct a City Lab?	☐	☐

If you answered "yes" to all the questions, you may assume that your City Lab would be embedded in strong networks and has chances to develop smoothly.

If you answered "yes" once or twice, you could start a City Lab, but need to invest time and effort into building relations with peers and stakeholders from the very beginning.

If you answered "no" to all the questions, you should probably first strengthen your relations with experts and stakeholders who could be involved in a City Lab.

Skills and experience

A City Lab is an advanced form of participation. In contrast to information and consultation, it directly engages individuals, groups, and organisations in the process of solution creation. As any other process, it requires specific capacities and skills on the part of organisers and participants.

C	Skills and experience	yes	no
Q1	Does your city have experience with City Labs, or any other kind of collaborative platforms, where administration representatives were engaged in dialogue AND co-creation of policies/projects/solutions?	☐	☐
Q2	Does your city have experience with other forms of participation, such as public consultations, participatory budgets, citizens' panels?	☐	☐
Q3	Does your city have access to organisations and partners, whose skills and experience related to public involvement and co-creation could be used in the process?	☐	☐

If you answered "yes" to all the questions, you may assume that your City Lab would be built on and informed by your previous experiences with co-creation and public involvement.

If you answered "yes" once or twice, you could start a City Lab as a platform to develop new skills related to co-creation and public involvement.

If you answered "no" to all the questions, you should probably first consider other participatory approaches, and develop necessary skills and experience though smaller scale trials.

Type of problem addressed by the City Lab

A City Lab is a creative, open-ended process. Its potential may be used best to tackle specific types of problems.

D	Type of problem addressed by the City Lab	yes	no
Q1	Does the challenge you want to address require experimentation, as the proven solutions do not work well enough, or the conditions are uncertain and difficult to control?	☐	☐
Q2	Does the challenge you want to address call for active involvement of people from different groups, and may demand confronting different views and perspectives?	☐	☐
Q3	Does the challenge you want to address require shared vision-creation of possible, desired futures in the given area?	☐	☐

If you answered "yes" to all the questions, you may assume that the challenge you have selected may particularly benefit from using the City Lab approach.

If you answered "yes" once or twice, you could still use the City Lab approach to further explore the chosen issue and to build a vision of possible solutions.

If you answered "no" to all the questions, you should probably consider another approach to look for solutions to your challenge.

2. The four phases of the City Lab process

1. Setting the stage

Setting the stage for the city lab process establishes the main rules and goals of the whole lab process. First, the issue to be addressed by the lab interventions is chosen. The issue should be relevant for the city's policies and plans, and should have the potential for scaling up. Second, the city lab team is formed. It should consist of diverse partners from different domains: representatives of relevant departments in the city administration, experts in relevant fields and representatives of key interest groups.

Considering the transdisciplinary and experimental nature of the city labs, inclusivity and openness to dialogue are key for team formation. Finally, setting the stage requires the needs diagnosis, aimed at identifying the crucial challenges and areas for potential impact, as well as potential enabling and impeding conditions for the lab intervention. It is important to devote enough time to this phase, which will prove beneficial further in the process.

Examples of useful tools for this stage

Fast idea generator
to generate new ideas by thinking differently

Thinking hats
to generate new ideas by framing a constructive discussion with your team

Brainstorm web
to facilitate group brainstorming

Disney's idea generation technique
to solve problems using role play

Assumption busting
to view the problem by challenging its assumptions

Problem definition
to clarify your priorities by focusing on key critical issues

People and connections map
to map actors that could potentially become your partner, user, or supporter

Stakeholders map
to visualise all stakeholders involved in the social innovation process

Team roles through reflection
to reflect on the team roles

Stakeholder visualisation
to know your stakeholder, what are their needs, motivation, and drivers for participating in the lab

Innovation flowchart
to look ahead to understand what you need to do to bring your idea to life

Idea canvas tool card
to design the strategy needed to execute an idea

SWOT analysis
to develop a clear plan by evaluating how you are doing and what your options are

Team canvas
to align teams and achieve cohesion among team values, goals, and performances

Tools used by SONNET cities

BRISTOL – survey with main stakeholder groups informed by previous project experience

The Bristol team developed a survey for the managers of the community buildings to gather information to help assess costs and provided key information for energy audits. Additionally, Bristol City Council drew upon the energy service team's existing knowledge of building energy efficiency based on previous projects. Bristol then undertook energy audits at 12 buildings.

GRENOBLE – analysis of enabling and impeding conditions and crowdsourcing of ideas for action

Based on the skills and previous experiences with energy efficiency and sufficiency projects, the Grenoble team prepared a list of enabling and impeding conditions that were analysed according to the following dimensions: economic, institutional, cultural, individual, social. The team designed their City Lab in response to the identified barriers and bottlenecks.

At the beginning of the process, the team organised three workshops with three target group audiences. The objectives of each workshop were to gather ideas of actions aimed at energy sufficiency to be tested during the City Lab, and to review the ideas proposed by the city.

Real life examples of challenges, surprises, and successes

MANNHEIM – City Lab provides a social infrastructure for existing energy transition projects.

The City Lab in Mannheim addressed the challenge connected to a broader plan to establish energy urban renovation management in a specific neighbourhood. As a part of the process of energy renovation, issues such as monument conservation, accessibility and age-based living, energy autarky, electro mobility and fair distribution of the streets for different forms of mobility were to be addressed. The City Lab allowed Mannheim to bring together the important stakeholders, initiatives, networks, and multipliers within the district, which was crucial for the whole project. This way, the City Lab informed the broader city energy transition process. What's more, the goals of the Mannheim City Lab were embedded in the Mission Statement "Mannheim 2030", particularly contributing to the strategic target "Mannheim is a climate-friendly – in perspective, climate-neutral – and resilient city that is a model for environmentally friendly life and actions".

WARSAW & ANTWERP – City Labs address a key issue in urban energy policies: increasing energy efficiency in apartment buildings to reduce carbon emissions and energy poverty.

In Warsaw and Antwerp, City Lab teams selected the topic of energy efficiency improvements in private households. This issue is crucial for cities' energy and climate policies and has an important social dimension. Their City Labs provided a platform to test innovative solutions in the energy efficiency field (such as ongoing, personalised feedback on their energy use provided to individual households in Warsaw, and renting energy-efficient appliances to vulnerable households in Antwerp) and created room for cooperation between various social groups, including technological and social innovators and citizens.

Socio-economic, socio-political, and socio-cultural aspects that emerged at this stage of the process

BASEL – co-development of the app as a win-win situation – beneficial for various actors involved.

In Basel, the City Lab involved the local energy utility as a key partner. It invested in the development of the app for various reasons. First, it sees itself as an efficient service provider for renewable energies, with the goal of providing a climate-friendly energy supply to its customers. Developing an app that helps users to reduce their CO2-footprint complements this overarching aim. Second, developing such an app allowed the utility to foster its image as an innovative green energy provider who is willing to support its customers to reach their pro-environmental goals. This seemed particularly important considering a potential liberalisation of the electricity market for household customers in Switzerland. Finally, the utility is an independent but state-owned public enterprise in a canton with powerful Green and Social-Democratic political parties and an electorate that puts a strong emphasis on energy and environmental topics. As the urgency of addressing climate change has become an important topic in political and societal discussions, taking active steps to help people reduce their carbon footprint was therefore also in line with political goals in the City of Basel.

ANTWERP – clear acknowledgement that energy transition poses a particular challenge for people from lower income groups.

Energy poverty is a major challenge in Antwerp: there is an above-average share of groups with a high risk of energy poverty (with 1 out of every 5 citizens being low-income), such as tenants, singles, and single-parent families and people without income from work. Families with the smallest incomes have (relatively) very high energy bills, even more so as they live in rental homes with poor energy performance. They often consume energy at very high costs, for example through expensive pre-paid meters. Disadvantaged groups do typically not benefit from subsidies / support measures because of thresholds for investing in their own PV installations or joining cooperatives. In addition to financial barriers, they often also lack a necessary network and knowledge or administrative insights or social skills. Solutions created in Antwerp's City Labs targeted these groups.

Lessons learnt

GRENOBLE – learning from previous experiences

City Lab organisers secured the diversity of lab participants at the first stage of the process. From previous experiences, they knew that it is crucial to conduct needs analysis and to provide conditions to secure continuation of collaboration already at this initial phase of the process.

For example, they involved the buildings' technical upkeep and maintenance services, and secured hierarchical management support. They also focused on adapting support actions to targets and their use of the buildings, explaining the function of energy systems (heating, ventilation, lighting, etc.) to users. Finally, the team highlighted the potential savings in energy consumption to raise users' awareness of energy-climate issues.

Responding to the unexpected – managing through COVID-19 pandemic

BASEL – organising communication using digital tools

An initial meeting of Lab organisers was held in person, but regular meetings were held online thereafter, using a video conferencing tool such as Zoom or Google Meet.

Early in the process of working together, a communication channel on Slack (a business communication platform used by the city partner) was started specifically for the City Lab team and included the academic partners. A common work environment in Miro (an online whiteboard) helped develop the scope and structure of the experiment together.

2. Agenda and goal setting

Entering this stage, you already know the area you want to work on – let's say, energy poverty or energy efficiency. Agenda and goal setting is a natural continuation of the setting of the stage phase. Having an issue chosen, team formed, and key needs diagnosed, it is time to set specific goal(s) for the lab intervention. It is important to consider both "doability" of goals and how they fit into the city's broader policies. Participatory decision-making is key.

At this stage of the lab process, ex-ante (pre-intervention) analysis is recommended, to develop a map of factors that might impact the realisation of the City Lab goal(s). The purpose of an ex-ante conditions analysis is functional – it should contribute to preparation of the experimentation phase, making a team attentive to possible obstacles and helping to identify sources of support to be leveraged.

Examples of useful tools for this stage

Idea selection
to map out the numerous ideas you have according to their originality and feasibility

Idea rating sheet
to achieve democratic voting from the contest participants

Skill share
to determine skills that the team members have or may need to achieve your goal

Problem definition
to re-frame the problem in a more specific and direct manner

System map
to take on a systemic view of the solution and see connections between the different actors

Theory of change
to clarify your priorities by defining goals and the path to reach them

Causes diagram
to clarify your priorities by breaking down a complex issue

Evidence planning
to look ahead by defining the outcomes from your work

Tools used by SONNET cities

WARSAW – applying SMART approach to goal setting

The Warsaw team used the SMART method to define the goal. They selected: the issue of energy saving in private households (Specific), an approach based on consumption measurement (Measurable), which possible to achieve due to cooperation with an innovative entrepreneur (Achievable), and in line with the remit of the Air Protection and Climate Policy Department (Relevant), and with a specific schedule (Time-bound).

MANNHEIM – setting goals at design thinking workshops

The City Lab team used the input from three design thinking workshops, which took place at the beginning of the project, to set the goals. To consider all relevant aspects, the workshops involved diverse groups: city administration staff with knowledge of inner-administrative practices, local stakeholders with their important knowledge of the neighbourhood, and academic partners with their scientific perspectives.

Real life examples of challenges, surprises, and successes

ANTWERP – broad engagement and inclusive communication in goal selection stage builds strong commitment

The information gathered during the scoping phase was discussed in four meetings with the broader project team, including the Antwerp city team, academic partner team, an external consultant, and three internal experts from the City of Antwerp. The Antwerp SONNET team presented a scoping document with the selection of five interventions to the Deputy Mayor for Climate and Energy, his chief of cabinet and senior advisor for energy and environment. At the next step, the City Lab team met possible intervention leads to: present the intervention idea; get approval of intervention leadership and support of the organisation they are working for, including commitment to invest time and funds; and to create the list of other organisations and people to contact for a planned kick-off and workshop.

MANNHEIM – ex-ante analysis led to adoption of flexible and experimental approach

Most inhabitants of the neighbourhood of intervention are tenants that live in older apartment buildings with refurbishment needs. The population is characterised by social deprivation, facing problems related to unemployment, migration and lack of German language skills, and social exclusion. On to the topic of energy, there was little previous experience in engaging inhabitants into administration-led citizen participation actions. At the beginning of the Lab, it remained unclear which approaches, tools and methods would be suitable to raise awareness for energy transition among neighbourhood citizens and to engage them in a participatory transition process. Therefore, the process was open with regards to the tools, methods and to some extent the outcomes and flexible to react on unforeseen changes or to lock-in situations. The City Lab presented a possibility to test out what would work. Participation is now increasingly taking place with engaged actors, such as the administration-led district manager, consumer centre, associations, etc.

Socio-economic, socio-political, and socio-cultural aspects that emerged at this stage of the process

MANNHEIM, ANTWERP, WARSAW, BRISTOL – how to engage participants from vulnerable groups?

IEnergy transition poses specific risks for people from disadvantaged groups (e.g., due to low income). In the City Labs targeting issues of energy poverty or energy efficiency, it is important to reach out to those residents to secure broad and inclusive participation. Broad outreach was set as one of the City Lab goals. It requires special effort, such as communication in different languages or engagement of trusted intermediaries. It is more difficult and time- and resource-consuming. Thus, despite setting the goal of broad engagement, some of the City Labs were not able to directly engage citizens from vulnerable groups, which made it more difficult for those citizens to benefit from intervention design conducted without their participation.

Lessons learnt

MANNHEIM – curb ambitions, work on relationships (and assign time for that)

More time is needed for establishing new relations – acknowledge that in heterogeneous inner-city neighbourhoods it takes time to kick-off change processes. New relations and a common language also need to be established in transdisciplinary teams, where people of different professions and backgrounds meet. In this sense, it might be more effective to reduce the number of activities and to calculate time to plan and prepare them well. Here preparation includes anchoring Labs in already existing, long-term processes of policy planning and in existing networks around policy development.

Responding to the unexpected – managing through COVID-19 pandemic

MANNHEIM – a virtual kick off meeting and break out group discussions of the potential City Lab goals

Due to the pandemic, the launch of the City Lab had to be postponed several times. Finally, it took place as a virtual meeting hosted jointly by the city and their SONNET academic partner. The delayed kick-off event brought together participants interested in social innovation in energy transitions to discuss ideas of actions that Mannheim can take to achieve more local initiatives towards sustainable energy transitions. The ideas were developed in the preparatory design thinking workshops and during a pop-up event on Mannheim streets. Participants of the kick-off were divided into breakout groups to discuss the ideas. The goal was to learn from the local multipliers which proposed measures and ideas for the local energy transition in the chosen neighbourhood that could be initiated.

3. Experimenting

Built on the two previous phases, actual experimental interventions will vary, being tailored to the city's specific needs and capacities. Preparing an experimentation phase, the city lab team should decide upon the following: the specific experiments and activities, methods, indicators of success, timeline, roles and responsibilities, details regarding the team meetings, means of communication, as well as procedures for participatory decision-making.

Although the experimentation phase is action-driven, it is important not to lose sight of the key principles of the city lab process:

1. participatory decision making and openness to dialogue
2. experimental mindset, openness to making mistakes, flexibility
3. iterative nature of the process, adaptability of various phases.

Examples of useful tools for this stage

Idea card
to get a feel of what you're doing right and what you could improve

Critical tasks list
to sustain and implement by executing your plan without being overwhelmed

Service blueprint
to plan or improve a service by showing what is happening along the service line and who is doing what through what means

Five tactics
to avoid missing project deadlines

Re-motivate demotivated project team
to get to know some tactics to boost project team morale

Personas
to know the people you're working with by visualising their key characteristics

Customer journey
to keep the beneficiaries at the centre of design decisions, highlighting pain points and opportunities

Experience prototype
to think better by making certain features of the service or product tangible

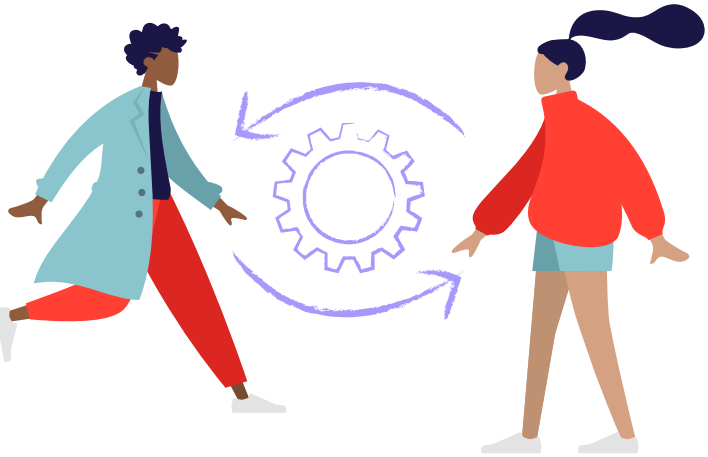
Target group
to know the people you're working with by better defining who you are trying to reach

Prototype testing plan
to test and improve by collecting useful feedback on your work at different phases

Tools used by SONNET cities

BRISTOL – promotional video introducing the project, building recognition, and broadening public outreach

A short video, including interviews with engaged building managers and an animation with narration, was created by Bristol City Council to help explain their City Lab. This was shared on Bristol Energy Network social media and sent to all the buildings to share on their social media platforms with a link to a survey. A longer version was also subsequently produced with more detail that was shared across the same channels.



BASEL – conducting an experiment designed to compare two versions of the app and assess their impact on users' behaviour

The field experiment was run to test the impact of a motivational messages, versus a basic version of the app without such messages. The behaviour change seen in the app test groups was compared to a control group without the app. This required considerable coordination between the academic and city partners to prepare the app, onboard the 500+ participants, and manage the communications.

GRENOBLE – ongoing informal exchange between key stakeholders to monitor and adjust interventions

During the experimentation phase, the city officer overseeing the Grenoble City Lab scheduled informal sessions to collect feedback on planned and ongoing actions from all relevant actors and to adjust the City Lab experiments when needed. Parties were encouraged to express themselves freely during the whole process.

Real life examples of challenges, surprises, and successes

WARSAW – installation of measuring devices and observation of the impact of personalised energy feedback

The experiment in Warsaw started after the installation of devices measuring energy consumption. For almost six weeks that followed, participants received advice on how to lower their energy consumption. In the first phase, the contractor installed smart meters in 11 households in various locations of Warsaw to measure electricity consumption and factors affecting indoor conditions, like carbon dioxide concentration, humidity, and temperature. In the next step, participants maintained ongoing contacts with the contractor and the project partner, who investigated changes in their habits and behaviours relevant to the more efficient use of energy. The last phase of the project consisted of analytical work and presenting conclusions and solutions that could be further used to reduce energy consumption in everyday life – even small energy savings in apartments, when properly propagated, can exert a strong impact on a city scale.

BRISTOL – assessing the feasibility of crowdfunding as a method to raise capital for energy efficiency measures within community buildings

The City Lab investigated the possibility of using crowdfunding – specifically a Community Municipal Bond (CMB) mechanism – to fund energy efficiency measures in community buildings. This took the form of surveying citizens across Bristol and building managers of the community buildings about their opinion of such an initiative, as well as technically surveying the buildings to assess the value of the energy efficiency works that needed to be undertaken and the resultant business case. Conducted in close cooperation with the community partner, the lab provided proof of citizens' interest in supporting community buildings with CMB, and those results are further used to advocate for implementation of such mechanisms in the city.

Socio-economic, socio-political, and socio-cultural aspects that emerged at this stage of the process

ANTWERP – dependence on the changing national legal framework impacted feasibility of City Lab's solutions

Some of the solutions proposed during the City Lab in Antwerp depended on the net-metering policy for prosumers and energy communities. Net-metering is an electricity billing mechanism that allows prosumers to use electricity they generate anytime, instead of when it is produced. Without the net-metering, the plan to purchase solar panels by the residents of the street engaged in the City Lab was less profitable and less accessible, as the time to get return on investment became much longer. As the energy sector is highly regulated, major changes in regulations often have a predominant impact on market feasibility of innovative energy solutions.

WARSAW – privacy concerns related to real-time energy use monitoring

The Warsaw experiment provided personalised feedback on behaviour related to energy use in the household. However, gathering high-resolution real-time data on energy usage makes it theoretically possible to reconstructing the daily habits of inhabitants in detail, which bothered some of the experiments' participants. This concern should be anticipated while designing the intervention on a larger scale and answered with adequate measures.

GRENOBLE – gap between the discourse and reality regarding resources available for energy sufficiency actions

The initial aim of the Grenoble City Lab was to test the eco-responsibility programme with a small group of associations and then extend it to a much larger number of associations. However, it was authorised only for a limited number of associations. As a result, the experiment could not be scaled up. Finally, the experiment was not directly supported by elected representatives. Additional support of various city departments would have been necessary for a large-scale roll-out of City Lab actions in general, and the eco-responsibility programme in particular.

Lessons learnt

BASEL – inclusive approach does not mean equal involvement and decision-making powers

The SONNET project assumed a balanced relationship between the city and academic partners, with both partners sharing tasks evenly. However, the app development was in the control of the city partner, as the City Lab lead.

This resulted in some information asymmetries between the city and academic partners as the technical or capacity limitations were best understood by the city partner. Unilateral decisions were sometimes made by the city partner to move forward with a pragmatic solution. This was to no detriment of the project but highlights that inclusion does not (and should not) necessarily mean equal decision-making powers.

Responding to the unexpected – managing through COVID-19 pandemic

MANNHEIM AND BASEL – digital tools as factors facilitating inclusion and feedback exchange

In Mannheim the engagement of local stakeholders turned out to be a time-intensive task, mainly because local stakeholders were facing a variety of other challenges that limited the time available to engage in the local energy transition.

However, the lab allowed to test innovative methods (such as digital participation and gamification or design thinking) and to establish novel social relations, especially among professional actors working in the neighbourhood, who can act as multipliers for engaging others. In Basel as the start of the field experiment was approaching, fixed bi-weekly, and then weekly, online meetings were set up to address issues related to the field experiment.

4. Evaluation

City lab evaluation should consist of an ongoing evaluation and outcomes evaluation. An ongoing evaluation assesses the level of inclusiveness of the City Lab process, whether the process is led in a dialogical way, and the relevance of the actions undertaken to the goals set. An ongoing evaluation focuses on three main areas: process, experiments, and methods.

The City Lab team should develop evaluation criteria and indicators, open to potential revisions along the process. Outcomes evaluation should help to assess social innovativeness of the results, disruptive potential of a City Lab in a given city context, as well as learning outcomes.

Examples of useful tools for this stage

Reflexive monitoring in action
an integrated methodology to encourage learning within multi-actor groups or networks as well as institutional change in order to deal with complex problems

Blueprint
to test and improve by crafting a detailed overview of your operations and resources

Improvement triggers
to test and improve by understanding what is most effective in your work

Logic model
to assess the “if-then” relationships between the inputs, outputs, outcomes and impact of the lab

Tools used by SONNET cities

BRISTOL – the innovation history approach to better understand innovation processes

Within a workshop setting of reflexive sessions, the participants developed a timeline (i.e., listing key events) and an actor network map surrounding the experiment. The aim of creating the timeline and the actor network mapping was to stimulate discussions and reflections: what is working (or not), how one‘s actions influence other people’s actions, do we have shared goals (or not), how to improve the process, what lessons were learnt.

This approach is time consuming. To address this problem, the academic team prepared the timeline and an actor network map for each session in advance and shared them before the sessions with the rest of the City Lab team.

Real life examples of challenges, surprises, and successes

BASEL – cooperation between practitioners and academics as an effort that paid off

Due to engagement of the academic partners, the testing of the app's impact was more demanding, as compared to what would have normally been done by the city partner on their own. However, it resulted in a more robust evaluation and data for informed discussions on further development possibilities. Reaching a common understanding of what is needed to make the field experiment scientifically sound involved a learning process and checking in on assumptions to find an approach that satisfied all. The inputs from the academic partners on the impact of the app on reducing the users' CO2 footprints have fed into the further development of the app by the city partners.

ANTWERP – identification of organisational challenges that impede the long-term impact of City Lab experiments

The evaluation process in Antwerp, conducted with the reflective monitoring approach, allowed for the identification of difficulties which may hamper the positive impact of City Labs. These are: a) limited embeddedness in a wider actor network, such as interested organisations, people, and other city departments (exacerbated by the pandemic, which made direct face-to-face communication impossible); b) changes in the composition of the project team leading to the loss of information, insights, and contacts; c) limited interactions with the target audience, that is, those experiencing energy poverty. Knowledge of these difficulties may help to address them in the planning stage of future City Labs.

Socio-economic, socio-political, and socio-cultural aspects that emerged at this stage of the process

GRENOBLE – target groups changed their behaviour due to COVID-19 pandemic, rendering impact assessment indicators unfit

The overarching goal of the Grenoble City Lab was to increase eco-responsibility and promote energy sufficiency across the three target groups (associations, the local administration, schools). Unfortunately, there were no available indicators to directly measure changes in eco-responsibility or energy sufficiency. It was not possible to compare energy consumption of target groups before, during, and after the City Lab actions as was intended, since COVID-19 pandemic led the building usage patterns of all three target groups to change significantly. Evaluators thus decided to use an alternative approach, consisting of capturing the diversity of actions tested and providing insights on how those actions were perceived by the target groups.

Lessons learnt

MANNHEIM AND BASEL – a need to distinguish between evaluation of the City Lab as an approach and evaluation of the project developed within the Lab

The experimental character of the Lab had to be considered when developing the evaluation methodology and influenced the evaluation process itself. The evaluation started with the definition of the experiments. However, it became clear during the evaluation that this was too narrow a definition of experimentation. Mannheim's team decided to use the SONNET definition that focuses on "experimenting as a process that includes two aspects: first, setting up the City Lab and its overall structure, and second, conducting concrete interventions and activities". This broader definition allowed for embedding each City Lab activity in the overall process, which can be seen as experimental from the beginning.

Similarly, the Basel City Lab team has found it useful to distinguish between diverse objects of evaluation, such as: achieved project results (was the goal achieved?), innovation process (was it inclusive?), and embeddedness of the Lab in the local structures (did the lab help to build structures for future collaborative processes?).

Responding to the unexpected – managing through COVID-19 pandemic

BRISTOL – occurrence of COVID-19 was not quickly enough followed by the re-adjustment of goals and performance indicators

In their project evaluation, the Bristol City Lab team concluded that it might have been better to monitor the project outcomes and watch out for the key performance indicators (KPIs) more regularly. During the COVID-19 pandemic, this would have partly meant to more actively re-frame the KPIs (and success linked to them) throughout the process. Meanwhile, in the uncertainty caused by COVID, the core team held onto the idea that the UK would come out of lockdown, and it would be possible to do face-to-face engagement activities despite turbulence. Eventually the aims and activities shifted over time. For example, the low survey response needed to be subsequently bolstered with another survey done by a third-party agency online only. It seems that the team, not unlike any other project team, was not mentally ready for readjustments and alternative planning. Earlier implementation of digital tools, as well as assuming uncertainty from the very beginning, could have been helpful.

Tips from the SONNET cities: peer-to-peer advice for City Lab methods' adopters

Below we present a list of recommendations collected among people involved in conducting the six SONNET City Labs. Based on their personal and professional experiences with the City Lab format, they were asked to indicate the most important factors at each stage of a City Lab process:

1. Tips relevant at every stage

- Stay flexible
- Ensure executive support/support and participation of senior authority stakeholders
- Stay open-minded and honest
- Keep pushing
- Consider a lab as a method of experimenting rather than a long-term policy initiative (they can rather trigger long-term policy shifts, or work as proof of concept)

2. "Setting the stage"

- Embed in other efforts with similar goal (City Lab should not be a stand-alone project)
- Ensure dedicated human resources
- Funding rarely comes from the city, so secure external funding => framing the lab as a proof of concept it may help secure financial support from the city for a follow-up
- Have enough time for team building, including between different city department representatives
- Consider the reputation of a city as a partner and Lab organiser – this may work for or against the Lab's success, so mind the image management
- Consider broad pool of stakeholders to get engaged in the project
- Labs are well suited to topics/problems not yet fully defined/specified (focus on exploration)

3. "Agenda setting"

- When setting the goal, keep in mind that problems around social relations ("how can we work together more efficiently") are better suited to the City Lab method than problems related to formal institutional barriers ("how can we overcome legal barriers around XYZ")
- Build in enough time and skills to navigate administrative processes
- Consider establishing a steering committee, composed of stakeholders' representatives, to guide the project
- As City Labs are experimental, inform yourself of legal and regulatory conditions and barriers

4. "Experimentation phase"

- Dedicate time for thinking, analysing, and adapting things. It is experimental, do not rely on existing schemes
- Expect barriers and problems to occur (both in social relations and in formal/institutional settings).
- Involve the target group as much as possible

5. "Evaluation"

- Make sure to set concrete objectives, review and validate them regularly in cooperation with partners
- Do not neglect political and administrative relations within a city – those may enable or hinder the success of the Lab. Since they involve transferring decision-making power to others, Labs may be cynically used when there is a lack of political will, which will not enable their success.
- Consider a Lab as a framework for collaboration with partners you usually may not collaborate with

Postscript

How did we compile this guide? The guide is based on knowledge and experiences derived from preparation, realisation, and evaluation of six City Labs, conducted as part of the **So**cial I**nn**ovation in **E**nergy **T**ransitions (SONNET) research project, funded by the European Commission[1]. SONNET is a transdisciplinary project, conducted by academic and non-academic partners. The consortium consists of six higher education and research institutions, six cities, and one city network (see table below).

To prepare the SONNET City Labs, we conducted a literature review explicitly focused on publications directly referring to the lab approach (search key term 'lab' in a title or abstract of the text; academic databases used: Scopus). To include publications directed to the broader public, we supplemented the review results by using broadened search scope (beyond peer reviewed journal articles). Our assumption was that research projects based on collaborative, 'lab like' approaches often publish practitioner-oriented materials that can be of high relevance for the SONNET project. Indeed, some of the materials found proved to be of high value. This was particularly true of the Guidelines for Urban Labs and Lab Tool Kit prepared within the URB@Exp project (2014-2017), a project based on four City Labs conducted in different European cities. We also drew on numerous projects, tool kits and open-source materials. This review allowed us to build the **list of tools** included throughout this City Lab Guide.

Based on the literature review, we prepared a Transdisciplinary research protocol, providing SONNET cities and researchers with guidelines on how to conduct a City Lab, both answering local needs and meeting overall SONNET objectives. The City Lab structure presented in this guide (setting the stage, agenda setting, experimenting, and evaluation) also emerged from our literature review.

Every six weeks, we followed and supported the six SONNET City Labs in regular, mainly digital meetings dedicated to discussing ongoing Lab issues with city leads and their local academic partners. We also discussed the processes in depth during regular consortium meetings and city workshops, where city and academic partners reflected on their experiences. Tips and recommendations from the SONNET cities included in this guide resulted from those workshops.

Finally, we analysed final City Lab reports provided by our city partners (documents of 36-86 pages each, available on the SONNET website). Each report contains information about lab-like activities conducted in each city before SONNET and a detailed description of the City Lab stages performed as part of SONNET. Separate sections of each report were devoted to Lab evaluation, presenting results of an ongoing evaluation and outcomes evaluation conducted by the local academic partners. Each report concluded with an analytical reflection section prepared jointly by local research partners and city representatives. Overall, we drew on contributions from all SONNET partners, and in particular from SONNET's six city partners: Antwerp, Basel, Bristol, Grenoble, Mannheim and Warsaw.

The City Lab reports were the main source of examples provided in this guide. We organised those examples in five categories: 1) tools used in the SONNET City Labs, 2) main challenges encountered on the way, 3) socio-economic, socio-cultural and and socio-political aspects influencing the process, 4) lessons learnt, and 5) managing through the pandemic. We decided on the five categories based on SONNET's goals and objectives, the aim to distil enabling and impeding conditions for Lab processes, and the desire to provide rich contextual knowledge of practical challenges and ways of coping with them. We also focused on drawing lessons from conducting the Labs in the middle of the COVID-19 pandemic, which offered an opportunity to reflect on navigating an experimental, transdisciplinary process through an unexpected crisis. By doing this, we hope to illustrate some generic and universal guidelines with context-based information, and therefore facilitate learning from successes and failures of others.

1) The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 837498.

SONNET City Lab Guide

Throughout the SONNET project, we have gathered insights on how to make use of City Labs to drive social innovation in support of sustainable energy transitions. Through this guide, we aim to reach out to local authorities and leaders to provide them with knowledge and tools that support their own use of this format. To follow our work, please sign up for email updates on our website and check out our twitter account:

sonnet-energy.eu @SONNET_energy

Partners

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