UNLOCKING THE TRANSFORMATIVE POWER OF SOCIAL INNOVATION IN ENERGY
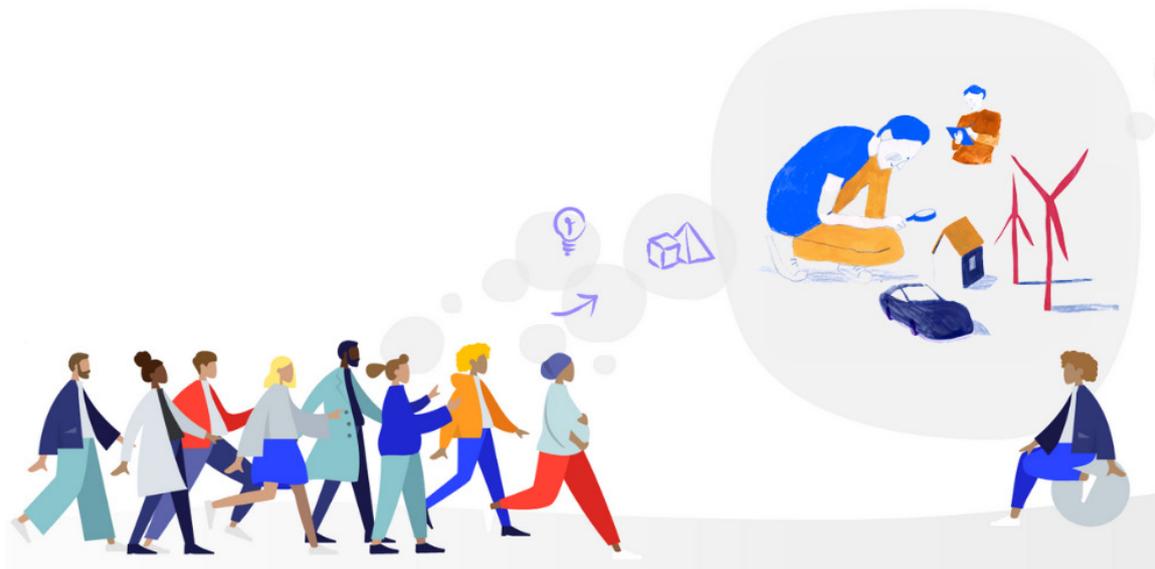
A Guide on the Transformative Power of Social Innovations in Energy

Content

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Foreword

The energy transition seems to be everywhere around us. Whether it be front-page headlines on what CO2 reduction targets world leaders will bring to the next climate conference, volatile electricity and fuel prices leaving our national news cycles in a constant wobble of love/hate for renewable energy solutions, the increasing number of court-cases around climate and energy, or the mounting swell of background pieces on local cooperatives, initiatives and innovations – we are talking about energy.

But even among all these conversations, there is one gigantic elephant in the room that we're hardly mentioning: Power.

Over the past 17 years, I have been doing research on the troubled relation between power and change, together with many other researcher colleagues. It has been a red thread throughout, as I travelled across related fields of research, education and practice – from sustainability transitions to social innovation, and from mobility and energy to urban initiatives.

While many researchers and practitioners agree that power and politics play a crucial role in energy transitions, it is often deemed an uncomfortable and taboo topic, and a heavily contested notion. So it is mostly left unpacked.

This power guide was co-created with many colleagues and other participants of the SONNET project and its Transformative Power Lab sessions. We fervently hope that this guide can provoke meaningful conversations about power among citizens, entrepreneurs, activists, policy-makers and researchers wanting to contribute to energy transitions.

I am also acutely aware that this guide is only a beginning for guiding conversations about power. Many related issues, equally important, complex and neglected, like (in)justice around race, gender and class, require more explicit discussion, understanding and facilitation wisdom in the future.

We hope that this work helps you to further deepen your power literacy, dive deeper into questioning power inequalities in your field and develop transformative power to contribute to more just and sustainable systems, in energy and beyond.

Flor Avelino (DRIFT)

1. Placing power at the heart of social innovation in energy

This guidebook is for people who want to build up their skills to change energy systems. It is for groups or individuals who want to gain insights and experience in how power can be seen, challenged, or increased in energy systems, in order to seize energy transition momentum and contribute to a shift away from fossil fuels.

While new renewable energy technologies may be necessary, technologies alone are insufficient to herald in transitions towards more just and sustainable energy systems. Therefore, this guide focuses on people working on social innovations meaning new sets of ideas, objects and activities that involve a change in social relations. Particularly, we take on the issue of how people in these social innovations can strategically deal with power. Examples of social innovations in energy are[1]:

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[1] These six fields, amongst many others, emerged from the SONNET typology of social innovation: https://sonnet-energy.eu/typology/

City-level competitions

City-level competitions for sustainable energy refer to competitive formats like games, voluntary comparisons, rankings or benchmarking which take place between, or within, cities

Framings against fossil fuel energy

Creation and dissemination of alternative storylines about energy pathways centred on fossil fuels such as coal, oil or natural gas.
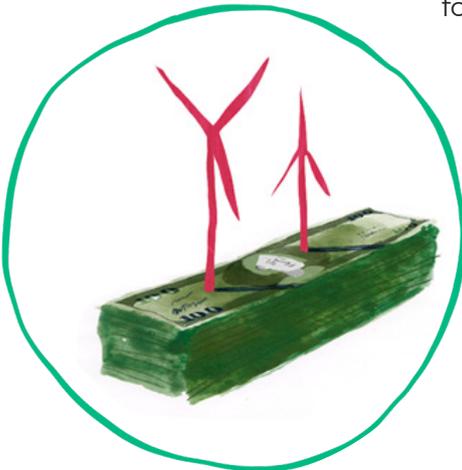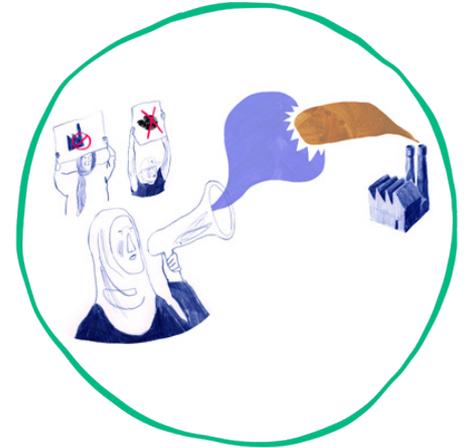
Innovative financing

Mobilisation of monetary resources to achieve renewable energy goals, and to shape and access institutions and structures that regulate financial flows.

Local electricity exchange

Matching local renewable energy generation with local consumption.

Participatory incubation & experimentation

Multi-actor collaborative formats that aim to experiment with novel energy solutions in specific local settings.

Renewable energy cooperatives

Decentralised initiatives of citizens and local communities own the means of renewable energy production.

There are unique power dynamics at play in each of these fields of social innovation (see: power vignettes in Annex 1).

Social innovations can provide answers to how energy systems can be changed. However, in order to have a transformative impact, they also need to challenge, alter or replace existing dominant power relations and structures. Currently, many of these relations and structures[2] in energy are problematic and unbalanced: certain actors in fossil fuel energy systems and large-scale renewable energy lobbies exert unchecked power at the expense of other actors, putting their own interests first. A switch to renewable energies does not automatically denote a switch in power relations. If unchallenged, inequalities and ecological extraction will continue to persist in energy transitions. Therefore, the crucial question is:

How can social innovations challenge, alter and replace existing power relations in energy?

Power relations can be difficult to see, and easy to take for granted. Take, for example, the power that energy companies have to decide what energy source is used to charge your phone (coal, nuclear, renewable, etc). That power source was chosen based on power dynamics that gradually formed in the past and still permeate through society. These are often quite invisible to us: as we grow up, we internalise these inequities as norms. Some of these norms can seem deceivingly trivial, but represent larger imbalances, such as the default temperature at which air conditioning systems are set, which is a temperature fit for people who wear clothes like a suit and tie.

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[2] The guide builds on the Transformative Social Innovation Manifesto: https://tsimanifesto.org/manifesto/

For many people in Europe, energy appears as a given. They pay their energy bills and are largely unaware of where it comes from, how it is produced, what historical path has led to the status quo, and what impacts it has. Today's dominant energy systems were designed to provide cheap and reliable energy and to be as profitable as possible. There are several fault lines in these systems: from greenhouse gas emissions causing global devastation, to overconsumption of energy or issues such as fuel poverty. Social innovations like energy cooperatives, anti-fossil fuel movements or policy experiments, are often dismissed as naive and unrealistic exceptions. This divide can cause both social innovators and people who defend the status quo to be locked into their own ideas and communities.

Meanwhile, established players and structures mostly determine if and how energy transitions take shape, which most likely means a push towards large-scale energy markets. Therefore, for truly transformative energy system change, it is crucial for people working on social innovation to remain open to a conversation about how innovative practices, ideas and technologies can become mainstream, while but also keeping in mind possible unintended consequences of their actions.

This guide has been developed in collaboration with over 100 social innovation practitioners and researchers who took part in a Transformative Power Lab, which is being developed and tested as part of the SONNET project[3]. You can use the guide to deepen your understanding of power (Chapter 2) or select relevant exercises for recognising, discussing, and challenging power in energy (Chapter 3). We hope that this guide will spark conversations that help make sense of the power dynamics within social innovations in energy and thereby amplify your capacity to forge transformative change. We hope it supports you to be steadfastly, and constructively, critical towards social innovation in energy, for the purpose of developing energy transitions that are inclusive and fair today, and which care for the planet and future generations to come.

> Online you can find lectures and additional videos explaining the exercises.
> Go to: https://bit.ly/Power-Guide

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[3] A paper describing the exact method of the Transformative Power Lab, written by the authors of this power guide, is forthcoming. A graphic harvest of the Lab can be found in Annex 2, and for more background reading about the concepts used in this guide, please refer to Annex 4.

2. WHAT WE KNOW ABOUT POWER AND SOCIAL INNOVATION

Power is one of the most contested concepts in social and political theory and has been studied from many different angles. On the one hand, power is about the capacity to achieve one's goals. On the other hand, power is also about incapacity and structural constraints. Learning from multiple, age-old debates about power, we have distilled and summarised ten main insights on power, which provide the building blocks for this power guide:
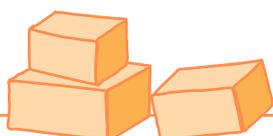
Building Block 1

Question power as inherent part of future energy directions
We need to question power to imagine possible energy transition pathways for the future and to recognise that those engaged in the process have unequal positions and diverse (sometimes contradictory) interests and values. This also means acknowledging the differences between, for example, traditional energy providers that switch to renewable energy sources, as compared to the rise of energy cooperatives. In one case, an oligopoly remains, meaning that a few powerful companies control the market, whereas in the other , shared ownership is put front and centre.

Building Block 2

Anticipate power dynamics in social innovations in energy
While many social innovations in energy intend to change power relations in the energy system, implicitly or explicitly, they often have unintended consequences that may reproduce or even exacerbate problematic power relations. For instance, decentralisation in one place often comes with 'recentralisation' (the emergence of new power concentrations) in other places. Platforms and networks that (initially) aim to decentralise power to users/ members can become a new concentration of power and/or profit. Similarly, inclusive and participatory decision-making processes, like those strived for in cooperatives, tend to be inclusive for some and exclusive for others. Anticipating these unintended consequences will not necessarily prevent power challenges but can help address and compensate for them. Ongoing evaluation of processes like those from a power perspective is necessary to account for complex dynamics and unintended consequences.
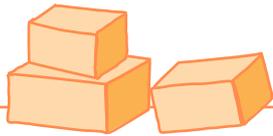
Building Block 3

Develop a language to talk about power

Talking about power can provoke negative or uncomfortable associations, causing people to avoid the subject. If we agree that transformative change is about changing problematic power relations, we need to recognise that a taboo around talking about power prevents us from taking meaningful action. In effect, this impedes the transformative potential of social innovations. Besides, the different associations and meanings that people tie to the concept require us to acknowledge that there are many different understandings of social innovation and power. There is a need to become more confident and brave when talking about power, and to develop language and capacities to do so.
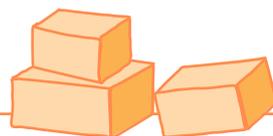
Building Block 4

Gain a sense of power

Vested interests are often blamed for the reproduction of the status quo. However, feeling powerless in the face of such powerful vested interests is just as much an impediment to changing vested interests. Gaining a sense of power is a prerequisite for transformative social innovation, as is understanding how to position oneself in relation to established players. Learning from how other initiatives started off and managed to organise themselves can be one example of how individuals can gain a sense of power.
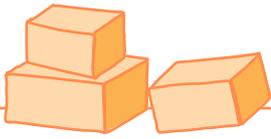
Building Block 5

Take a multi-dimensional perspective on power

To make conversations about power productive, we need to acknowledge and discuss different dimensions. One way to do that is to use the distinctions between 'power to', 'power over' and 'power with'.

power to	power over	power with

"getting things done"

Capacity to mobilise resources to achieve specific goals.

Includes internationally affecting outcomes

For example, the power to be the owner of energy production systems or for communities to be energy independent.

"forcing and dominating"

Force/impede others to do what they otherwise (not) do.

Includes domination, dependency, oppression and exploitation. Can be visible, hidden, incisible or unconscious.

For example concerning money, rules and regulation, but also inequalities in terms of class, income, ethnicity, background or education.

"acting in concert"

Collective capacitiy to collaborate to achieve common goals.

Includes coaction and empowerment as a goal in itself. Even if collective golas are not reached, this still describes the power in organising meetings, creating a community, democratic structures, involvement and inclusion, or the ability to generate income through a local energy market and spend on local needs in the community

Avelico based on Partzsch (2017) and others.
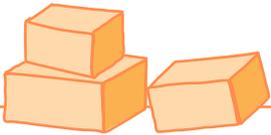
Building Block 6

Understand the ingredients of transformative power

Transformative power is a particular combination of different kinds of power:

1. *Innovative or 'prefigurative' power manifests, for instance, as people mobilise renewable energy sources and cooperative ownership models as an alternative way to produce energy. Community energy initiatives are not just opposing the existing energy system or proposing a different one, but really demonstrating (i.e. 'prefiguring') an alternative energy future in the here and now.*

2. *Reinforcive power, in turn, is about developing and implementing necessary institutional, regulatory and financial frameworks that enable alternative energy systems. One example are policies like feed-in tariffs, which make it financially feasible for citizens to invest in renewable energy technologies. Enforcing such new regulatory frameworks is crucial for social innovations to have transformative impacts.*

3. *In addition to innovative and reinforcive power, transformative change also requires countervailing power to challenge and dismantle existing structures and institutions that reproduce problematic power relations in the energy system. Transforming energy systems is not just about 'adding' new elements, but also about daring to criticise, replace and phase-out ways of doing, thinking and organising that are problematic.*

transformative power

=

prefigurative power
capacity to prefigure new ways of doing, thinking & organizing

+

countervailing power:
capacity to challenge & dismantle existing structures & institutions

+

reinforcive power
capacity to reproduce existing structures & institutions

Building Block 7

Connect globally: Translocal Power

The transformative power of social innovation in energy can be increased through more translocal, intersectional and strategic collaborations between: different types of social innovations in energy, between different localities, and with other types of innovation and social change in and beyond the energy system. Combining specific local issues with wider international connections can be particularly empowering. It allows you to not only see the results of your efforts in your direct local environment, but also to have a wider sense of societal and global impacts. Organising in translocal networks can be an alternative way to diffuse, grow and 'scale-up'. An example of this is the European federation of citizen energy cooperatives (REScoop.eu), which represents the interests of over 1900 cooperatives in the European debate on the future of energy.

3. POWER EXERCISES: PUTTING POWER INSIGHTS TO USE

We have developed and tested a number of practical exercises that can facilitate exchange about power dynamics in social innovations. All have been tested in a Transformative Power Lab which was developed by and conducted within the SONNET project. We invite you to dive into these exercises, and to adjust them as you see fit. Rather than a strict method that you have to finish from A to Z, you are free to pick exercises that you feel might help you and colleagues, and interpret and integrate them in your own workshops, labs, team meetings etc. Alternatively, they can also be used by facilitators. Whether it is during a small team meeting, an off-site strategy day, a conference session or workshop, **doing these exercises serves to develop a language for discussing power and identifying where your own transformative power lies**.

RECOGNIZING POWER IN THE ENERGY SYSTEM

There are no right or wrong answers to the questions we suggest. What is considered 'right' or 'wrong' will likely differ across groups, and coming closer to an answer can only be the result of collective discussions and investigations. Where there is societal change, there will always be compromises with dominant systems and actors. After all, no transformative social innovation can operate in a vacuum.

DIVING INTO POWER DYNAMICS IN SIEs

Importantly, whenever you are discussing power, sharing power remains important. One way to do this is to combine these exercises with hosting an Open Space, which is a format in which participants can come up with and discuss their own ideas and propositions (e.g. see this video, or choose a similar method). Another way might be to involve other people in crafting the programme beforehand, and to reflect on how your role and framing affects the facilitation[4].

TRANSFORMATIVE POWER

Online you can find lectures and additional videos explaining the exercises.
Go to: https://bit.ly/Power-Guide

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[4] One example of a network in which these group facilitation reflections are emphasised is the Art of Hosting.

Exercise 1:
Developing a power language through images

Purpose: Using images to break the ice, have participants reflect freely on the concept, and gauge where people are coming from.

Description: Starting a conversation about power can be tricky. For the Transformative Power Lab, we used images and illustrations throughout the sessions, and collaborated with a graphic facilitator. To start discussing power, using a visual representation of what power means to people can be a low-threshold, creative and fun way to invite people to share their thoughts and ideas, and explore new territory.

Instructions for a Visual Power Check-in:
- Ask participants to prepare an answer ahead of the lab to the question, 'What image represents power for you?'. Participants can bring any image they like: a painting, a photograph, a logo, a drawing, etc. When working online, you can ask participants to set the image as their background.
- In pairs, take 10 minutes to share the image that they brought to exemplify power by discussing: Why did you choose this image?
- Debrief by asking people to share a one-word highlight of their bilateral discussions.
- If available to you, involve a graphic facilitator to harvest and summarise the images, as was done in the Transformative Power Lab.

Example(s):
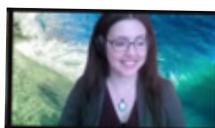
Exercise 2:
Seeing different roles - the multi-actor perspective

Purpose: Becoming more specific about who is exercising power and to what entities we attribute power.

Description: These divisions are reflected in the so-called multi-actor perspective, which divides society into state (government, public agencies), market (firms, businesses), community (households, families, etc.), and the non-profit sector (NGOs, associations, foundations). In the middle, there is a hybrid sphere, which represents hybrid organisations, like social enterprises, that make profit but also prioritise social or ecological impact. Within these domains there are also struggles and hierarchies: think of the local vs. national within the state, multinationals vs. small independent enterprises in the market, or generational or gender inequalities in communities.

Importantly, the multi-actor perspective is not just about the macro level: it is also about us and the roles that we play ourselves. For instance, when discussing the state, we can identify our individual roles, as voters and citizens, while in the market we are consumers or employees, in the non-profit sector activists or donors, and in community friends or parents. Power struggles do not only exist at the macro-level between the state, the market and the community. At an individual level, we also experience tensions and contradictions between how we behave as consumers, voters or neighbours. The multi-actor perspective allows you to acknowledge the multiple roles that you play and want to play in contributing towards more sustainable and just energy systems, and the possible contradictions in how we play that role – for instance voting in favour of certain environmental standards, but using fossil fuels as a consumer.
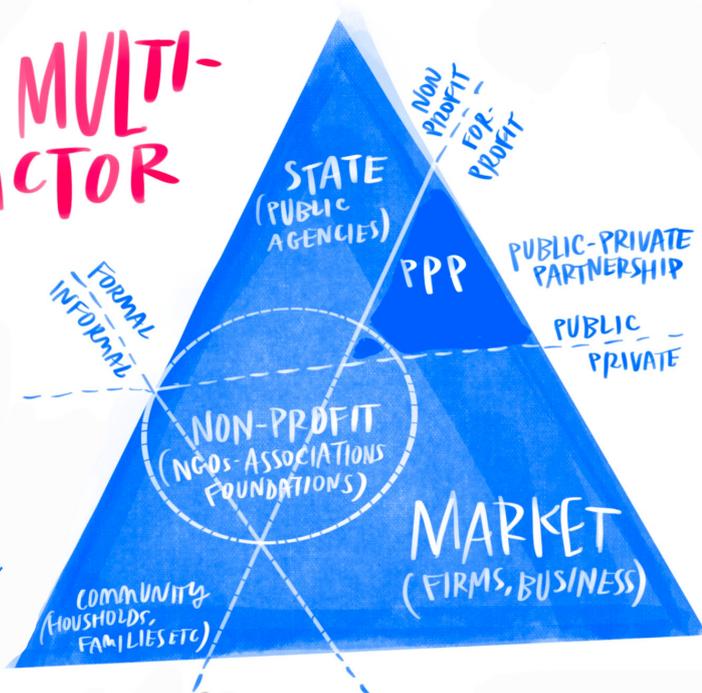
While there is a tendency to associate social innovation with community (e.g. community energy, social movements), or the market (new ways of financing, platforms for exchange), social innovation in energy is not confined to one specific context, and can emerge across diverse areas. Shifting (power) relations and boundaries between institutional logics is – in itself – a form of social innovation. The shifting relations are constantly under discussion and changing: they are in flux, not static.

Instructions for using the multi-actor perspective:

- To prepare, have digital or printed handouts ready describing the multi-actor perspective (see Annex 3), and present or discuss the meaning of the multi-actor perspective with your group.
- Having the multi-actor perspective in mind, focus on your own experience and roles: 'What are the different roles you play in energy?'; 'How powerful/powerless do you feel in those roles?'; and 'What roles do you want to play?'. Before discussing the answers with each other, allow for a few minutes of individual reflection. Do not only discuss your professional role, but also your role in the community and in the state as a consumer, family member, voter, citizen, neighbour, etc.
- There are several options for how to do this exercise, depending on the group and time you have. For instance, reflections can be done in groups of two for 15 minutes, or groups of three (a 'triad', where one person observes and listens) for 15-30 minutes.
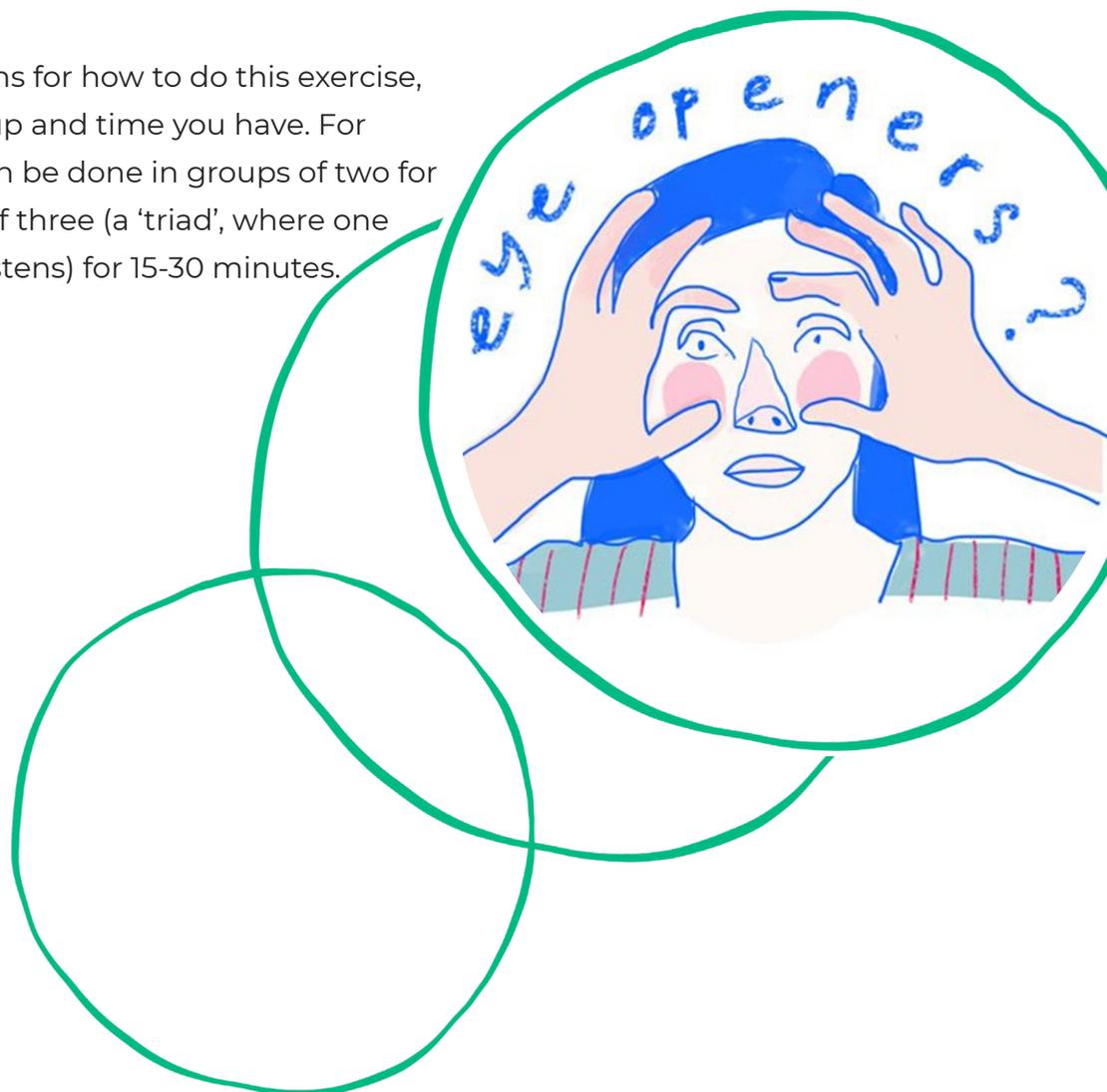
Exercise 3: Understanding 'power to', 'power over', and 'power with' in your social innovation field

Purpose: Putting on power goggles to analyse power in your social innovation field.

Description: In doing this exercise, patterns will start to emerge: who do you think has power, and do they see this as such themselves? 'Power to', 'power over', and 'power with' are explained in Building Block 5.

Instructions for exploring how power manifests in your social innovation:

· Prepare by reading or developing 'power vignettes' about social innovation: these are short narratives that exemplify how 'power to', 'power over', and 'power with' manifest in specific fields of social innovation. You can use the Power vignettes in Annex 1 which were written about social innovation fields studied in the SONNET project, or you can develop your own examples for other social innovations in specific fields. Developing these vignettes and sharing your answers with others in your group can become part of the exercise in and of itself. Questions that are answered in the vignettes are:

    - What is this social innovation?
    - What are examples of it?
    - What are three examples of 'power to', 'power over', and 'power with' in this field?

· Discuss in groups of four: 'How does power manifest in your 'field' of social innovation in energy?' 'Which elements from the power vignettes do you recognise and what would you add?' Think of power to/over/with. Start from your own examples and practical experiences. Take at least 45 minutes.
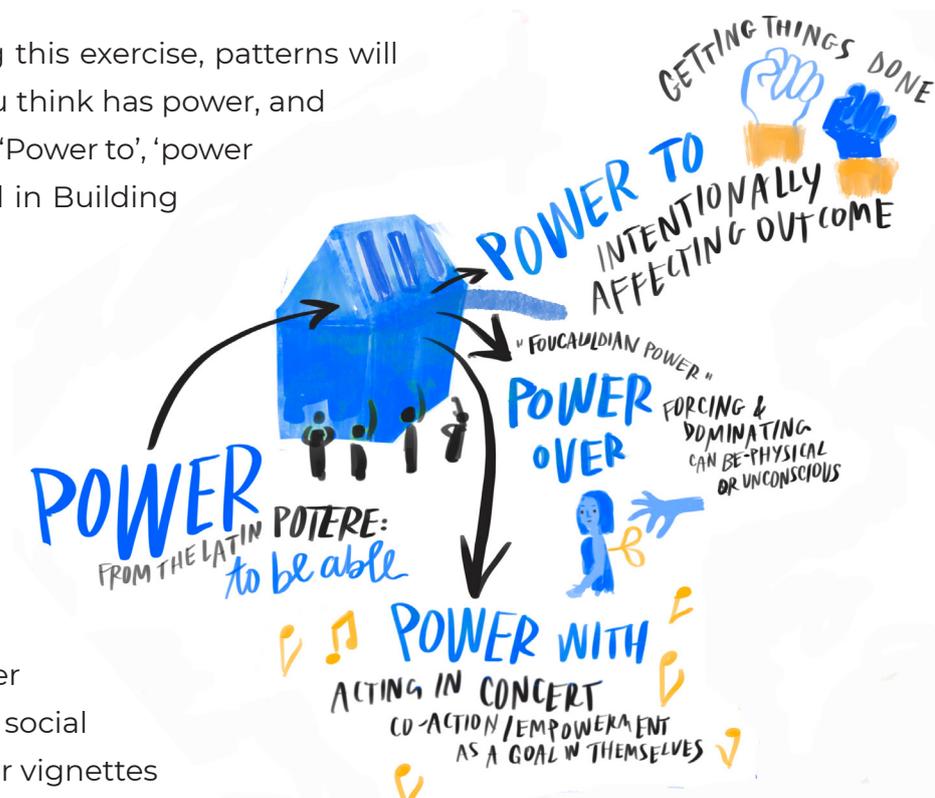
Exercise 4: Unpacking power tensions

Purpose: Understanding the unintended consequences, tensions and paradoxes of social innovation in energy.

Description: Participants are challenged to think about tensions and unintended consequences of their social innovation by first opening up the possibilities of unintended consequences in social innovation, to then zoom in on their own fields, projects or initiatives.
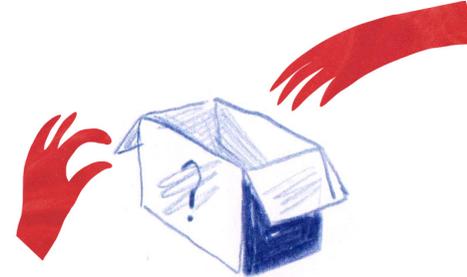
Instructions for unpacking power tensions:

- Prepare by sharing examples of unintended consequences in social innovations that you know of – this does not have to be limited to innovations in energy alone. You can think of examples such as Couchsurfing and AirBnB, Facebook or Uber.

- Select what field, project or initiative you want to focus on. Then, explore the following questions in groups of four (or less): 'What are the main power tensions of this social innovation in energy? How can we tackle these?' Be sure to also consider unintended consequences. Examples of topics that emerge may concern people or groups that the social innovation excludes, aspects of the dominant system that it reproduces, or potential synergies or counter-effects of one social innovation acting with another (e.g. an energy community using a renewables-based cryptocurrency to manage its finances). Take at least 45 minutes.

THE "DARK" SIDE OF SIEs

UNINTENDED CONSEQUENCES

CAN YOU IDENTIFY THESE?

Exercise 5:
Strategising with 'Critical Power Moments'

Purpose: Understanding what have been crucial turning points related to the objectives of your social innovation.

Description: A Critical Power Moment (CPM) is a noticeable or significant shift or challenge of dominant power relations and structures. By becoming aware of past leverage points, you can strategise to understand how you can leverage your countervailing power in the near future, for instance by initiating new collaborations, campaigns or actions.

Instructions for identifying Critical Power Moments:

· Work in groups of four to identify two CPMs related to your social innovation initiative/work up to today: 'What were Critical Power Moments in your social innovation that had an impact on the status quo of energy?' Be specific: who, what, where, when? Do the same exercise again, but this time for a desired future CPM. Take at least 45 minutes.

· Use a chart to list all CPMs, where the Y-axis represents the degree of impact (high or low), and the X-axis represents time. You can choose to create a chart on an online platform such as Miro or Mural, or to create one by hand. An example of such a chart is pictured below.

· Debrief by discussing what collaborations could contribute towards reaching the future CPM.

Exercise 6:
Strengthening your transformative power

Purpose: Understanding how to strengthen the transformative power of your social innovation initiative.

Description: This exercise supports participants to unpack what prefigurative power, reinforcive and countervailing power they have (see Building Block 6). The interplay of these is crucial for social innovations in order to amplify your impact, and to understand how these forms of power interact. As such, you can identify where there are opportunities for you to further build your transformative power.

transformative power
=

prefigurative power
capacity to prefigure new ways of doing, thinking & organizing

+

countervailing power:
capacity to challenge & dismantle existing structures & institutions

+
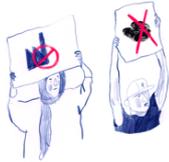
reinforcive power
capacity to reproduce existing structures & institutions

Instructions

- Prepare by listing examples of prefigurative, countervailing and reinforcive power in social innovations in energy that you know of (for instance by looking at the power vignettes in Annex 1).

- Formulate how prefigurative, countervailing and reinforcive power of your social innovation are exercised: 'What is your 'strongest' power?' 'What obstacles do you face in realising these three kinds of power?' 'Where do you identify gaps, and can you identify opportunities for action?' 'What are the synergies and tensions that arise between these three forms of power?'

- Discuss in groups of four: How can your transformative power be strengthened? What role can translocal power or intersectionality (meaning relating to other forms of oppression) play in this? Take at least 45 minutes.

Exercise 7: Expanding translocal power

Purpose: Discussing how new links and collaborations across geographies may support pushing the objectives of your social innovation.

Description: During this exercise, you are challenged to think across boundaries. Rooted in Building Block 7, this exercise gives you the opportunity to expand your horizons by thinking of potential allies, networks and collaborations that you might work with in order to increase your 'power to', and 'power with'. Through translocal, intersectional and strategic collaboration, social innovations in energy can bolster their radical potential and decrease their dependency on the status quo. For instance, if an energy community can rely on seed funding from other energy communities, they no longer have to seek out a loan from a conventional bank.

Instructions:

- Reflect on the needs, goals, and objectives of your social innovation;

- Prepare a long list of actors: What initiatives or actors do you know that share your goals and objectives? What initiatives or actors do you know that could meet your needs? You can use resources such as the TRANSIT long list, UrbanA wiki or SONNET case studies.

- Discuss in groups of four: 'What opportunities can you identify to collaborate or join forces with actors or initiatives which share your values and could meet your needs?' Create a concrete action that you can realise within two weeks, and which connects you to other people in order to further investigate this.

On SONNET

The research project Social Innovations in Energy Transitions (SONNET) was initiated to bring diverse groups together to make sense of how social innovation can bring about a more sustainable energy systems in Europe. How has social innovation contributed to making our energy sources, use and production cleaner? How can social change help reduce our carbon footprint in the future?

Six cities and six research institutions in Europe carried out '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. By bringing together designated academic and local government partners, expertise of all kinds came together to co-create knowledge and solutions.

In addition to its research, SONNET hosted several regional, national, and European events to spread and co-create knowledge on social innovation and the energy transition.

The SONNET project has been active from 2019–2022, and supported by the European Union's Horizon 2020 Research and Innovation programme, Grant Agreement no. 837498.

Acknowledgements
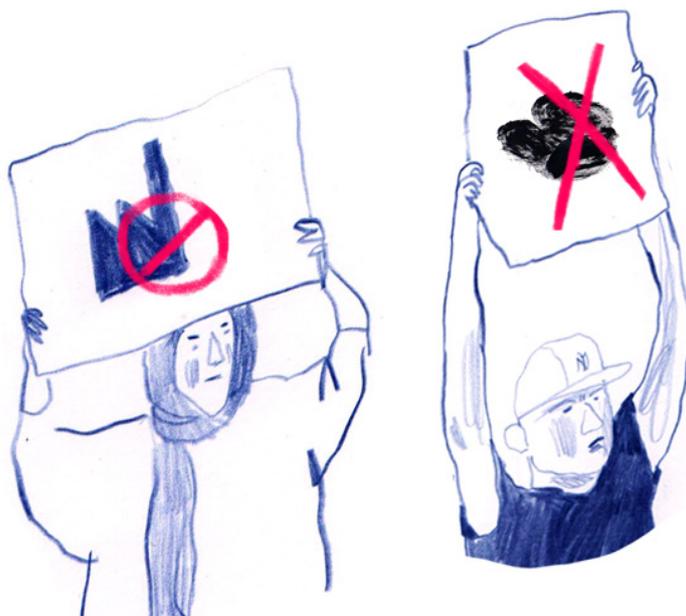
ANNEX 1 Social Innovation and Power Vignettes

Annex 1.1 City-level competitions

City-level competitions for sustainable energy refer to competitive formats like games, voluntary comparisons, rankings or benchmarking which take place between, or within, cities.

The competitive approach challenges participants to find pathways towards sustainable energy consumption and production. The playful and game-like character differs from dominant technocratic ways of thinking and organising energy-related topics. Competitions as 'fun' approaches to promoting and mainstreaming sustainable energy are initiated by public or private institutions as an innovation to existing formalized and bureaucratized energy relations.

Below we provide two concrete examples of how power can manifest itself in city level-competitions for sustainable energy. The first box explains how **political stakeholders exercise power over the 2019 Climathon competition in Mannheim**. The second box describes how **Swiss communities achieve ambitious goals in sustainable energy by cooperating with each other as part of the 'Energie-Region' programme**.

***Power over*: Political stakeholders confine implementation of ideas from the Climathon competition in Mannheim**

Even if competition formats result in new ideas and solutions for pressing societal challenges, their implementation strongly depends on political will and governmental support. An example of this is the hackathon Climathon, a 'marathon of ideas' that has been regularly organised by the city administration since 2015. It is inspired by hackathon events, during which computer programmers and other software developers spend short periods of time - usually 24 to 48 hours - to collaborate on a project. The aim of a Climathon is to develop innovative solutions for challenges related to climate change. The event takes place on the same day in different locations around the world. Each event is hosted by a local organising team, often working closely together with the local city administration and other partners including private companies, universities and associations.

Participants of the 2019 Mannheim Climathon came up with suggestions on achieving carbon-neutrality such as a platform to organise bike-sharing, and a measurement system for energy consumption of local buildings. However, the decision which of these solutions are implemented is inherently political, and thus depends largely on the will of policymakers, who thus exercise power over these competition formats. There might not be a budget to implement the ideas, or the city administration might not feel authorised or responsible to take up certain initiatives. In those cases, winning teams are encouraged to continue with their initiatives privately, thereby often making them dependent on the power of existing market forces or philanthropy.

***Power with*: Swiss communities collaborate to become a certified 'Energie-Region'**

To achieve the goals set in the Swiss Energy Strategy 2050 and the Paris Climate Agreement, the Swiss Ministry for Energy initiated the 'Energie-Region' programme. Certified energy regions are provided with 15.000-30.000 CHF (around 13.700-27.400 EUR) subsidies annually, technical support, and networking possibilities. To become a certified energy region, city governments and other municipalities in the region have to collaborate closely to achieve the strict targets set within each of the project's phases. The Energie-Region programme is a good example of how competitions or labels may provide power with – it empowers municipalities and other regional actors to achieve ambitious goals in sustainable energy by acting together.

Annex 1.2 Framings against fossil fuel energy

Framings against fossil fuel energy pathways involve the creation of alternative storylines about energy pathways centred on fossil fuels such as coal, oil or natural gas. The aim is to change dominant ideas about the future of energy, by emphasising the problems of fossil fuels (environmental damage, safety issues, CO2 emissions etc.) and by proposing alternative energy futures. Activities include campaigns, protests, petitions and the sharing of information, expertise and experiences. Many actors at various levels can be involved: NGOs, network organisations, or local resident working initiatives, active, locally, regionally, nationally or internationally.

Framings against fossil fuel energy are socially innovative as they challenge existing mainstream stories around fossil fuels. They spread alternative storylines that are not necessarily new, but have been told by actors whose voices have been silenced or ignored previously. This also changes how society relates to the fossil fuel industry .

We highlight two examples of power dynamics in framings against fossil fuel energy: the power to challenge fracking in the UK's National Planning Policy Framework and the collaboration within the Silesian Climate Movement in Poland.

Power to: Challenging the National Planning Policy Framework

In July 2018, the revised National Planning Policy Framework (NPPF) was published in the UK. It required English councils to recognise " the benefits of onshore hydrocarbons, including shale gas, for energy security and transition to a low carbon economy". Councils were also required to "put in place policies to facilitate their [onshore hydrocarbons] exploration and extraction" and 'plan positively for them'' (as reported by Hayhurst 2018). In August 2018, representatives of Talk Fracking,an anti-shale group) asked the Secretary of State to withdraw the paragraph on fracking/onshore hydrocarbons in the framework. They argued that the revised NPPF did not take into account the greenhouse gas emissions from shale gas extractions, measuring methane releases and impacts on air quality. Moreover, the NPPF was not in line with the government's Clean Growth Strategy that was also published in 2018.

Talk Fracking challenged the revised NPPF in the High Court, and their case won (High Court ruling March 2019). This decision meant that future planning applications for fracking could be objected to on current scientific evidence, especially about climate change, as opposed to government policy insisting on the need for oil and gas extractions for energy security. This example demonstrates that through "power to" in terms of the wealth of resources (e.g. money, knowledge, experts) groups/ organisations are able to gather to win court cases. Funds were raised through several creative crowdfunding activities, such as walks and art sales.

Power with: The Silesian Climate Movement

Around 2018, broad social movements around climate change developed in Poland like the Youth Climate Strike, Extinction Rebellion and others. A patchwork of several initiatives emerged over time, characterized by flat organisational structures, democratic decision-making mechanisms, and relatively low entry barriers. For years, Polish ecological organisations used to primarily focus on issuing expert reports, monitoring administrative paths of legal acts and investigating environmental harm. Most people were not able to get involved in these activities. To fill this gap, social movements with broader activities and goals developed in order to give more people a sense of agency.

One example is the Silesian Climate Movement that was launched in December 2018. Initially, there were some elements of hierarchy in its organization, but later on the movement shifted to more bottom-up methods of self-organisation and social organising. It is very easy to join the movement and the working groups don't have sharp boundaries, with members fluctuating between them. This illustrates a form of "power with", in which several groups can come together as a movement that tries to make processes more inclusive so that a wide variety of people can participate in organising and implementing activities.

Annex 1.3 Innovative financing

Innovative financing is an important lever in energy transitions: it can enable new ways of funding and deploying renewable energy. New actors (e.g. citizens as investors), new roles (e.g. energy community turns into distribution system operators) and novel combinations of actors (e.g. cooperation between traditional utility and local community) are emerging, changing social relations and ways of doing, thinking and/or organising. Examples of innovative financing include:

- **Municipal community loan**: Municipalities lend money to energy communities.
- **Investment-based crowdfunding**: Together, a number of funders provide small loans to collectively invest in an energy initiative.
- **Institutional investment in green infrastructure**: Large-scale investments in infrastructure projects.
- **'Corporate' and 'private wire' power purchase agreements**: Agreements between two parties to buy and sell energy.
- **Subsidy mechanisms**: Funding for energy initiatives provided by governments.

To illustrate power in these social innovations, we highlight the stories of municipal energy in Bristol (UK) and crowdfunding in the Netherlands.

From power over to power to: **The case of Bristol taking charge in the UK**

Local authorities usually depend on others to mobilise financial resources for energy, providing these other actors (e.g. national governments, multinational companies or banks) with considerable power over the local energy system. However, local governments can also mobilise financial resources themselves. The city of Bristol decided to claim their own financial power by establishing self-financing energy teams, in the context of budgetary constraints imposed by the central government's austerity programme. In 2010, Bristol City Council's cabinet approved the procurement of a wind farm developer to construct two wind turbines at Avonmouth. This made Bristol the first local authority to own operational wind turbines.

The installation cost around 10 million GBP (approx 11.6 million EUR), and was financed by the Public Works Loan Board, a body of the UK Government. Based on available Feed-in-tariffs, the sale of electricity, and Levy Exemption Certificates, the installation was projected to generate an annual income of 1 million GBP. As of 2020, this income pays for a large number of staff at the Bristol Energy Service. In this example, the local authority of Bristol was given the power to make their own decisions as to where, and how, they wanted to invest in the energy transition.

Power with: **Professionalizing crowdfunding in the Netherlands**

Crowdfunding, or crowdinvesting, allows small investors to contribute money to renewable energy projects. In 2016, the Dutch Ministry of Economic Affairs stimulated the crowdfunding sector to professionalise by starting a trade organisation. The trade organization gave the sector collective power to lobby for their needs and work towards achieving their goals.

Up until then, crowdfunding had not been able to institutionalise changes in the ways of doing, thinking or organising in the financial sector, mainly because of the sheer size of the financial sector in the Netherlands. The trade organisation gave the crowdfunding platforms 'power with'; they gained the ability to achieve collective goals collaboratively. Interestingly, the trade organisation of crowdfunding in the Netherlands defined certain quality requirements for crowdfunding, which excluded many newcomers. This is a good illustration of how power with can over time result in new structures that exercise power over with exclusionary implications.

Annex 1.4 Local electricity exchange
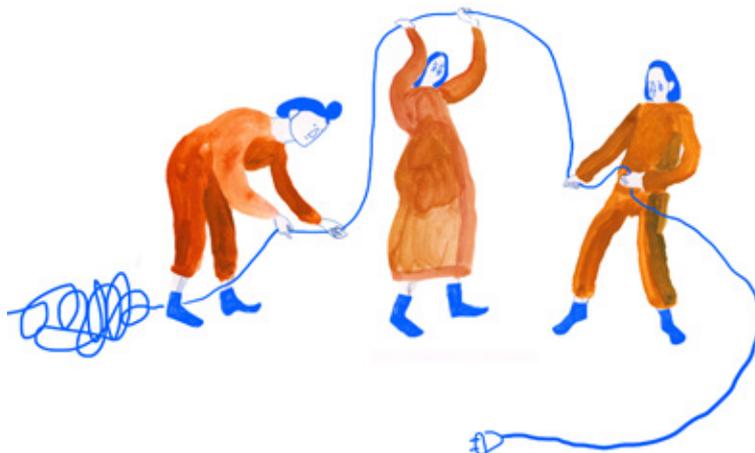
Local electricity exchange is about matching local renewable energy generation with local consumption. This can result in new business models and new forms of collaboration, allowing more people to become engaged in energy transitions.

The aim of local electricity exchange is to increase the share of renewable energy in current energy systems, and to reform electricity markets by maximising the use of locally produced energy. Local electricity exchange is socially innovative as it represents a different way of generating electricity, one that happens closer to the consumer. Such local production of electricity also changes how people relate to energy, as there is a more direct connection between where energy comes from and how it is shared in a community.

Local electricity exchange can take many different forms. The most common are:

- Collective self-consumption: collective actions to generate, purchase or manage electricity at neighbourhood, district or street level;
- Power purchase agreements (PPAs): e.g. electricity suppliers who create direct contracts with renewable electricity producers, and reserve electricity to a limited number of customers located in the same or a neighbouring municipality;
- Peer-to-peer (P2P) electricity trading: electricity transactions between consumers or prosumers,

usually non-professional actors (i.e. who are not professionally employed in energy companies), with the use of technologies such as virtual platforms/blockchain, which enable sharing of energy within connected communities.

We provide three examples of how power manifests itself through the Local Electricity Bill campaign in the UK, Growth of collective self-consumption in Switzerland and collaboration between Planète Oui and Valorem to build solar parks.

Power to/with: **The Local Electricity Bill campaign in the UK**

Existing legal and policy arrangements around electricity systems and markets can impede local electricity exchange. Electricity supply licence rules for instance, can be an obstacle for small generators as meeting the requirements can be very costly. Challenging this obstacle was one of the aims of the not-for-profit organisation, Power for People, which campaigns in the UK for a rapid transition to 100% clean energy benefitting local economies. They drafted the Local Electricity Bill with the aim to empower communities to sell their energy directly to local people. Their campaign for the Local Electricity Bill, The Community Energy Revolution, is one of the most noticeable initiatives concerning more local energy supply. The bill was introduced to parliament in June 2020, and its supporters included 60 county authorities and local authorities, Greenpeace, trade associations such as British Hydropower association, renewable energy associations, solar trade associations, Good Energy, the Church of England, over 300 community groups, individuals lobbying their local MPs, 300 parish town councils, and the Chamber of Commerce. Although the bill has not become a legislative act yet, the campaign illustrates how power to and power with can be exercised through strategic collaboration between many different actors who bundle their efforts to lobby for changing existing policy and regulatory frameworks.

Power with: **Collaboration between Planète Oui and Valorem to build solar parks**

In 2016, the French municipality Mézières-lez-Cléry chose project developer Valorem to build a solar park of 4.2 MWp on an old mining site (Valorem Energie). In November 2019, when construction was about to start, Valorem signed a partnership with Planète Oui, an electricity supplier. The objective of this partnership was to make solar electricity available to people who live in the vicinity of the solar park. The partnership is a good example of how power with manifests as actors collaborate towards common goals in local electricity exchange projects.

***Power over/to*: Growth of collective self-consumption in Switzerland**

For a long time, distribution system operators (DSOs) have had a lot of power over the grid infrastructure and management of electricity bills in Switzerland. However, the recently introduced new legal entity of Zusammenschluss zum Eigenverbrauch (ZEV) (tr. Association for self-use) challenges this status-quo by allowing the self-consumption of solar power beyond building or property boundaries.

In a ZEV, landlords may provide energy for their tenants and keep electricity costs low by organising self-consumption in multi-party houses and districts. A ZEV replaces the local utility and becomes responsible for energy supply, metering, and organising a community of consumers. This model enables actors to invest in privately owned supply and distribution infrastructure to sell locally produced electricity to tenants of nearby properties.

By 2019, more than 3,079 ZEV projects in various forms had been realised in Switzerland. Increasingly, mainstream actors such as housing cooperatives and real estate companies as well as pension funds start using the ZEV model. It is expected that the realisation of P2P and blockchain pilot projects will extend the ZEV organisational model towards new forms of local electricity exchange and trading.

Annex 1.5 Participatory incubation and experimentation

Participatory incubation and experimentation refers to sites of multi-actor collaboration and experimentation, like living labs, city labs, testbeds, pilots, and transition arenas. Experiments typically take place in settings that are close to real-world contexts, involving everyday problems and actors. The aim is to find new ways of organising energy production and consumption, for instance by including new technologies, funding mechanisms or governance structures.

These experiments are socially innovative in that their primary goal is to enable innovation and to co-create new ways of doing, thinking and organising.

The two boxes below provide examples of power relations connected to participatory incubation and experimentation: The first box describes the **dependence of the Belgium living lab StadsLab2050 on the city administration of Antwerp** and the second box explains how **diverse stakeholders work together and collaborate as part of the 'Energieavantgarde Anhalt'** regional networking association.

Power over: Policymakers exert power over the Belgium living lab Stadslab2050

Incubation and experimentation typically require external funding from public resources, which makes them dependent on the preferences of political stakeholders. Stadslab2050, a living lab founded by the city of Antwerp in 2013, provides a good example of such reliance on political support. The lab involved a diverse set of societal stakeholders including companies, citizens, civil society, civil servants, and researchers, which worked towards making Antwerp carbon-neutral by 2050. One of Stadslab2050's experiments dealt with reducing the energy consumption of shops in a commercial neighbourhood of Antwerp through shifting societal norms and deeply rooted behavioural routines. In 2020 however, Antwerp's local political climate turned against the living lab format, and Stadslab2050 was discontinued as an independent initiative and integrated into the city's larger climate strategy. Stadslab2050, which depended on funding by the Flemish government and the city of Antwerp, is thus a prime example of how policymakers and funding schemes exert **power over** experimentation formats.

Power with: Energieavantgarde Anhalt brings diverse stakeholders together to advance the regional energy transition in the German region Anhalt

Founded in 2012, Energieavantgarde Anhalt is a regional networking association that aims to advance the sustainable energy transition within the region Anhalt in Germany. It falls under the category 'Reallabor' (tr: 'labs in real world contexts') which describes a hybrid form of experiments that integrate a diverse set of actors to generate and apply knowledge (Schneidewind, 2014). Activities carried out by the Energieavantgarde Anhalt initiative include the development of mission statements, regional networking activities, and start-up competitions for energy related innovations. A major focus lies on networking activities and bringing actors together to work on the regional energy transition. The Reallabor is thus a good example of power with as it enhances networking and strategic collaboration between civil society actors, scientists, political actors (such as stakeholders from municipalities, regional districts, the government of Saxony-Anhalt or the Federal Ministry of Education and Research), private companies, foundations and others to find solutions for a sustainable production and consumption of energy.

Annex 1.6 Renewable energy cooperatives

Renewable energy cooperatives (hereafter referred to as 'cooperatives'), are models through which citizens jointly own the means of production of renewable energy (e.g. windmills or solar panels), while also participating in its organisation.

Cooperatives are socially innovative, as they often aim to contribute to sustainable energy transitions by democratising energy production. By actively participating in producing electricity, members of cooperatives are no longer passive consumers of power – they become so-called prosumers. Through enabling citizens to become central actors at all levels of using and producing energy, cooperatives contribute to a change in social relations.

Below, we provide two concrete examples of how power may manifest itself in and through cooperatives: The first box demonstrates the **powerful position of large energy utilities** within the German policy-making arena, while the second box explains how **intermediary organisations can empower cooperatives** through organising collective action.

Power to and power over: **The expansion of renewables in Germany and incumbent energy utilities exercising power through lobbying**

The German power sector was long dominated by the so-called 'big four' energy utilities: RWE, E.On, Vattenfall and EnBW. The 1998 liberalisation of the German electricity market led to a high concentration of power with the big four utilities covering around 90% of electricity generation by the mid-2000s. However, introduced in 2000, the Renewable Energy Sources Act (EEG) laid the foundation for Germany's energy transition and promoted a rapid expansion of renewable energies. Moreover, German policymakers decided to phase-out nuclear power by 2022 and coal-fired power by 2038. The previously dominant position of incumbent utilities (whose business models relied on nuclear and coal) was therefore challenged significantly. As a consequence, Vattenfall withdrew entirely from the German market and E.On split up into two companies. The resulting ability of renewable energy actors, including cooperatives, to take over large parts of the energy market is a good example of power to.

Nevertheless, large utilities are still considered to be extremely influential political stakeholders. They have access to extensive financial resources, and, more importantly, often hold close contacts to powerful politicians. The policy network between policymakers and utilities allows utilities to influence energy policies according to their interests. This is a textbook example of how power over can operate indirectly, as these activities are likely to remain invisible to the general public. For instance, after extensive lobbying from incumbent energy providers, two amendments to the Renewable Energy Sources Act in 2012 and 2014 undermined existing business models of cooperatives by, among others, reducing Feed-In-Tariffs (fixed electricity prices paid for renewable energies). In 2014, the revenues of almost 80% of all regional energy cooperatives and more than 80% of the supra-regional energy cooperatives depended on Feed-In-Tariffs (Herbes et al., 2017).

Power with: **Cooperatives join forces through intermediary organisations**

Individual cooperatives generally have little leverage to influence policy making and defend their interests. However, joining intermediary organisations enables cooperatives to represent their interests collectively, and thus more powerfully. Within Europe, intermediary organisations can be seen to operate on the regional, national and EU-level. For instance, the European federation of citizen energy cooperatives (REScoop) represents the interests of over 1900 cooperatives in the European debate on the future of energy. Examples of national intermediaries include the Association of Independent Energy Producers (VESE) in Switzerland or the Cooperative and Raiffeisen Cooperation (DGRV) in Germany. Intermediary energy networks provide an example of ***power with***, i.e. the capacity of actors to act in concert and increase collective power through collaboration. In addition to empowering cooperatives in the policymaking arena, intermediaries also work on fostering the societal acceptance of renewable energies and on supporting newly established cooperatives, for example through training or coaching activities, financing services or by building connections to key stakeholders.

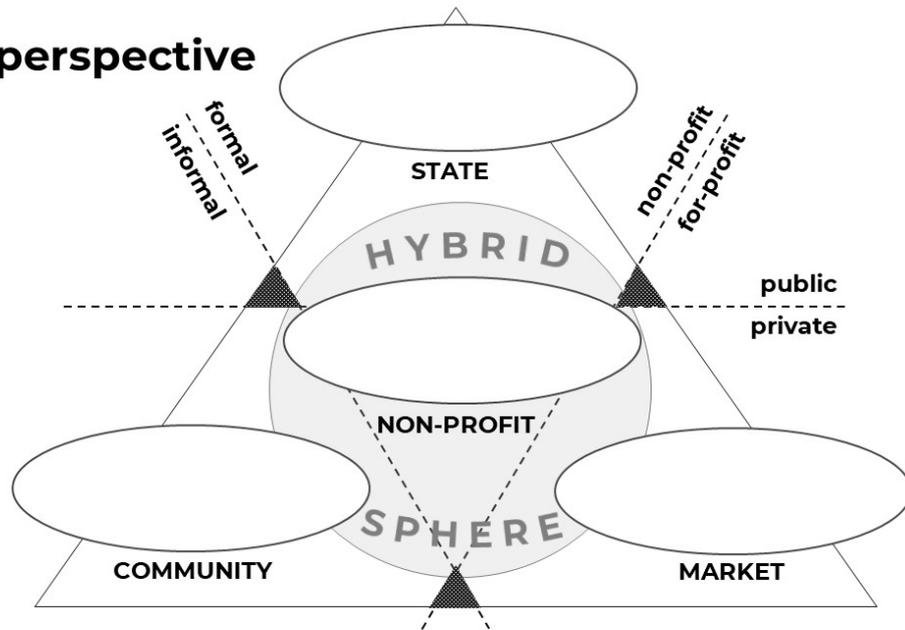# ANNEX 2 Graphic harvest of the Translocal Power Lab
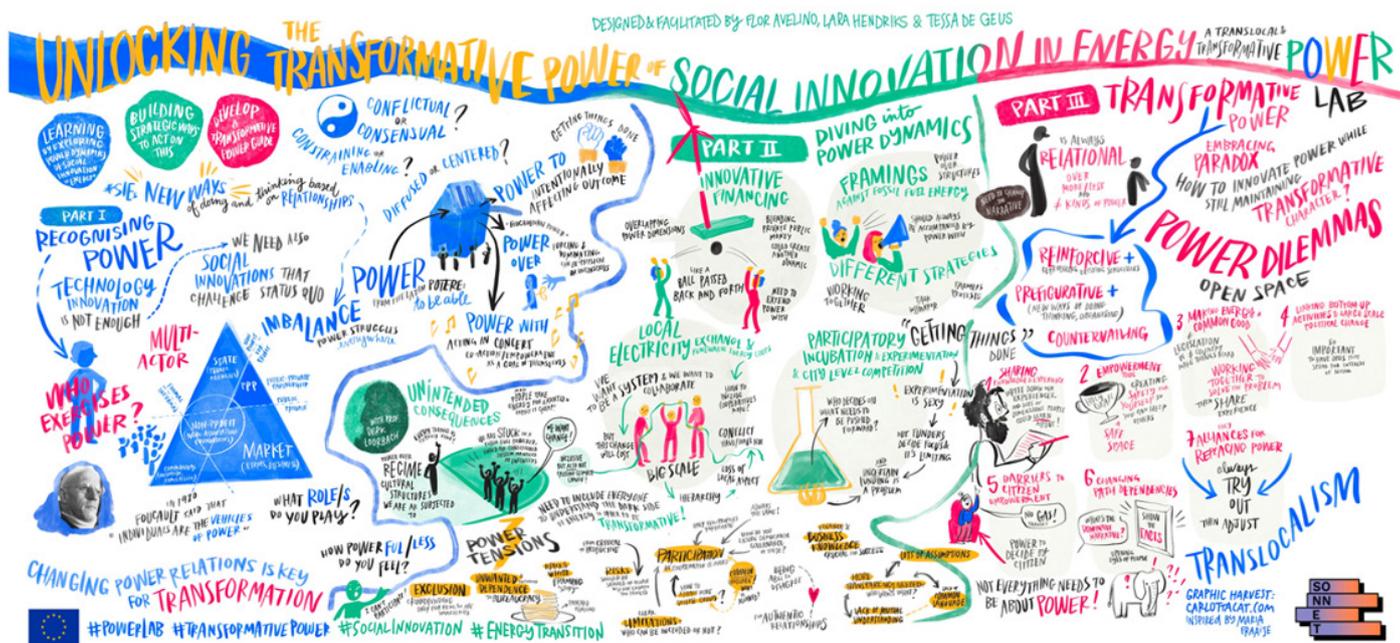
Graphic harvesting by Carlotta Cataldi.
To view and navigate around the full-sized image, click here.

ANNEX 3 Hand-out of the multi-actor perspective exercise

Multi-Actor perspective
Hand-out

STATE

HYBRID

formal
informal

non-profit
for-profit

public
private

NON-PROFIT

COMMUNITY

SPHERE

MARKET

Avelino & Wittmayer 2016, 2017, 2019

ANNEX 4 Resources and references

(Transformative) social innovation:

- Avelino, F., Wittmayer, J. M., Pel, B., Weaver, P., Dumitru, A., Haxeltine, A., ... & O'Riordan, T. (2019). Transformative social innovation and (dis) empowerment. Technological Forecasting and Social Change, 145, 195-206.

- Pel, B. (2016). Trojan horses in transitions: A dialectical perspective on innovation 'capture'. Journal of Environmental Policy & Planning, 18(5), 673-691.

- Pel, B., Wittmayer, J. M., Avelino, F., & Bauler, T. (2019). Paradoxes of Transformative Social Innovation: From Critical Awareness towards Strategies of Inquiry.

- Pel, B., Wittmayer, J., Dorland, J., & Søgaard Jørgensen, M. (2020). Unpacking the social innovation ecosystem: an empirically grounded typology of empowering network constellations. Innovation: The European Journal of Social Science Research, 33(3), 311-336.

- Pel, B., Haxeltine, A., Avelino, F., Dumitru, A., Kemp, R., Bauler, T., ... & Jørgensen, M. S. (2020). Towards a theory of transformative social innovation: A relational framework and 12 propositions. Research Policy, 49(8), 104080.

- Wittmayer, J. M., Backhaus, J., Avelino, F., Pel, B., Strasser, T., Kunze, I., & Zuijderwijk, L. (2019). Narratives of change: How social innovation initiatives construct societal transformation. Futures, 112, 102433.

Power and social innovation:

- Avelino, F. (2011). Power in Transition: Empowering Discourses on Sustainability Transitions. Erasmus University Rotterdam. Retrieved from http://hdl.handle.net/1765/30663

- Avelino, F. (2017). Power in sustainability transitions: Analysing power and (dis) empowerment in transformative change towards sustainability. Environmental Policy and Governance, 27(6), 505-520.

- Avelino, F. (2021). Theories of Power and Social Change (2021). Power Contestations and their Implications for Social Change Research, Journal of Political Power, online first: http://dx.doi.org/10.1080/2158379X.2021.1875307

Energy and social innovation:

- De Geus, T. and Wittmayer, J., (2019). Social Innovation in the Energy Transition. Examining diversity, contributions and challenges. Scoping workshop report. Cambridge: Energy-SHIFTS. Available at: https://energy-shifts.eu/wp-content/uploads/2019/10/02_Social-Innovation-in-the-Energy-Transition.pdf

- De Geus, T., Wittmayer, J., Van Berkel, F. (2021). Charging the future: Roadmaps and value tensions for mainstreaming prosumerism to 2030 and 2050. PROSEU – Prosumers for the Energy Union: Mainstreaming active participation of citizens in the energy transition (Deliverable N°6.3). Available at: https://zenodo.org/record/4568680#.YUhEgo4zbcs

- Stephens, J. (2019) Energy Democracy: Redistributing Power to the People Through Renewable Transformation, Environment: Science and Policy for SustainableDevelopment, 61:2, 4-13, DOI: 10.1080/00139157.2019.1564212

- Wittmayer, J. M., de Geus, T., Pel, B., Avelino, F., Hielscher, S., Hoppe, T., Mühlemeier, S., Stasik, A., Oxenaar S., Rogge K.S., Visser, V., Marín-González E., Ooms, M., Buitelaar, S., Foulds C., Petrick, K., Klarwein, S., Krupnik, S., de Vries, G., Wagner, A., & Härtwig, A. (2020). Beyond instrumentalism: Broadening the understanding of social innovation in socio-technical energy systems. Energy Research & Social Science, 70, 101689. Available at: https://sonnet-energy.eu/wp-content/uploads/2020/09/Wittmayer-et-al_Beyond-instrumentalism_2020.pdf

Multi-actor perspective:

- Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: a multi-actor perspective. Journal of Environmental Policy & Planning, 18(5), 628-649.

- Avelino, F., & Wittmayer, J. (2017). Interlude: A multi-actor perspective on urban sustainability transitions. In Urban Sustainability Transitions (pp. 272-284). Routledge.

- Avelino, F., & Wittmayer, J. M. (2019). The transformative potential of plural social enterprise: A multi-actor perspective. In Theory of Social Enterprise and Pluralism (pp. 193-221). Routledge.

Translocal empowerment:

- Avelino, F., Dumitru, A., Cipolla, C., Kunze, I., & Wittmayer, J. (2020). Translocal empowerment in transformative social innovation networks. European Planning Studies, 28(5), 955-977.

- Loorbach, D., Wittmayer, J., Avelino, F., von Wirth, T., & Frantzeskaki, N. (2020). Transformative innovation and translocal diffusion. Environmental Innovation and Societal Transitions, 35, 251-260.

Other SONNET resources:

- Energy Read on the social innovation in energy typology: https://sonnet-energy.eu/wp-content/uploads/2020/06/EnergyReadsfinal.pdf