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SONNET – SOCIAL INNOVATION IN ENERGY TRANSITIONS

Co-creating a rich understanding of the diversity, processes, contributions, success and future potentials of social innovation in the energy sector

Working Paper

‘The diversity, processes and contributions of social innovation in the energy sector: revised conceptual framework and SIE typology based on SONNET’s empirical evidence’

Deliverable D1.4 | D4

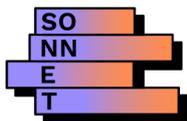
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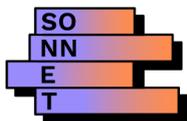
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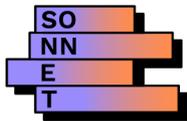
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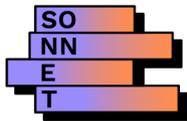
Executive Summary

This working paper outlines the conceptual advancements developed as part of the SONNET project. Firstly, SONNET has developed a typology of social innovation in energy (SIE) and this paper reflects on the usefulness and relevance of this typology. Secondly, drawing on three bodies of scholarship – sustainability transitions, social innovation and social science in energy – SONNET has developed a sensitising framework in its first year and since then has brought forth six conceptual advancements. These advancements relate to:

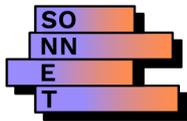
- the understanding of the diversity of social innovation,
- the multi-actor nature of social innovation,
- the power dynamics in social innovation and sustainability transitions,
- the governance of social innovations in cities,
- broader mobilisation processes as social innovations
- policy mixes for social innovation

Each of these conceptual advancements are summarised in this deliverable, including the provision of fifteen working propositions which can also practically inform transition processes towards more just, secure, sustainable, competitive, and affordable energy.

- (1) To capture the diversity of social relations and the multitude of actors that come into play and/or need to redefine their roles and activities in existing energy transitions, a broad understanding of social innovation is needed – one that allows for capturing the diverse transition directions and transformative potentials (or not) involved.
- (2) As a category of innovation, social innovation slots in well with prevailing ways of making sense of energy matters and can therefore act as a boundary object between disciplines and across research, practice, and policy or more generally as an entry-point for inserting social science and humanity (SSH) insights into energy research, practice and policy more generally.
- (3) Europe's energy systems are changing where many national governments have set decarbonisation goals. These changes have meant that more incumbent energy actors (e.g. existing energy companies) have had to change their usual way of working. The boundaries between SIE-field-actors and other field-actors have become increasingly blurred. It sometimes is no longer a David and Goliath story.
- (4) SIE-fields vary in the extent to which they fit into the existing energy systems and their transitions (or not). Some SIE-fields and their actors therefore challenge existing institutions more than others whereas other might maintain them. The speed and direction of transitions is partly determined in how far SIE-field-actors are able to create and challenge/disrupt institutions and hold onto their original aims when developing the SIE.



- (5) Understanding power requires a dialectic, multi-dimensional perspective. To make conversations about power productive for understanding and facilitating social innovation in transitions, we need to acknowledge the many different dimensions of power, e.g. that power can be both constructive and destructive, oppressive and emancipatory, and so on. One of the most accessible ways to acknowledge different dimensions and complexity of power in an interdisciplinary and transdisciplinary context is to distinguish between power to, power over and power.
- (6) Transformative power is a particular combination of prefigurative power (capacity to new ways of doing, thinking and organising), reinforcing power (capacity to enforce structures and institutes), and countervailing power (capacity to challenge and dismantle existing structures and institutions). Social innovation is not just a matter of niche-actors exercising prefigurative power while incumbent regime-actors impede them by exercising reinforcing power. Instead, SIE-fields develop as niche-actors, intermediary actors as well as regime-actors interact with different kinds of power (to, over and with, prefigurative, countervailing and reinforcing power) that both strengthen and challenge the SIE-field.
- (7) The extent to which transformative power is exercised depends on complementary power exercised across SIE-fields and their initiatives. When it comes to assess transformative potentials, it might not only be key to consider the extent to which one specific SIE-initiative exercises transformative power, or even the extent to which transformative power is exercised within a SIE-field, but rather about the intersections between different SIE-fields and the dynamic interplay between those initiatives and fields.
- (8) Innovating government arrangements is facilitated through institutional isomorphism and through mimetic pressure (peer pressure among city and regional networks, e.g. cities implementing solutions because other cities have done so).
- (9) Novel governance arrangements depend on the existence of institutional structures (like policies and strategies) that operationalise sustainability goals and on individual engagement of institutional entrepreneurs (e.g. public officials promoting sustainable energy transitions).
- (10) The extent to which institutional entrepreneurs (those who introduce novel governance arrangements) can introduce changes (embed novel solutions in existing structures) depends on the support of political leadership and top management in city administration.
- (11) The introduction of novel governance arrangements (esp. multi-actor partnerships) is shaped by the scarcity of financial resources in state, regional, and local budgets. Multi-actor partnerships increase the possibility to obtain financial resources from external sources (e.g. the EU). Therefore, the framing of international or private financing schemes significantly influences innovating governance arrangements and, more broadly, sustainability-related change on national, regional, and local levels.



- (12) Scalar practices linked to the (dis)continuation of fossil fuels have consequences for the democratic legitimacy and accountability of existing fossil fuel energy pathways. Social mobilisations against fossil fuels as social innovation have been able to reinforce, assert and step up the politics surrounding fossil fuels by trying to hold actors linked to continuation activities to account based on climate change targets (Hielscher, Wittmayer and Dańkowska, 2022).
- (13) Actors linked to continuation activities need to make a case for fossil fuel within pathways towards sustainable energy whilst often upholding contradictory positions around climate change. They attempt to continue to support fossil fuel extraction by trying to evade democratic accountability through, for example, relocating the locus of decision making away from contested space, not acknowledging local impacts of fossil fuels in national policy making and linking the potential benefits of exploration and extraction projects to diverse localities and actors. Actors linked to continuation of fossil fuels relocate, contain and manage the politics surrounding fossil fuels (Hielscher, Wittmayer and Dańkowska, 2022).
- (14) The upscaling and diffusion of social innovation in energy depends not only on enabling innovation policies but in particular on supportive energy and climate policies.
- (15) The policy mix of relevance for a specific type of social innovation in energy differs from that of other types, therefore calling for type-specific, tailored policy support.

The deliverable closes with a short outlook to future research.

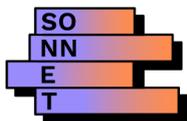
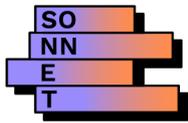


Table of Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 8 |
| 2 | Reflection on the typology of social innovation in energy..... | 9 |
| 3 | Conceptual advancements | 12 |
| | 3.1 Broadening our understanding of social innovation: towards its diversity..... | 13 |
| | 3.2 Going beyond individual SIE-initiatives: Examining diverse SIE-fields and their dynamics | 14 |
| | 3.3 Acknowledging power dynamics in social innovation: A heuristic for investigating power in sustainability transitions | 15 |
| | 3.4 Governing energy transitions: City administrations supporting and creating multi-actor collaborations | 16 |
| | 3.5 Mobilising for energy transitions: Scalar practices and their role in shaping articulations of political contestations..... | 17 |
| | 3.6 Policy mixes for social Innovation: Shining a light on policies as enabling and impeding factors | 19 |
| | Way forward | 21 |
| | Appendix 1: EC summary requirements..... | 26 |

Figures

| | |
|--|----|
| Figure 1. SIE Typology (Source: SONNET Energy Read #1, Mischkowski and Wittmayer, 2020)..... | 9 |
| Figure 2. Overview of SONNET framework (Source: Hielscher et al., 2020)..... | 12 |



1 INTRODUCTION

After having worked three years on social innovation in energy (SIE), the SONNET project has advanced the knowledge base around social innovation in energy in several ways. This working paper specifically focuses on the conceptual advancements that have been made and how these refine our initial conceptual understanding.

- First, trying to untangle the diversity of social innovation, SONNET has created and worked with a typology of social innovation in energy and therefore can share reflections on its usefulness and relevance.
- Second, untangling processes and contributions of social innovation, SONNET has conceptually advanced the field in numerous ways, which have mostly been captured through several (submitted and/or published) peer-reviewed scientific articles.

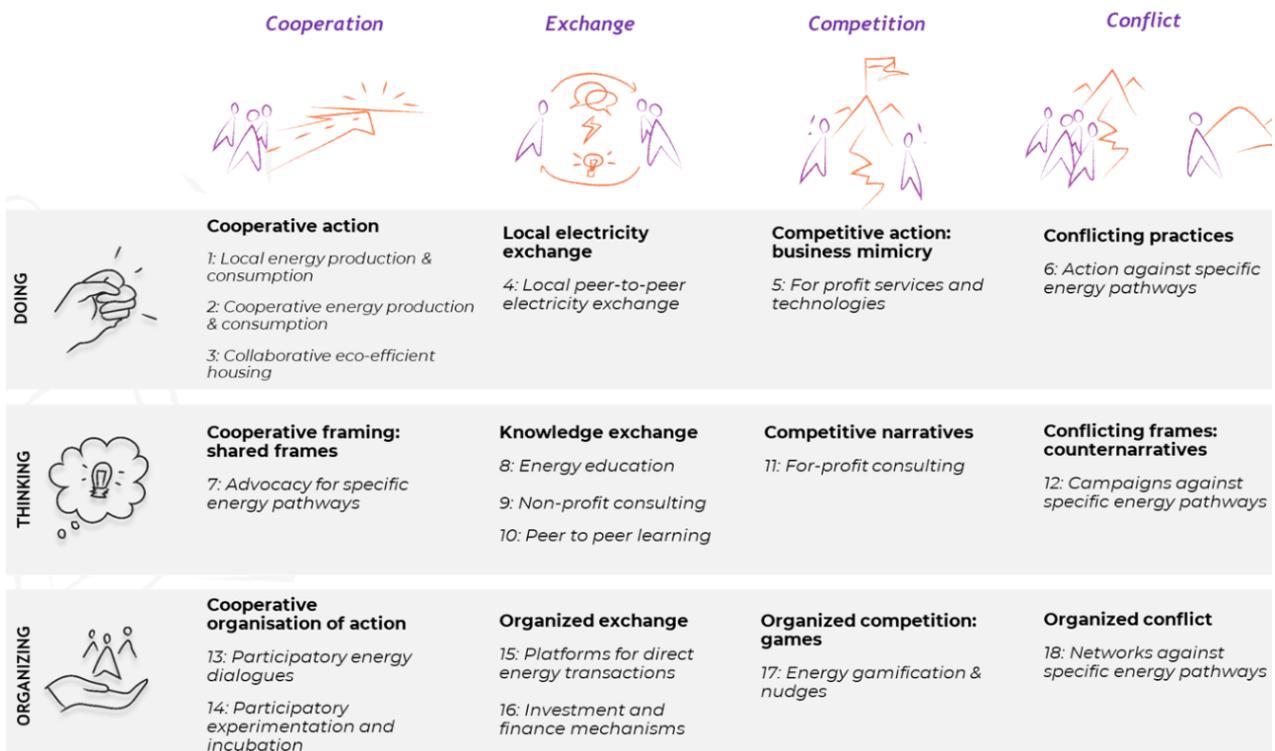
This deliverable aims to provide a reflection on the SIE typology as well as an overview of the project's conceptual advancements. In doing so it revisits our initial typology (D1.1; (Wittmayer, Fraaije, *et al.*, 2020)) and conceptual framework (D1.2; (Wittmayer, Hielscher, *et al.*, 2020)) and refines these based on the work done in the past three years. Each conceptual advancement that we zoom into is accompanied by working propositions, which can also practically inform transition processes towards more just, secure, sustainable, competitive, and affordable energy.

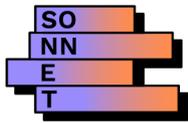
2 REFLECTION ON THE TYPOLOGY OF SOCIAL INNOVATION IN ENERGY

In SONNET, a typology of social innovation in energy (SIE) was developed to capture the diversity of SIE, and to investigate processes of SIE and their contribution to energy system transformations in a systemic way (Wittmayer, Fraaije, *et al.*, 2020; Wittmayer *et al.*, 2022). This typology is conceptually informed by work on social innovation, sustainability transitions and social science in energy and empirically grounded in a mapping of 500 SIE-initiatives. The typology highlights how energy system transformations are also driven by the changes in the manifold relations and roles of actors and the different activities they engage in.

SIEs are (combinations of) ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy (Wittmayer *et al.*, 2022). This is reflected in the two axes of the typology: ‘social relations as social interactions’ and ‘manifestations as new ways of doing, thinking and/or organising energy’. Social relations refer to the changing interactions between actors in society, and are described as cooperation, exchange, competition, and conflict in the typology. The manifestations refer to the ways in which SIE manifests in the energy sector, and are described as doing, thinking, and organising.

Figure 1. SIE Typology (Source: SONNET Energy Read #1, Mischkowski and Wittmayer, 2020)





This typology was used to inform the subsequent empirical work in SONNET, including the case studies in WP3 (Hielscher *et al.*, 2020; Hielscher and Wittmayer, 2021), the work on policy mixes (Rogge *et al.*, 2022) and power dynamics in WP2 (de Geus *et al.*, 2021), as well as the work on citizen surveys in WP5 (Guetelein and Schleich, 2022). Drawing on the typology for the empirical work over the past two years, the SONNET project team was able to learn about the usefulness and limitations of this typology. Lessons and reflections were shared and discussed during the inter- and transdisciplinary dialogue session as part of SONNET's consortium meeting in March 2022. These reflections and discussions were analysed by the DRIFT team and are outlined in what follows. In sum, the SIE typology was valued for its ability to serve as a communication device within the consortium and externally with practitioners of SIE; as well as for making the diversity of SIEs visible, and therewith accounting for the complexity of the topic under study. The limits of the typology lay in it being considered as (too) broad, fluid and at times counterintuitive.

Usefulness: communication device

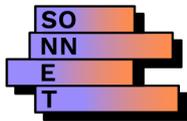
A dominant reflection concerned the usefulness of the SIE typology as a communication device. The typology helped to show what SIE is and how diverse it is. The typology was considered a useful communication device internally within the consortium, as well as externally with other actors involved in SIE.

Internally, the typology helped to communicate about the project and to create a shared understanding. This way, both city representatives and academics from across different disciplines involved in the consortium had a similar understanding of SIE that eased the process of developing a shared understanding of their diversity, processes and contributions. The typology also contributed to an improved communication within the project because it was easier to discuss concrete examples of SIE, and their emergence and development. Externally, the typology was useful to explain what SIEs are, the many ways in which they can make impact, and to make SIE empirically understandable for other actors. The dimension of doing/thinking/organising was considered particularly helpful to explain SIE to actors outside of SONNET.

Usefulness: making diversity visible

The SIE typology was also a useful means to make the diversity of SIE, its actors, and social relations visible. By distinguishing 18 different types along 4x3 dimensions, it was considered as accounting for the complexity of the topic under study. It showed that SIE go beyond energy cooperatives and made smaller and different processes within energy transitions visible.

As a result, the typology allowed, first, to systemically showcase different SIEs, as well as empirically investigate them. Second, it made it possible to differentiate between the kinds of policy support needed to enable SIE and to provide SIE type-specific policy recommendations. Third, the typology allowed for a deeper understanding of the roles of SIE in energy transitions by showing the different forms of engagement and the potential of actors to influence transition dynamics. Finally, it was appreciated that the typology provided room for discussion, for example, on the development of new types.



Limits: boundary problems

One of the main limitations encountered with the SIE typology concerned issues of where to draw the boundary of SIE – the main risk being that the typology be a ‘catch-all’ due to the broad underlying understanding of SIE and its focus on multi-actor relations. Also, boundaries between SIEs are fluid in practice. First, this raises the question of when an SIE falls into which category – for example which manifestation (new ways doing, thinking or organising) is an innovation primarily displaying? Or maybe a combination between them all? For developing the typology, we decided to focus on the manifestation that was most dominant. Second, this fluidity of boundaries also made it difficult to produce findings within types and across different types, seeing that empirical phenomena sometimes were hard to grasp. For example, studying an energy cooperative might be more straightforward than investigation local energy production and consumption in which several SIE-initiatives could fall beyond energy cooperatives. A last implication of fluid boundaries and a broad take on SIE is that it raised the question of when does innovation stop being a SIE? Such questions are important to ask when defining and categorising an SIE to understand its value and usefulness.

Limits: overcomplication

Some researchers and practitioners found it difficult to understand the typology not least because it is fine-grained and differentiates between 18 different types. The typology was also considered to need further translation to make it useful for practitioners, for instance, by providing examples of SIE within the types. Moreover, the typology could be counterintuitive to some, for example to the idea that conflictual relations are part of social innovation, or the fact that it is a categorisation of types of innovation and not of types of actors: i.e. energy cooperatives are then engaging in different types of SIE rather than constituting one type. Methodological considerations were that it could be difficult to operationalise the typology for empirical work, as there was a need to be more case-specific at times, seeing the types can encompass broad phenomena that are not easy to study within case studies (in particular when trying to set boundaries for the case study or developing a sampling strategy).

To sum up

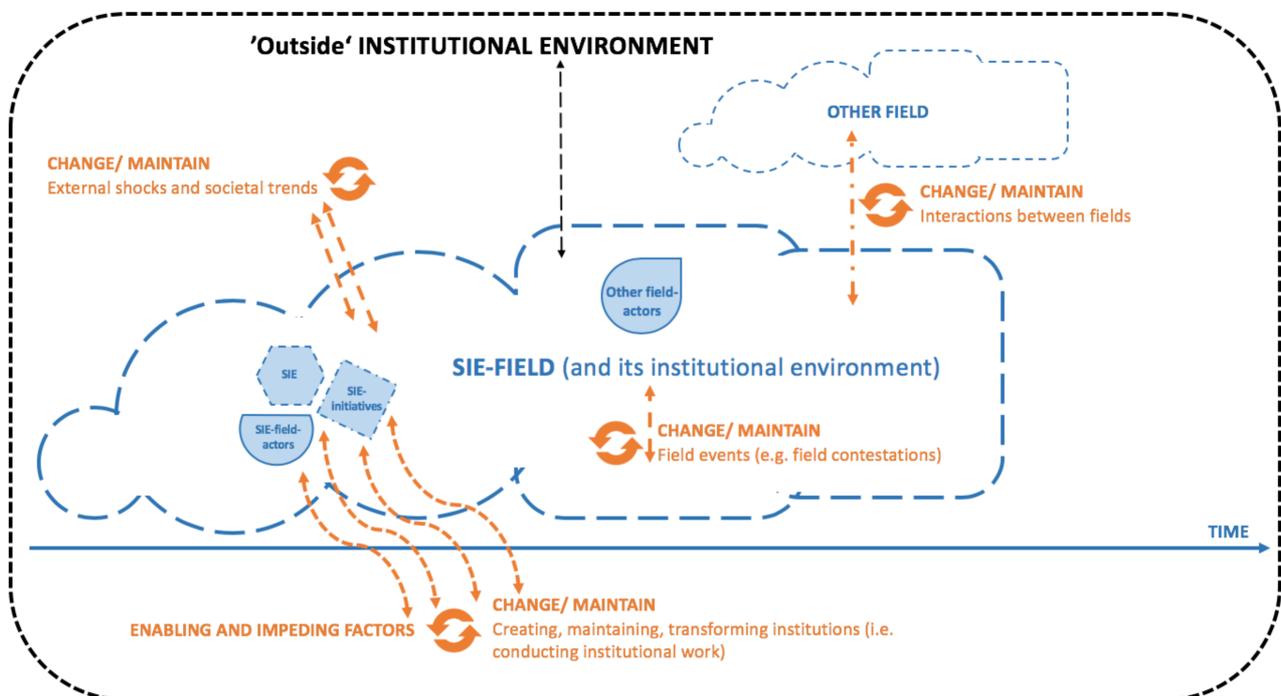
In sum, the strength of the SIE typology – its ability to account for complexity seems to also be its limitation. Attempting to showcase the breadth and depth of the phenomena also means that the typology does not oversimplify empirical phenomena. This broad take on social innovation makes it possible to showcase the diversity, but on the other hand, as other attempts of categorisation, runs the risks of fluid boundaries – that needs to be constantly reflected upon. Overall, however, these limitations do not seem to take away the communicative strength of such a matrix in opening discussions on what constitutes social innovations in energy transitions.

3 CONCEPTUAL ADVANCEMENTS

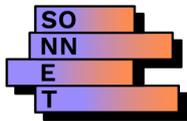
New ways of thinking, doing, and organising have to establish themselves within existing institutional structures - i.e., within entrenched rules, norms and thought patterns. The implementation of social innovations is therefore very much embedded in processes of institutional change. At the same time, actors actively participate in institutional change processes, attempting to shape and influence them according to their own goals (e.g. Rohde and Hielscher, 2021). Therefore, to understand social innovations and their transformative potentials, the analysis of institutional change is of great importance (Cajaiba-Santana, 2014; van der Have and Rubalcaba, 2016). In SONNET, we examine diverse social innovations as phenomena that are linked to breaking through existing institutions or creating new ones and always also contributing to some extent to the reproduction of the institutional order (Pel and Bauler, 2014). Considering that energy transitions are widely accepted which means that all actors (including more established ones in the system) need to change their ways of thinking, doing and organising energy. Such developments allow for investigations of institutional change in the making where actors collaborate and/or disagree over the direction and speed of changes.

Throughout the SONNET project, we have worked with a sensitising framework outlining our understanding of the diversity, processes and contributions of SIE (see Figure 1).

Figure 2. Overview of SONNET framework (Source: Hielscher et al., 2020)



Drawing on the empirical work within SONNET including six city labs and city policy networks, 18 case studies on SIE across 6 countries, and a mapping of 500 social innovation initiatives across 8 countries, several conceptual advancements have been achieved linked to literature derived from social innovation, sustainability transitions and social science energy research. These



advancements have mostly been developed and documented in scientific articles. The following sub-sections outline and contextualise each key advancement, formulate a set of working propositions for them and provide references for further reading to those interested.

3.1 Broadening our understanding of social innovation: towards its diversity

Social innovation in energy transitions has largely been approached as a bottom-up phenomenon driven by citizens and communities joining forces in grassroots initiatives (Hargreaves *et al.*, 2013; Smith *et al.*, 2016), energy cooperatives (Yildiz *et al.*, 2015; Bauwens, 2016) or other forms of community energy (Walker and Devine-Wright, 2008; Creamer *et al.*, 2019). In addition, social innovation is often defined as something inherently good that addresses societal challenges and urgent societal needs (Bureau of European Policy Advisers, 2011; Hoppe and de Vries, 2018). SONNET has moved beyond such narrow understandings of agency and purpose in social innovation by suggesting to broaden its understanding to allow for diverse actors driving social innovation, for including diverse, also emancipatory or transformative ends, for taking the social as entry point while acknowledging its material nature, and for its experimental nature (Wittmayer, de Geus, *et al.*, 2020). Taking such a broad understanding of social innovation, SONNET then proposed a comprehensive typology of social innovation that allows to capture the phenomenon in its empirical diversity, and to more systematically investigate processes of social innovation and their contributions to making socio-technical systems more sustainable. This typology allows to distinguish between different kinds of social interactions/relations (cooperation, exchange, competition, conflict) and different activities (new ways of doing, thinking and/or organising energy) (Wittmayer *et al.*, 2022).

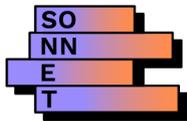
Working propositions:

- (1) To capture the diversity of social relations and the multitude of actors that come into play and/or need to redefine their roles and activities in existing energy transitions, a broad understanding of social innovation is needed – one that allows for capturing the diverse transition directions and transformative potentials (or not) involved (Wittmayer *et al.*, 2022).
- (2) As a category of innovation, social innovation slots in well with prevailing ways of making sense of energy matters and can therefore act as a boundary object between disciplines and across research, practice, and policy or more generally as an entry-point for inserting social science and humanity (SSH) insights into energy research, practice and policy more generally (Wittmayer, de Geus, *et al.*, 2020).

Continue reading

This conceptual work has been elaborated in the following journal articles:

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., Hartwig, A. (2020) Beyond instrumentalism:



Broadening the understanding of social innovation in socio-technical energy systems. *Energy Research & Social Science*. 70, 101689. <https://doi.org/10.1016/j.erss.2020.101689>.

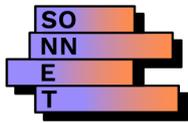
Wittmayer, J.M., Hielscher, S., Fraaije, M., Avelino, F. & K. Rogge (2022) A Typology for Unpacking the Diversity of Social Innovation in Energy Transitions. *Energy Research & Social Science* 88, 102513. <https://doi.org/10.1016/j.erss.2022.102513>.

3.2 Going beyond individual SIE-initiatives: Examining diverse SIE-fields and their dynamics

To be able to investigate institutional change, it is often not enough to look at the activities of individual initiatives and organisations (for example, an energy cooperative as a social innovation). Still, most of the research on social innovation examines specific initiatives and their networks (Wittmayer *et al.*, 2017). Taking fields as a unit of analysis and their emergence and development over time, helps to broaden the perspective, where the interactions of several actors (e.g. those enabling and impeding social innovations, derived from market, community or public) and diverse social innovations can be investigated. The field approach derived from institutional theory allows for such an investigation (Fligstein and McAdam, 2011) and is increasingly used in thinking about sustainability transitions (Kungl and Hess, 2021). Such an approach allows for an investigation of how emergent institutional arrangements linked to a social innovation are given legitimacy and solidify into a commonly shared system of meaning - that is, how they become institutionalised. This broader perspective thus brings into focus networks of initiatives, intermediaries, dominant institutional arrangements, and interactions between fields within institutional changes. It makes it possible to analyse the interactions between social innovations and structural conditions and thus to grasp the role of social innovations in broader transformation processes. In SONNET, we investigated six diverse SIE-fields and their emergence and development over time within energy transitions, deriving some insights for advancing a field perspective within the social innovation literature.

Working propositions:

- (1) Europe's energy systems are changing where many national governments have set decarbonisation goals. These changes have meant that more incumbent energy actors (e.g. existing energy companies) have had to change their usual way of working. The boundaries between SIE-field-actors and other field-actors have become increasingly blurred. It sometimes is no longer a David and Goliath story.
- (2) SIE-fields vary in the extent to which they fit into the existing energy systems and their transitions (or not). Some SIE-fields and their actors therefore challenge existing institutions more than others whereas other might maintain them. The speed and direction of transitions is partly determined in how far SIE-field-actors are able to create and challenge/disrupt institutions and hold onto their original aims when developing the SIE. (Hielscher *et al.*, 2021)



Continue reading

This conceptual work has been elaborated in the following SONNET deliverable, and is currently also written up as a journal article:

Hielscher, S., J.M. Wittmayer, K. Rogge, M. Iskandarova, B. Parrish, A.-L. Vernay, B. Buccolini (2021) Synthesis report on the comparative analysis of SIE-fields and their SIE-initiatives in six countries: Encouraging the diversity, processes and contributions of SIE. Deliverable 3.3. SONNET: EU Horizon 2020 Grant agreement no: 837498.

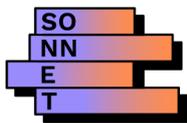
Wittmayer, J.M. & S. Hielscher (under development) Changes in social relations in energy transitions: Investigating social innovation processes.

3.3 Acknowledging power dynamics in social innovation: A heuristic for investigating power in sustainability transitions

Both the fields of social innovation and sustainability transitions have been elaborately critiqued for ignoring or downplaying the role of power in processes of innovation and transition (Swyngedouw, 2005; Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Stirling, 2010; e.g. Ayob, Teasdale and Fagan, 2016). These critiques are often accompanied/ followed by attempts to review literature on power and to synthesise conceptualisations of power in relation to innovation and transformative change (e.g. Avelino, 2017; Brisbois, 2019). Several of these studies have focused on the energy sector. While there is increasing attention to notions and theories of power in the fields of transition research and energy studies, and – to a lesser extent – in social innovation research, there has – as far as we know – not yet been research that explicitly links social innovation in energy transitions in explicit power terms. In SONNET, we developed a conceptual framework/ heuristic to think about power that is simple enough for an interdisciplinary and transdisciplinary context while at the same time acknowledging the multidimensional complexity of power.

Working propositions:

- (1) Understanding power requires a dialectic, multi-dimensional perspective. To make conversations about power productive for understanding and facilitating social innovation in transitions, we need to acknowledge the many different dimensions of power, e.g. that power can be both constructive and destructive, oppressive and emancipatory, and so on (Avelino 2021). One of the most accessible ways to acknowledge different dimensions and complexity of power in an interdisciplinary and transdisciplinary context is to distinguish between power to, power over and power with (De Geus *et al.*, under review, cf. Avelino *et al.*, under review).
- (2) Transformative power is a particular combination of prefigurative power (capacity to new ways of doing, thinking and organising), reinforcing power (capacity to enforce structures and institutes), and countervailing power (capacity to challenge and dismantle existing



structures and institutions). Social innovation is not just a matter of niche-actors exercising prefigurative power while incumbent regime-actors impede them by exercising reinforcing power. Instead, SIE-fields develop as niche-actors, intermediary actors as well as regime-actors interact with different kinds of power (to, over and with, prefigurative, countervailing and reinforcing power) that both strengthen and challenge the SIE-field (Avelino *et al.*, under review).

- (3) “The extent to which transformative power is exercised depends on complementary power exercised across SIE-fields and their initiatives. When it comes to assess transformative potentials, it might not only be key to consider the extent to which one specific SIE-initiative exercises transformative power, or even the extent to which transformative power is exercised within a SIE-field, but rather about the intersections between different SIE-fields and the dynamic interplay between those initiatives and fields” (Avelino *et al.*, under review).

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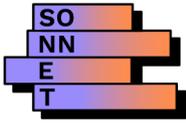
This conceptual work has been elaborated in the following journal articles (currently under review):

Power to, over and with: exploring the transformative power of social innovations in energy transitions across Europe.

Making Sense of Power through transdisciplinary process-oriented sustainability and action research: Insights from a Transformative Power Lab.

3.4 Governing energy transitions: City administrations supporting and creating multi-actor collaborations

Local governance processes have also been argued to play an important role in energy transitions (Torrens *et al.*, 2019; Brugger and Henry, 2021). City administrations have been allocated key rights and responsibilities to enable changes to energy systems (Feldhoff, 2016), including looking after local energy supply, urban planning and housing infrastructures. As part of these developments, city administrations have started to develop new, collaborative governance arrangements for sustainable urban energy transitions, working with diverse urban actors to push energy transitions forward (Torrens *et al.*, 2019). They initiate, enable and facilitate these processes with differing intensity and diverse means ranging from establishment of networks, implementation of sustainability policies, and more recently through urban experimentations (Broto and Bulkeley, 2013; Raven *et al.*, 2019). Work on (urban) transitions and transformations has been built on and reached out to institutional theories (Fuenfschilling and Truffer, 2016; Fuenfschilling, Frantzeskaki and Coenen, 2019; Köhler *et al.*, 2019), but rarely for investigating intraorganisational processes taking place within city administration and the interconnectedness of these processes with external pressures towards urban energy transitions. In SONNET, we investigated how city administration internally builds skills and structures enabling governance of energy transitions to respond by fitting in existing institutions, developing new institutions and multi-actor



collaborations, and sometimes creating new opportunities for urban transitions. This view “from within” a city administration is a topic that is rarely investigated and attempts to advance the urban transitions literature. The following propositions explain and contextualise governance innovating as a process where fitting in (propositions 1 and 4) and creative design (propositions 2 and 3) are intertwined (Strumińska-Kutra *et al.*, under review).

Working propositions:

- (1) Innovating government arrangements is facilitated through institutional isomorphism and through mimetic pressure (peer pressure among city and regional networks, e.g. cities implementing solutions because other cities have done so).
- (2) Novel governance arrangements depend on the existence of institutional structures (like policies and strategies) that operationalise sustainability goals and on individual engagement of institutional entrepreneurs (e.g. public officials promoting sustainable energy transitions).
- (3) The extent to which institutional entrepreneurs (those who introduce novel governance arrangements) can introduce changes (embed novel solutions in existing structures) depends on the support of political leadership and top management in city administration.
- (4) The introduction of novel governance arrangements (esp. multi-actor partnerships) is shaped by the scarcity of financial resources in state, regional, and local budgets. Multi-actor partnerships increase the possibility to obtain financial resources from external sources (e.g. the EU). Therefore, the framing of international or private financing schemes significantly influences innovating governance arrangements and, more broadly, sustainability-related change on national, regional, and local levels.

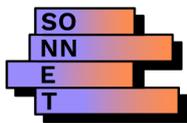
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This conceptual work has been elaborated in the following journal article:

Innovating urban governance for sustainability transitions. Between institutional design and adaptation.

3.5 Mobilising for energy transitions: Scalar practices and their role in shaping articulations of political contestations

Over the past decade, fossil fuel energy pathways have been characterised by closures of sites, continued extractions and new explorations, demonstrating processes of (dis)continuation. The role of social mobilisations within the (dis)continuation of fossil fuel energy pathways in energy transitions have remained relatively underexplored in social innovation in energy transitions. We



investigated the politics of such (dis)continuation of fossil fuel pathways by drawing on insights from a body of literature that focuses on geographical processes. We have particularly focused on the work of the politics of scales (e.g. Swyngedouw, 1997) and within it scalar practices (e.g. Fraser, 2010), which have recently been linked to contested fossil fuel energy pathways (e.g. Cotton, 2017; Nyberg, Wright and Kirk, 2018). Building on the work of the politics of scale, MacKinnon (2011) has argued to replace this notion with the concept of scalar practices, stating that it is often not scale per se that is the prime object of contention, but rather specific processes and institutionalised practices that are themselves differently scaled. Our research demonstrates how scalar practices can change and who is able to get involved in and intervene in such policy processes, as illustrated by the UK Secretary of State's ability to over-rule local planning application decisions around shale gas to speed up the process for the fossil fuel industry. Such inventions of national policies into local decision-making processes "*remove powers from local communities for decision-making control by rescaling decisions from local to national scales*" (Cotton, 2017, p. 198). Little work has gone into identifying such different scalar practices, and SONNET offers a key contribution in this area, confirming earlier propositions of Fraser (2010). Fraser (2010, p. 332) has identified scalar practices to be attempts of actors who "*'produce' and 'use' scale [...] to create some sort of advantage, to establish associations, connections, or solidarities across social divides, or to represent their interests... amidst oppressive or otherwise difficult conditions*".

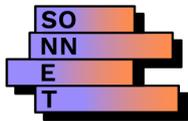
Working propositions:

- (1) Scalar practices linked to the (dis)continuation of fossil fuels have consequences for the democratic legitimacy and accountability of existing fossil fuel energy pathways. Social mobilisations against fossil fuels as social innovation have been able to reinforce, assert and step up the politics surrounding fossil fuels by trying to hold actors linked to continuation activities to account based on climate change targets (Hielscher, Wittmayer and Dańkowska, 2022).
- (2) Actors linked to continuation activities need to make a case for fossil fuel within pathways towards sustainable energy whilst often upholding contradictory positions around climate change. They attempt to continue to support fossil fuel extraction by trying to evade democratic accountability through, for example, relocating the locus of decision making away from contested space, not acknowledging local impacts of fossil fuels in national policy making and linking the potential benefits of exploration and extraction projects to diverse localities and actors. Actors linked to continuation of fossil fuels relocate, contain and manage the politics surrounding fossil fuels (Hielscher, Wittmayer and Dańkowska, 2022).

Continue reading

This conceptual work has been elaborated in the following journal article:

Hielscher, S., Wittmayer, J.M., Dańkowska, A. (2022) Social mobilisation in energy transitions: Scalar practices in contested fossil fuel energy pathways in the United Kingdom, the Netherlands and Poland. *The Extractive Industries and Society*, 101073. <https://doi.org/10.1016/j.exis.2022.101073>.



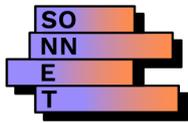
3.6 Policy mixes for social Innovation: Shining a light on policies as enabling and impeding factors

The emerging literature on policy mixes for sustainability transitions has so far paid very limited attention to social innovation (Rogge, Kern and Howlett, 2017; Kern, Rogge and Howlett, 2019), which is at odds with recent claims that transformative policies need to promote a wide array of innovation, and social innovation in particular (Schot and Steinmueller, 2018; Jacob and Ekins, 2020). Likewise, social innovation scholars have not yet applied the logic of policy mix thinking to their research. In SONNET, we have therefore made efforts to better connect social innovation research with policy mix research. We have defined policy mixes of relevance for social innovation as encompassing policy strategies and instrument mixes at different governance levels and policy fields which enable or impede the development of social innovation, and have evolved incrementally over many years (building on Kern and Howlett, 2009; Rogge and Reichardt, 2016). Primarily based on the analysis of SIE-fields in our SONNET case studies, we have explored whether and how policy mix delineation and analytical approaches developed primarily for technological innovation can also be usefully applied to social innovation. We have also discussed our lessons-learned in a policy dialogue in Brussels and with our SONNET city partners.

For policy mix delineation we have shown, using the empirical case of participatory incubation and experimentation in Germany, that the top-down and bottom-up approach suggested by Ossenbrink et al (2019) can also be applied to social innovation. For the analysis of the focal policy mix, we have developed an analytical framework that bridges policy mix elements (policy strategy, instrument mix) and policy mix functions (creation, destruction) in a 2x2 matrix (thereby combining Kivimaa and Kern, 2016; Rogge and Reichardt, 2016), and have empirically tested it. Based on this analysis, we have pointed to shortcomings in policy mix conceptualisations regarding the consideration of social innovation, particularly regarding instrument purposes. Therefore, we have suggested to introduce a distinction that specifically includes social innovation: either by adding “social innovation” as fourth category next to technology push, demand pull, and systemic policy purposes; or by distinguishing between socio-technical push vs socio-technical pull. In addition, we have proposed a holistic and dynamic policy mix conceptualisation for socio-technical transitions that distinguishes, on the one hand, between primary innovation type (technological, socio-technical and social innovation), and, on the other hand, between transition phases (emergence and acceleration phase of transitions). Finally, we have also looked into the policy making processes around policy mixes for social innovation and for these have suggested concrete action points in four priority areas, that would, together, allow for a greater recognition of social innovation in energy and climate policy making, such as in the Fit for 55 package.

Working propositions:

- (1) The upscaling and diffusion of social innovation in energy depends not only on enabling innovation policies but in particular on supportive energy and climate policies.
- (2) The policy mix of relevance for a specific type of social innovation in energy differs from that of other types, therefore calling for type-specific, tailored policy support.



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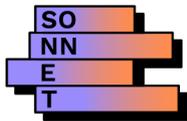
This conceptual work has been elaborated on in the following journal article (currently under review):

Policy mixes for social innovation? The case of participatory incubation and experimentation in energy in Germany.

Fit for social innovation? Policy mix reflections for EU energy and climate policy making.

Also, our policy work has been incorporated in the joint policy brief created together with three other EU-funded research projects:

COMETS, NEWCOMERS, SocialRES and SONNET (2022): Putting people at the heart of energy transitions. Social innovation in energy: four projects shine a light on the path forward. Policy brief, April 2022. Brussels/Antwerp: COMETS, NEWCOMERS, SocialRES, SONNET H2020 projects. Available online [here](#).

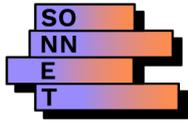


WAY FORWARD

SONNET has set out to let three bodies of scholarship talk to each other: sustainability transitions literature and research on social innovation and on social science in energy. Drawing from these, and specifically also on writings on institutional theory, SONNET has developed a sensitising framework in its first year (D1.2; (Wittmayer, Hielscher, *et al.*, 2020)) and since then has focused on six conceptual advancements relating to the understanding of social innovation, its multi-actor nature, power dynamics, governance in cities, broader mobilisation processes and policy mixes for social innovation.

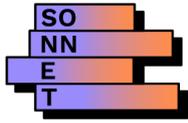
There is more to be done and in closing this piece, we share a set of future research avenues:

- (3) First, the **SIE typology** was an ambitious undertaking covering a diverse sample from eight European countries. Future studies are needed to verify and possibly expand on the typology considering that SIEs still emerge and develop over time.
- (4) Second, using **a fields perspective**, helps to better study and understand inter-field dynamics and interactions: how different fields relate to one another and potentially bring about transformative change in energy systems.
- (5) Third, the **power heuristic** can be further developed through additional theoretical, empirical and methodological reflections. This includes feminist work on “power within”, i.e. focusing on processes of socialisation where certain groups like e.g. women accept and normalise unequal power relations. Methodologically, it would be interesting to apply the heuristic in a variety of knowledge co-production processes, including more critical attention to the role that researchers play in the power dynamics of knowledge co-production around SIE (Strumińska-Kutra and Scholl, 2022). Empirically, more attention is needed for the power dynamics between fields and how these are co-shaping energy transitions.
- (6) Fourth, analysis of **governance of energy transitions** (and SIE governance) could benefit from an explicit focus on strategic governance learning and on the complementary nature of different governance modes (hierarchies, markets and networks). Future studies could also more closely explore the multilevel nature of governance processes, while focusing specifically on the often-contradictory agendas and tensions that exist between city level and state level governance.
- (7) Fifth, future research on **scalar practices** could add to our list of investigated scalar practices linked to the (dis)continuation of fossil fuels. Moreover, more work could go into developing a meta-classification of scalar practices derived from investigating diverse practices to develop recommendations for social movements on how to learn from them for their own purposes and/or develop strategies to keep up the politics surrounding fossil fuels.
- (8) Sixth, **policy mix thinking and analysis** should be applied more widely- and with multiple qualitative and quantitative methods - to generate evidence on the effectiveness of policies - from various governance levels and policy fields - for enabling or impeding social innovation in energy, but also in other sectors requiring sustainability transitions.

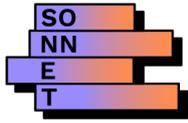


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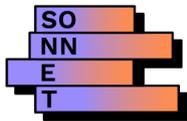
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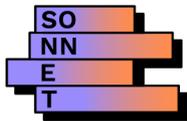
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Appendix 1: EC summary requirements

Changes with respect to the DoA

There are no changes in this deliverable as compared to the outline in the description of work.

Dissemination and uptake

This deliverable works as a working paper reflecting on and outlining the main conceptual advancements made by the SONNET project team. In doing so, it draws on numerous academic publications (both submitted and published) as well as one deliverable. This paper will be shared on the SONNET website as well as the Zenodo platform along with the open-access academic publications.

Short Summary of results (<250 words)

The SONNET project has advanced the knowledge base around social innovation in energy in several ways, and this working paper firstly, reflects on the usefulness and relevance of a typology of social innovation, and secondly, outlines six conceptual advancements. Drawing on three bodies of scholarship: sustainability transitions, social innovation and social science in energy, SONNET has developed a sensitising framework in its first year (D1.1) and since then has brought forth six conceptual advancements relating to: 1) the understanding of social innovation, 2) its multi-actor nature, 3) power dynamics, 4) governance in cities, 5) broader mobilisation dynamics and 6) policy mixes for social innovation.

Evidence of accomplishment

This deliverable and associated documents.

