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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

Report on preliminary typology of social innovation in the energy sector

SONNET Deliverable D1.1

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PROJECT PARTNERS

No	Participant name	Short Name	Country code	Partners' logos
1	Fraunhofer Society, with its Fraunhofer Institute of Systems and Innovation Research (Fraunhofer ISI)	ISI	DE	
2	Dutch Research Institute for Transitions	DRIFT	NL	
3	University of Sussex, with its Science Policy Research Unit (SPRU)	UoS	UK	
4	Grenoble Ecole de Management	GEM	FR	
5	Akademia Leona Kozminskiego	ALK	PL	
6	Zuercher Hochschule for Applied Research	ZHAW	CH	
7	ICLEI European Secretariat	ICLEI	DE	
8	City of Mannheim	MANN	GER	
9	City of Antwerp	ANTW	BE	
10	City of Bristol	BRIS	UK	
11	City of Grenoble	GREN	FR	
12	City of Warsaw	WARS	PL	
13	City of Basel (Associated Partner)	BASE	CH	

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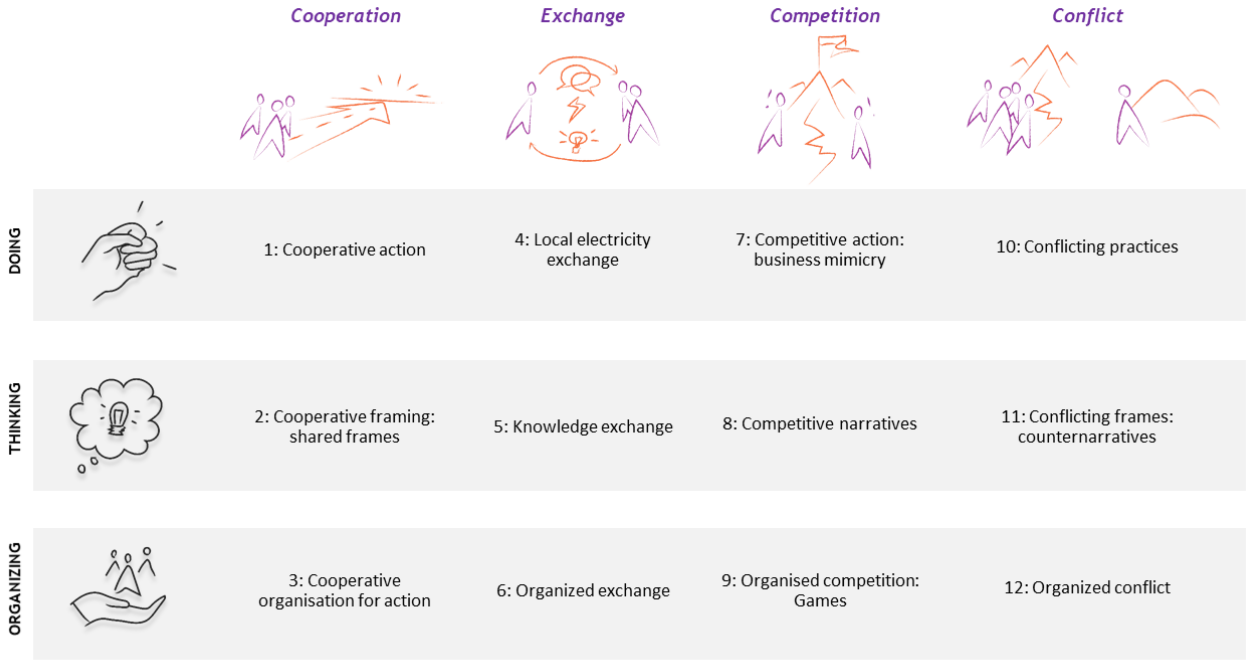
Executive Summary

SONNET (Social innovation in Energy Transitions) aims to co-create a rich understanding of the diversity, processes, contributions, successes and future potentials of social innovation in the energy sector (SIE). This report addresses SONNET's objective 1, namely, to ***capture the diversity of SIE in Europe within a comprehensive SIE typology***.

The typology presented in this report is a *preliminary* typology of social innovation in energy to be refined towards the end of the SONNET project based on empirical findings. The preliminary typology characterises SIE as socio-technical configurations of ideas, action and/or objects that change social relations and involve new ways of doing, thinking and organizing. These socio-technical configurations are categorised in a matrix along two variables: (a) social interactions (cooperation, exchange, competition, conflict), and (b) manifestations in the energy sector (doing, thinking, organising). The resulting typology - shown in the summary figure below – includes 12 types of SIE, each of which are socially innovative to the extent that they actually change social relations and to the extent that their ways of doing, thinking and/or organising energy deviate from the dominant ways of doing, thinking and organising in current energy systems. The typology does not specify to what extent the socio-technical configurations are social innovative, or how social relations are changed. Instead, the extent, direction, quality and scale of change is open for empirical exploration.



This deliverable explains in detail how SONNET's SIE typology was developed, what methodological choices were made, and what empirical data was collected so far to substantiate and describe the different types of SIE. The SONNET team mapped 500+ different SIE initiatives across the six SONNET countries and regions (France, Germany, Poland, Switzerland, United Kingdom and the

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Benelux region, covering Belgium, Luxembourg and the Netherlands), with a specific focus on the SONNET cities (Mannheim, Antwerp, Bristol, Grenoble, Warsaw and Basel). This mapping was done in an iterative process that served to sharpen our understanding of what counts as SIE and also how it manifests in the energy sector. Through providing a more operational understanding of the different manifestations of SIE-initiatives, the mapping thus also informed the otherwise deductive typology development.

Concretely, this typology differentiates between 12 different types of configuration of ideas, actions and/or objects that are socially innovative to the extent that they actually change social relations involving new ways of doing, thinking and/or organising energy. The typology allowed us to classify a broad diversity of empirical examples of SIE, which in turn allowed us to embed the typology empirically and to provide descriptions and flesh to the different types.

As such, it will serve as starting point to empirically explore the types of SIE in the further SONNET work. This report also outlines further steps for developing the typology with the goal of having a more consolidated version towards the end of the SONNET project.

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1 INTRODUCTION

SONNET (Social innovation in Energy Transitions) aims to co-create a rich understanding of the diversity, processes, contributions, successes and future potentials of social innovation in the energy sector (SIE). This report fulfils SONNET's objective 1, namely, to ***capture the diversity of SIE in Europe within a comprehensive SIE typology***. It is situated in work package 1, which (amongst others) provides the knowledge base and conceptual framework for the overall project activities at the beginning of the project. To aid the development of a meaningful typology, the SONNET team mapped 500+ different SIE initiatives across the six SONNET countries and regions (France, Germany, Poland, Switzerland, United Kingdom and the Benelux region, covering Belgium, Luxembourg and the Netherlands), with a specific focus on the SONNET cities (Mannheim, Antwerp, Bristol, Grenoble, Warsaw and Basel).

The typology presented in this Deliverable 1.1 is a ***preliminary typology*** that should allow for a differentiated analysis of SIE across all SONNET work packages. The typology provides input into the investigation of novel governance arrangements (WP2), the selection of SIE-initiatives for the in-depth case study analysis (WP3), the transdisciplinary city labs (WP4), the citizen surveys (WP5), and the characterisation of successful SIEs (WP6). Based on SONNET's empirical evidence, a refined version of the typology will be reported on in D1.4 toward the end of the project.

D1.1 Report on typology and characterisation of social innovation in the energy sector
Deliverable D1 captures the diversity of the SIE phenomena. It consists of two parts, firstly a mapping of about 500 different SIE-initiatives across the SONNET countries and secondly, a characterisation of different types of social innovation in the energy sector.

Task 1.2 Typology of social innovation in the energy sector based on a broad mapping (M3-M7) (8%)
Lead: DRIFT, co-lead: UoS, supported by: Fraunhofer ISI, further involvement: all partners.
This task aims to develop a meaningful typology of different types of SIE that captures the diversity of the SIE phenomena. To this end, the SONNET team maps about 500 different SIE-initiatives across the six SONNET countries, with a specific focus on the SONNET cities. At the first F2F project meeting a procedure is agreed for the identification of SIE-initiatives (M.15), which draws on input from the literature and project review (T1.1), a web-search of SIE-initiatives, social media analysis and 2-4 telephone conversations with intermediary organisations (e.g. energy charities). Based on this procedure, each academic partner collates a map of SIE-initiatives for their country and SONNET city. The SONNET city partners act as validators of the collated map. Based on this map, we draw up a preliminary typology and characterisation of SIE. The typology is elaborated through a web-based small workshop (M3) and feedback by the consortium is gathered through a dedicated consultation process.
(Source: Grant Agreement, p93/96)

In section 2, we provide an overview of the current thinking on social innovation in energy. We then outline our methodological approach towards developing a SIE typology and the mapping of 500+ SIEs in Europe (section 3). In section 4 we present our result, the different types of SIE. We conclude the report hinting towards limitations of our approach, as well as providing recommendations for the further development of the typology.

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2 SOCIAL INNOVATION IN ENERGY

2.1 Introduction

The concept of social innovation has been rapidly taken-up in policy and research in the last years (Edwards-Schachter and Wallace 2017; Harsløf 2015; van der Have and Rubalcaba 2016; Krlev et al. 2019). While many different definitions are used, all of these share an interest in the social (whether social practices or social relations) as object of innovation (Avelino, Wittmayer, et al. 2019; Howaldt and Schwarz 2010; McGowan, Westley, and Tjörnbo 2017; Moulaert and MacCallum 2019; Mulgan et al. 2007; Murray, Caulier-Grice, and Mulgan 2010). Despite the only recent uptake in research and innovation policy, the concept of social innovation has a long history dating back to the early 19th century (e.g. (Godin and Vinck 2017; van der Have and Rubalcaba 2016)). This long history adds to the multiplicity of meanings, orientations and uses of social innovation in different public, policy and scientific discourses.

Arguably, policy and research in the energy sector have been focusing on social dimensions (Miller, Iles, and Jones 2013; Sovacool 2014) and have shown interest in the social as object of innovation for longer (e.g. (Seyfang and Smith 2007; Walker and Devine-Wright 2008)) – however, the concept of 'social innovation' has not been picked up until recently. In the last years, the concept of social innovation is more and more explicitly used, surely also encouraged through the European Union's 2020 work programme in energy research and its implicit support of social innovation as means to mainstream Social Sciences and Humanities in otherwise more technically oriented energy research[1]. Social innovations in the energy sector are considered to span both supply and demand in different sectors such as mobility, heat, electricity and ICT, and entail the active contributions from consumers, citizens and organisations that go beyond the purchase and adaptation of low carbon technologies. The diversity of such SIE is widely recognised (Seyfang and Haxeltine 2012; Smith et al. 2016)

The concept has been taken up in energy research often in its instrumental meaning as a tool to shape society (as argued by (Haxeltine, Pel, Wittmayer, et al. 2017; Jessop et al. 2013; Frank Moulaert et al. 2013)). The pervasive definition of social innovation as introduced by the Bureau of European Policy Advisors is often used as orientation. It defines social innovation as "new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. In other words, they are innovations that are not only good for society but also enhance society's capacity to act" (Bureau of European Policy Advisers 2011). This quality of being 'inherently good' is taken up by scholars working on a conceptualization of social innovation in energy. This includes for example (Hewitt, Bradley, Baggio, Barlagne, et al. 2019), who define SIE as the "reconfiguring of social practices in

[1] Specifically, in the 2018-2020, investments were dedicated to support R&D on the role of social innovation in the energy sector (e.g. https://cordis.europa.eu/programme/rcn/704431/en).

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response to societal challenges, with the aim of improving societal well-being through the engagement of civil-society actors" (Hewitt, Bradley, Baggio, and Barlagne, et al. 2019). Or also (Hoppe and de Vries 2018), who define SIEs as "contribut[ing] to low-carbon energy transition, civic empowerment and social goals, [for] the general well-being of communities." Social innovation is thus considered as a means to achieve specific energy-related social goals, but also as a counterpart to or extension of technological innovation (e.g. (Dóci, Vasileiadou, and Petersen 2015; Karvonen 2013)). In the light of this narrow and instrumental understanding of social innovation, it has been argued to depart from a broader understanding of social innovation, in terms of its directionality, actors and agency, its object of innovation and modes of governance (Wittmayer et al. under review[2]).

There is little academic work that has explicitly focused on SIE, thus work that has conceptualised SIE, developed characteristics of SIE and/or grounds differences between types of SIE on clearly developed variables. Few scholars explicitly link social innovation and the energy sector in a way that results in the distinction of SIE types. Rather than distinguishing types of SIE more broadly, (Hewitt, Bradley, Baggio, Barlagne, et al. 2019), for example, focus on community energy as social innovation and distinguish types of organisational actors in community energy, namely REScoops, Community Development Trusts, Local Government Projects with citizen participation, public-private partnerships, private companies, and other grassroots initiatives. There is a handful of publications that develops typologies of actors (such as cooperatives, communities, users) (Bauwens, Huybrechts, and Dufays 2019; Schot, Kanger, and Verbong 2016; Yildiz et al. 2015) or projects (Haggett et al. 2013; van Veelen 2017; Walker and Devine-Wright 2008). Based on analysing the 20 contributions to their special issue on 'Social Innovations in the Energy Transition', (Hoppe and de Vries 2018) formulate key topics relevant to SIE, which provide a good starting point to think about a typology. These key topics are: 1) technological innovation leading to new market models, actor configurations, and institutional settings creating room for social innovation; 2) new governance arrangements; 3) community energy, its impact, implications, and social incentives and policy to empower it; 4) new participative research approaches to test and learn from livings labs and best practices; 5) 'green nudges' to stimulate behavioural change; and 6), serious energy games. Through their work in the EU-funded research project SI-DRIVE, (Ooms, Huygen, and Rhomberg 2017) identified three SIE practice fields for renewable energy initiatives: energy collectives (e.g. collective purchasing, energy cooperative, business collectives, co-housing), local production of energy (local production of biofuels, biogas or heat) and providing examples and inspiration (e.g. renewable energy model regions)

[2] Wittmayer, Julia M., de Geus, Tessa, Pel, Bonno, Avelino, Flor, Hielscher, Sabine, Hoppe, Thomas, Mühlemeier, Susan, Stasik, Agata, Oxenaar, Sem, Rogge, Karoline S., Visser, Vivian, Marín-González, Esther, Ooms, Merel, Buitelaar, Saskia, Foulds, Chris, Petrick, Kristian, Klarwein, Salvador, Krupnik, Seweryn, de Vries, Gerdien, Wagner, Aleksandra, Hartwig, Anja (December 2019, under review) A means to an end? Broadening the understanding of social innovation in energy. International peer reviewed journal.

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2.2 SONNET's take on social innovation in energy

SONNET takes a broad understanding of social innovations in energy as a starting point (Wittmayer et al. under review[3], based amongst others on (Avelino et al. 2019; Haxeltine, Pel, Dumitru, et al. 2017; F. Moulaert et al. 2017; Schubert 2018; Unger 2015)). It does so, to extend beyond on the one hand an instrumental and necessarily narrow view on the scope and societal significance of social innovation and on the other hand the critiques on the concept. Doing so should enable SONNET to capture the diversity of social innovation in the energy sector and not to rule out relevant phenomena for studying innovations in the 'social'. For example, by focusing on community energy only, we could lose sight on what other socially innovative actors are doing (B. Pel et al. 2019) or by focusing on specific policy goals that social innovations should add up to, we might downplay the transformative potential it could have to challenge societal structures more fundamentally.

Taking such a broader understanding of social innovation includes to not link the means with an end and thus to keep open what social innovations are contributing. Moreover, we understand social innovation as a multi-actor endeavour that can be initiated by and is engaged with by different societal actors – thus not only by grassroots but also by local governments or businesses. Taking a broader perspective, means that a focus on the social as object of innovation also includes its interrelation with technological, material and ecological aspects. And it broadens it out to reach beyond top-down policy implementation towards transformative governance (Wittmayer et al. under review). Building on the work of (Avelino et al. 2019; Haxeltine et al. 2018; Haxeltine, Pel, Dumitru, et al. 2017), SONNET studies social innovations in energy as changes in social relations, involving new ways of doing, thinking, and/or organising energy. Social innovations can refer to (combinations of) ideas, objects and/or activities. These are 'socially innovative' to the extent that they imply/demonstrate a change in social relations associated with new ways of doing, thinking and/or organising.

Social innovations in the energy sector (SIE) are (combinations of) ideas, objects and/or activities that change social relations and involve new ways of doing, thinking and organising energy.

Important to note is that firstly, we distinguish social innovation from actors or groups of people who can be socially innovative and enact or bring about social innovations – these are referred to as social innovators or *social innovation actors*. Secondly, with 'new', we do not necessarily refer

[3] Wittmayer, Julia M., de Geus, Tessa, Pel, Bonno, Avelino, Flor, Hielscher, Sabine, Hoppe, Thomas, Mühlemeier, Susan, Stasik, Agata, Oxenaar, Sem, Rogge, Karoline S., Visser, Vivian, Marín-González, Esther, Ooms, Merel, Buitelaar, Saskia, Foulds, Chris, Petrick, Kristian, Klarwein, Salvador, Krupnik, Seweryn, de Vries, Gerdien, Wagner, Aleksandra, Hartwig, Anja (December 2019, under review) A means to an end? Broadening the understanding of social innovation in energy. International peer reviewed journal.

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to things that are entirely new, rather we also refer to '*renewed' phenomena* in terms of "re-discovering, re-inventing, re-using, re-vitalizing and translating forgotten, lost or abandoned ways of doing, thinking and organising of the past. Innovation is just as much about new combinations of old things, as it is about integrating new things into existing contexts" (TSImanifesto, 2017[1]). And finally, *social innovations in energy are about energy, they have* a clear link with or are primarily focusing on energy (understood as electricity and heat). This concerns production, transmission/distribution, trading/storage and/or consumption (incl. saving/efficiency).

The typology we are developing aims at describing different types of social innovation in energy. To start with, this includes different (combinations of) ideas, objects and/or activities, which we refer to as **'socio-technical configuration'** (see Table 1) (Bonno Pel et al. 2019).

Table 1: Overview of elements of a socio-technical configuration

Elements of a socio-technical configuration	**Operationalisation**	**Example: Cooperative heat provision**
Ideas	narratives (incl. beliefs, discourses, framings, …); rules (incl. informal and formal rules, policies, laws & regulations, …); knowledge (incl. information, facts, figures, how-to, …); expectations and visions; …	heat provision through decentral/small scale community-owned organisation energy commons, …
Objects	technologies, infrastructures, natural resources, monetary resources, …	using residual heat to heat a neighbourhood, physical network, …
Activities	practices, routines, behaviour, …	Attending to the heat generators, being in contact with clients, and many other tangible activities involved in running a community-owned energy company producing and distributing heat to the neighbourhood

A common-sense definition of **'social relations'** is the relations between actors in society. In transition studies, (Avelino and Wittmayer 2016) have proposed to differentiate between actors in different societal spheres, such as state, market, community and third sector and between individuals, organisations and sectors. This differentiation then allows to analyse the power relations between these actors at different levels of aggregation. Another option is to describe social relations through focusing on social interactions between actors (Brinkerhoff et al. 2008; Simmel 1971). Sociologists distinguish different types of social interactions, including exchange (incl. reciprocity, transaction), cooperation, competition, conflict, coercion and accommodation. The definition of social innovation that SONNET adopted is not per se about describing social relations, but about 'changing' social relations. In relation to specific social innovation initiatives, this would mean a judgement of whether these propose alternative or new social relations (either expressed in terms of power relations or in terms of quality of the relation) as opposed to the dominant or incumbent social relations.

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In the SONNET definition of social innovation, we also distinguish between different **'manifestations'** that accompany new social relations in terms of (re)newed ways of doing, thinking and/or organising. Based on (Avelino et al. 2019; Barnes et al. 2018; Chilvers and Longhurst 2016), we distinguish between:

- Doing, which relates to 'practices related to energy technologies and the physical composition of the energy system'
- Organising, which relates to 'governance and organisational structures within initiatives and within the energy system (i.e. institutions in terms of forms of social organisation or standard operating procedures that shape behaviour and find expression through rules, practices and narratives)'
- Thinking, which relates to 'forms of knowledge and normative framings including values and perceptions'

Taking this definition and the broad perspective on social innovation as a starting point, we have developed a typology of SIE that will be outlined in the following sections. We consider such a typology relevant for the following reasons:

- A typology of social innovation that is comprehensive, i.e. not only covers specific phenomena (e.g. prosumerism, energy cooperatives), and focuses on energy has not yet been developed.
- A typology of SIE allows for a differentiated analysis of patterns, relations and links between specific SIE types and their development with enabling and impeding conditions as well as contributions.
- A SIE typology provides guidance for systematic analysis of SIE conducted by researchers and can help policymakers to support SIE-initiatives in more informed ways and practitioners to learn from other best practices and advocate for differing support and changes within the energy systems, depending on the type of SIE.

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3 METHODOLOGICAL APPROACH: MAPPING & TYPOLOGY DEVELOPMENT

3.1 About typologies

Methodological literature on typology work differentiates between different goals of typologies (Bennett and Elman 2006; Elman 2005; McKinney 1969). In their descriptive role, typologies aim to answer what a type is constituted of, focusing on the attributes of types – their description. In the explanatory role of typologies, these attributes are based on existing theory. Therefore, the resulting types help to understand what can be expected to be seen if the theory is correct. According to (Elman 2005, 296) explanatory typologies are "multidimensional conceptual classifications based on an explicitly stated theory". In their less referred to classificatory role, empirical data is coded to understand which of the different types, the empirical data belongs to.

The resulting types are also to be understood from the perspective of Weberian' 'ideal types' as *analytical categories* and thus as abstractions that are not be one-to-one descriptions of actual empirical examples. Rather than claiming that all empirical examples within one category are equal, what is claimed is that certain empirical examples fit neater with one analytical category (thus one type) than with another (Collier, LaPorte, and Seawright 2008).

Typologies in general are thought of as being made up by different elements. In the following, we outline these elements by referring to the example of different types of policy implementation as provided by (Collier, LaPorte, and Seawright 2008) (see also

Figure 1):

a) Overarching concept: The concept that is investigated by the typology – in the example below the concept is 'policy implementation'.
b) Row and column variables: The overarching concept can be described/explained along different variables – the categories of these variables form then the rows and columns. In the exemplary case below, the row variable is 'ambiguity' and the column variable is 'conflict'.
c) The matrix: Cross tabulating the variables and their expressions (high and low in the example below) creates a matrix. The number of row and column variables determines the size of the matrix (e.g. 2 row variables and 2 column variables result in a 2x2 matrix etc.) However, it can also be the case that one variable has more than two categories, or that more than two variables are used leading to a larger table.
d) Types: The manifestations located in the cells of the matrix provide the 'types' of the typology (i.e. the different types of policy implementation in our example below). These should have substantively meaningful labels. These types give conceptual meaning to each cell, corresponding to their position in relation to the role and column variables.

Figure 1: Example of a typology

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Table 7.2. Matland's Typology of Policy Implementation

Ambiguity \ Conflict	Low	High
Low	Administrative Implementation	Political Implementation
High	Experimental Implementation	Symbolic Implementation

Source: Adapted from Matland (1995).

Source: Collier, LaPorte, and Seawright (2008, 156)

SONNET's main aim is to develop a multi-dimensional comprehensive typology: a typology that is based on more than one variable (thus no characterisation) and describes a broad array of different kinds of SIE. We focused on a descriptive typology that is nevertheless based on our conceptual understandings of social innovation. We also used different iterations of the typology in their classificatory function to analyse the empirical examples of SIE-initiative in our SONNET mapping database. The main goal of our preliminary typology is to guide the development of the further work in SONNET by providing an overview of different types of SIE. Towards the end of the project, this typology will be consolidated based on the empirical material gathered and analysed up until then.

3.2 The typology variables

The SONNET typology takes 'social innovation in the energy sector' as the ***overarching concept*** that is described by the resulting types. As part of our iterative development of the typology (see for a complete outline and rational section 3.3), we have ***settled for two variables*** along which to describe social innovation in energy. These are anchored in our definition of social innovation, namely 'social interactions' and 'manifestations in the energy sector'. These variables and their expressions, as outlined below, are abstract enough to allow for the resulting typology to be comprehensive and descriptive enough to allow for further empirical exploration.

Social interactions

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There are different options for conceptualising social relations, some of which are discussed under section 2. In the process of conceptualising this typology variable, one important consideration has been whether to have the typology describe changes in social relations or mere social relations. For example, we tried to have this variable being expressed through different degrees of change (low, medium, high) in actor constellations, in actor roles and in quality of actor relations. However, it was difficult and near to impossible to then classify empirical examples derive from the mapping within this scheme. Another approach was to have the variable expressed as degree (low, medium, high) to which the quality of interaction promoted by the SIE was different from the status quo in the energy system (e.g. competition-based, centralised). However, this would mean to start from a singular, very generalised and very rough understanding of existing social relations in energy systems and would prefigure the actual work that is to be done in the empirical work packages to establish a nuanced and contextualised understanding of the different ecosystems (B. Pel et al. 2019) within which SIEs are developing. It also would not allow us to consider that social/power relations might work out differently on different scales, e.g. while they might be best described as competitive on the macro-level might, they might be exchange-based on the micro-level (cf. Avelino and Wittmayer 2019). We therefore left this path and decided to make the 'change in social relations' an empirical question, which could be explored using the types resulting from a typology focusing on describing social relations alongside the manifestations in energy systems.

Table 2: Types of social interactions

Type of social interaction	**Definition based on** (Brinkerhoff et al. 2008, 98–100)
Exchange	"Exchange is the voluntary interaction from which all parties expect some reward" The mechanism is along the lines of a trade: I give you a tangible or intangible benefit and you give me one back. Such relationships are based on the norm of reciprocity – if you give something you expect a reward.
Cooperation	"Cooperation is interaction that occurs when people work together to achieve shared goals" While exchange is a trade, cooperation is teamwork. Cooperation is more likely when individuals are faced with a common threat, when it serves their economic self-interest, when they share a sense of community identity, or when they value belonging to a community.
Competition	"Competition is a struggle over scarce resources that is regulated by shared rules" If the respective goals of actors are mutually exclusive, and in situations of scarcity of resources, competition (or conflict)-based interactions are likely. In case of competition, the struggle will be regulated by shared rules.
Conflict	"Conflict is a struggle over scarce resources that is not regulated by shared rules, it may include attempts to destroy, injure, or neutralise one's rivals" Conflict includes an aspect of 'anything goes' and if it is inflicted with outsiders, it can enhance in-group solidarity.

We thus settled with describing social relations through the different types of social interactions between actors that occur in relations (Brinkerhoff et al. 2008; Simmel 1971). Doing so allowed us

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to describe types of SIE that are characterised by certain types of interaction – whether these constitute a change in social relations then becomes an empirical question to be answered within specific contexts. Based on (Brinkerhoff et al. 2008), we distinguish between competition, exchange, cooperation and conflict (see Table 2 for the definitions).

Manifestations in the energy system

In order to understand the new ways of doing, thinking and organising that come with changing social relations, this typology variable was chosen to describe the ways in which SIEs manifest in the energy sector. The different iterations of the typology development allowed us on the one hand to conceptualise these manifestations along the literatures outlined under section 2, and on the other hand to substantiate our understanding along the empirical material of the mapping database. This resulted in the following overview (see Table 3).

Table 3: Operationalisation of manifestations to the energy system

	Definition	Operationalisation	Example
Doing	Practices related to energy technologies and the physical composition of the energy system	Generating electricity/heat (efficiently)	Generating electricity from renewable energy sources
		Distributing and transporting electricity/heat	Exchanging electricity through peer-to-peer transactions
		Supplying electricity/heat	Offering innovative energy contracts to customers
		Using electricity/heat	Low energy usage through insulated housing
		Using smart technology	
		Storing electricity/heat	Storing electricity in community battery
		Installing energy technology	Installing a smart energy management system for individual consumers
Organising	Governance and organisational structures within initiatives and within the energy system (i.e. institutions in terms of forms of social organisation or standard operating procedures that shape behaviour and find expression through rules, practices and narratives)	(Facilitating) Networking	Organising a symposium for networking for women working in the energy transition
		'Implementing' organisational form and governance structure	
		Finance mechanisms	Offering innovative funding policies to stimulate innovative energy initiatives
		Facilitating producer/customer exchanges	
		Facilitating knowledge transfer	Platforms
		Facilitating energy savings	
Thinking	Forms of knowledge and normative framings including values and perceptions	Raising awareness about energy	Campaigning for energy savings in local municipality
		Campaigning against political agenda	Opposing local energy policy agenda for nuclear energy
		Pushing a new framing, discourse or narrative	Anti-nuclear framing

		Transferring knowledge & skills	Offering knowledge on housing insulation to citizens. Education program for technical skill development

Putting together those two variables and their various expressions resulted in the following matrix (see Figure 2).

Figure 2: Schematic overview of property space using the chosen variables

		Social interactions			
		Cooperation	**Exchange**	**Conflict**	**Competition**
Manifestations	**Doing**	Type 1	Type 4	Type 7	Type 10
	Organising	Type 2	Type 5	Type 8	Type 11
	Thinking	Type 3	Type 6	Type 9	Type 12

3.3 Iterative process of SIE typology development and SIE-initiatives mapping

The typology development was done in an iterative fashion – iterations took place between conceptual considerations and empirical substantiation through the mapping of 500+ SIE-initiatives across the six SONNET countries (Benelux, the United Kingdom, Germany, Switzerland, Poland and France, see Table 4 for an overview and the Appendix for more information). This database of SIE-initiatives was analysed with the goal of typology development.

It is good to bear in mind the different 'units of analysis' for the mapping and the typology development: while we mapped SIE-initiatives we developed a typology of SIE. Since social innovation is a diverse and multi-layered phenomenon, we took actual SIE-initiatives as starting points for formulating a more abstract understanding of the SIEs they are driving or engaging in. The goal of the mapping was to identify empirically which initiatives manifest around specific social innovations in energy. The mapping, and thus the selection of SIE-initiatives was informed by conceptual work, specifically in relation to our take on SIE as outlined under section 2.1., by inter- and transdisciplinary sense-making in relation to what constitutes boundaries of what can be understood as SIE (e.g. whether an initiative focusing on mobility would be considered a SIE

initiative or not) as well as by considerations that emerged from the parallel process of typology development (e.g. in relation to the mapping variables to be mapped to ensure that there was enough information for a meaningful analysis).

Likewise, the final choice of typology variables and the ensuing property space (as outlined under Figure 2) was based on conceptual considerations related to our take on SIE as well as on empirical sense-making through using the emerging mapping database to test a range of typology variables.

Table 4: Overview of geographical coverage of mapping results

Region/Country		Number of SIE-initiatives mapped
Benelux	*Belgium*	20
	Luxembourg	15
	Netherlands	70
France		80
Germany		80
Poland		70
Switzerland		80
United Kingdom		87
Total		**502**

This section recounts this iterative process of arriving at the typology, the typology variables outlined in the previous section as well as a database with 500+ SIE-initiatives – see Figure 3.

Phase 1: Writing and reviewing draft mapping guidelines (~ July-September 2019)

Mapping guidelines were written, which detailed our emerging understanding of SIE, our understanding of a typology and the process to arrive at one, a first outline of possible typology variables (those variables that should be helping us to describe SIE), our understanding of the mapping process and outcomes as well as a first proposal for mapping variables (those variables that should help us describe the mapped SIE-initiatives).

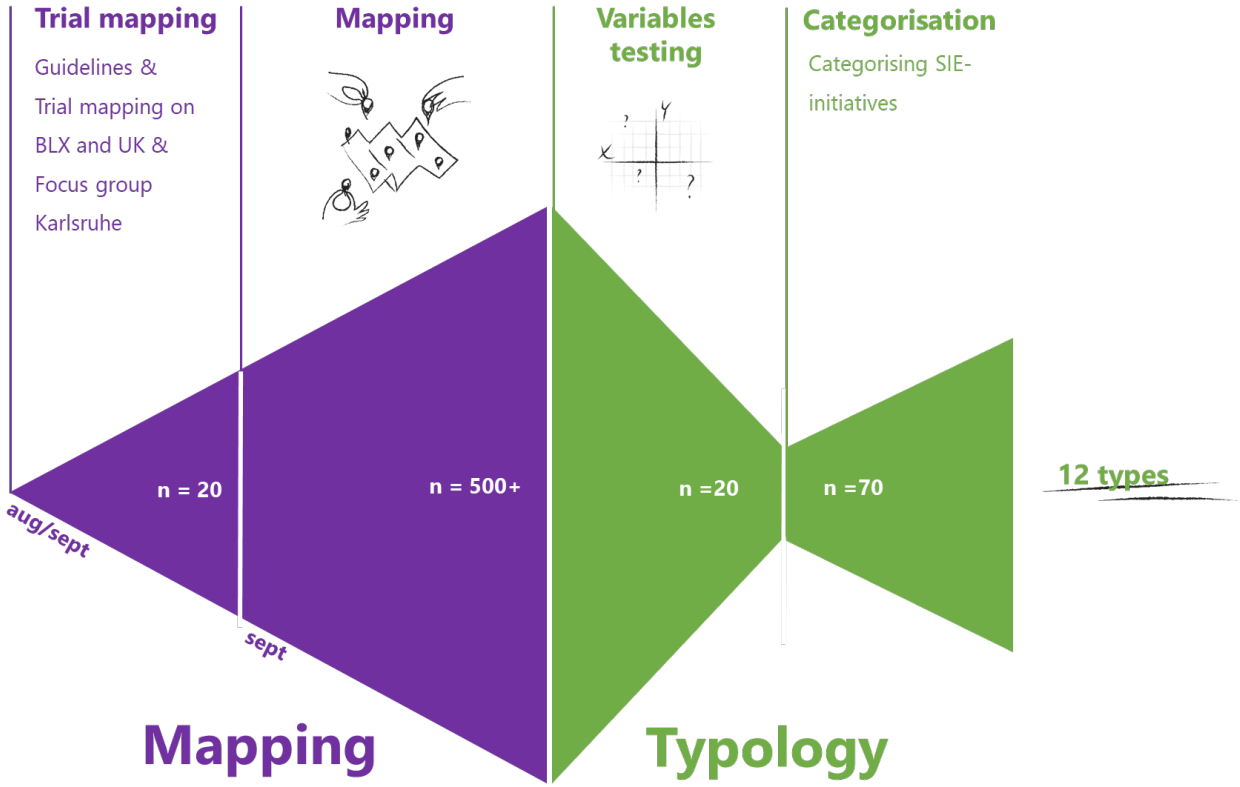
To account on the one hand, for the diversity of SIE across Europe, and on the other hand, for the existing academic conceptual ambiguity (and arguably void), the draft mapping guidelines included several **principles** that guided the mapping process:

- *Search for diversity*: The mapping aimed for breadth rather than for depth. This meant that it pushed the boundaries and thinking of diversity in several ways: energy activity, change in social relations, etc. Diversity in this respect meant diversity within the mapping categories, between the categories, and across the SIE
- *Working typology*: We aimed for this preliminary typology to be as good as it could be, considering practical limitations, the iterative character of the typology development (to be revisited towards the end of SONNET) and the early stages of our research.
- *Search for the boundaries*: One of our quests was to understand where the boundaries (porous as they may be) for SIE are. This meant that the mapping worked at the fringes of

what was 'in' or 'out' – and that we built our understanding of this boundary together throughout the mapping process.

- *Explore the field*: The mapping was explorative (and based on an interpretative research traditions) and did not aim for representativeness (with the matching (neo)positivistic research tradition). This all while acknowledging that both positivist science (i.e. 'physical facts, numbers, and statistics') and constructivist analysis (i.e. 'values, discourse, and perceptions') contribute to our understanding of SIE throughout SONNET.
- *Co-create the field*: In line with SONNETs transdisciplinary character, the mapping process was of a co-creative nature. This implied that the mapping benefited from the knowledge of both the SONNET cities and the local academic partners. Where applicable, more actors were asked to contribute to the mapping.
- *Beyond the city, include the country*: The mapping included the respective SONNET cities but was not limited to them. In order to capture SIE initiatives that are not operating on local scale or in an urban context, we went beyond the SONNET cities to map a broader diversity of SIE initiatives.

Figure 3: Overview of mapping & typology development



These draft guidelines had several suggestions in terms of possible typology variables, as well as mapping variables. The latter included a series of descriptive variables (e.g. name of the initiative, year of establishment, aims of the initiative) as well as analytical variables (e.g. their socio-political contribution, or the social relations that they are changing).

These draft mapping guidelines were shared with the consortium to discuss questions, feedback and suggestions – both via mail as well as through a workshop to answer and accommodate feedback on the guidelines. A list of all feedback was constructed and used to develop a second draft version of the mapping guidelines. As a result, several mapping variables were added, such as 'beneficiary', 'issue', 'ways to address this issue' and 'energy activity'. The descriptions of analytical variables concerning the social innovation were adjusted to increase clarity for the remainder of the team.

Phase 2: Trial mapping (September 2019)

The second draft mapping guidelines were tested in two stages. First, forty SIE-initiatives were completely mapped (n=20 in the UK and n=20 in the Benelux, respectively). The strategy was to aim for diversity and see which boundaries of SIE emerged as the mapping continued. During an online meeting, the UK/NL mapping team discussed challenges and possibilities of the current approach. Secondly, project partners in France, Poland, Germany and Switzerland were asked to map five initiatives in their respective countries along the descriptive variables to start thinking about the delineation of SIE.

Phase 3: Focus group meeting to delineate the boundaries of the mapping (October 1st, 2019)

Feedback from the consortium on the mapping process was collected and discussed in a focus group setting during our Karlsruhe project meeting. The aim was to further delineate our shared understanding of the boundaries of what counts as SIE and consequently as SIE initiative and what not. A shared and refined understanding of SIE emerged, that was documented in a final version of the mapping guidelines as follows:

- *SIEs are changes in social relations*: Social innovations are (combinations of) ideas, objects and/or activities that imply/demonstrate a change in social relations and new ways of doing, thinking and/or organising (Avelino, Wittmayer, et al., 2019; Alex Haxeltine et al., 2017);
    - Also, ideas can be socially innovative even if they do not translate into action – this is in opposition to classical innovation studies making the difference between invention and innovation.
    - We speak of a change in social relations in comparison to the existing energy system. Social innovation changes these relations or creates new ones.
    - The word "new" does not necessarily refer to things that are entirely new. It can also refer to "renewed" phenomena in terms of "re-discovering, re-inventing, re-using, re-vitalizing and translating forgotten, lost or abandoned ways of doing, thinking and organising of the past. Innovation is just as much about new combinations of old things, as it is about integrating new things into existing contexts" (TSImanifesto, 2017[4])

[4] TSI Manifesto, online at: https://tsimanifesto.org/ (accessed January 2020)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 837498.

- *SIEs are about energy*: Social innovations in energy are ideas, objects and/or activities with a clear link to and/or primarily focusing on energy (understood as electricity and heat). This concerns production, transmission/distribution, trading/storage and/or consumption (incl. saving/efficiency). SIEs thus need a clear link with electricity and heat. This is to say that a clear link with low carbon, mobility or food is not enough – SIEs in low-carbon, mobility, food or other sectors are relevant to the extent that they show a clear link with electricity/heat. This might still leave the question of when something is an SI in energy, and when is it an SI in mobility unresolved. It is important to recognise that this distinction is not set in stone and emerges from our iterative mapping. At this stage of the mapping, we invite all to map as diversely as possible, but within the context of electricity and heat. This might include mobility SIEs around vehicle-to-grid (V2G) operations, but excludes car-sharing platforms, as they do not directly refer to electricity and/or heat. If you doubt whether a SIE-I follows our definition of SIE-Is, we urge you to include the initiative at this stage.
- *SIEs go beyond societal spheres*: Social innovation initiatives are often considered to be bottom-up initiatives (Unger 2015). However, social innovations relate to different societal spheres – thus not only community, but also state or market. Examples of these are knowledge sharing platforms for prosumers initiated by large market players (i.e. EnergieRealisten, NL), or remunicipalisation of energy utilities.
- *SIEs manifest at different scales*: Social innovations take form at different geographical and governance scales. They can thus be local, but they can also be regional, national, translocal or supra-national in nature.
- *SIEs are multi-directional*: Social innovation is neither good nor bad per se: our understanding of social innovation does not include a value judgement regarding the directionality or normativity of energy transitions (following (Franz, Hochgerner, and Howaldt 2012; Haxeltine, Pel, Wittmayer, et al. 2017). We are thus mapping movements – whether these are Fridays for Future or Pro-Nuclear.
- *SIEs are intangible*: Social innovations include an 'intangible' component; they are thus more than just introducing a smart meter. And often a novel business model will be a social innovation.

The final guidelines also outlined more specifically the distinction between a social innovation in energy (SIEs), and a social innovation in energy initiative (SIE-I). Whereas SIE-Is concern a specific initiative, SIEs describe more broad phenomena. While we are mapping initiatives (SIE-Is), we are interested in defining the social innovations (SIEs) they drive or enact – this is also what the typology was to be about.

For the mapping, we included social innovation initiatives in energy:

- that manifest as active households, (local) communities, networks, platforms, movements, organisations, projects and/or programmes (or the like);
- that work on ideas, objects and/or activities that imply/demonstrate a change in social relations and new ways of doing, thinking and organising;

- that have a clear link with energy (understood as electricity and heat) and concern energy production, transmission/distribution, trading/storage and/or consumption (incl. efficiency and saving).
- that are rooted in cities, but also in neighbourhoods, regions, nations, continents, rural areas etc.;
- that are initiated/driven by any actor in society and across societal spheres (including community actors, residents or students; but also, by governments, or businesses, etc.)
- that are contributing to a diversity of possible futures (whether pro nuclear or pro renewables, etc.)
- ….

In addition, the mapping variables were adapted, and the process further specified.

Phase 4: Mapping 40 initiatives per country (~October 2019)

Based on this shared understanding of SIE, six country team completely mapped 15-20 SIE-initiatives and filled out the descriptive mapping variables (and not the analytical ones) for 20-25 SIE-initiatives – this added up to a total of about 240 initiatives. This phase focused on gathering an as diverse sample as possible in terms of energy activity, form of the initiative, geographical scale, etc – including the knowledge of city as well as academic partners.

Since arguably there are no lists of social innovations in energy, the mapping teams were asked to start their searches based on their experience in the topic and the provided with the following search strategies:

- Overviews of social innovation initiatives that have been drawn up during the SONNET proposal writing phase based on the working knowledge of the involved researchers
- Contact with city partners to find out what is happening in each city.
- Internet search using appropriate search terms in local language. For inspiration regarding search terms, please check the SONNET literature database served as a starting point
- Contact with multipliers in the energy transition about their latest inspirations, or with associations or networks
- Contact with intermediaries, which often list initiatives, or case studies in articles and check (previous) EU projects

Taking these strategies as a starting point, the database was filled along the principles outlined above and using information available on the website of the initiative or other available documents preferably authored by the initiative itself. Country teams were to copy/paste as much as information directly from sources written by the SIE-initiative to allow for relying on information as provided by the initiatives and reduce the diversity in interpretations that would result from 10+ researchers working on the database.

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Phase 5: Developing a draft preliminary typology based on 20 initiatives from the UK and the Benelux (~October/November 2019)

A core team looked at the total of about 240 initiatives to come up with a first discussion input for the typology – including an official milestone meeting (milestone 2) end of October to kick-start the work on the preliminary typology. From the different possible typology variables, a first set was selected to further pursue in terms of understanding which of these could be expressed in ways that makes it possible to use the mapping results for illustrating empirical relevance and for a first description of the types. The following includes an overview of the initial variables plus the considerations regarding how they could be further conceptualised and operationalised (made empirically observable).

- Social relations: could be expressed as a) the extent to which an initiative is an open/closed group (openness for participation); b) high/medium/low levels of participation; c) at the scale of actor involvement: individual, group, system; or as types of interaction: exchange, cooperation, conflict, etc.
- Transformative ambition: could be expressed in terms of the scale of the aims of SIE initiatives, or the tension between current state and aim, amongst others.
- Emphasis on novelty: could be expressed as a spectrum of the ways of doing, thinking and organising; or possibly related to institutional work activities: maintaining, creating, transforming; amongst others.
- Energy activities; to express the relation of the SIE with the energy system: e.g. through the ways of doing, thinking and organising.

Trying both, further conceptualisation of the variables through reading into different literatures, as well as further attempts towards empirical sensemaking on the basis of the mapping database, the team narrowed down the variables. Using the following three typology variables, ten UK-based and 10 Benelux-based SIE initiatives were analysed to understand the empirical relevance and aptness of the conceptualisations/operationalisations of the variables.

- 'Change in social relations', which distinguishes different types of (changed) social relations;
- 'Socio-technical configuration', which distinguishes different aspects of the SIE (i.e. ideas, objects, actions)
- 'Manifestations in the energy system', which distinguishes different contributions that the SIE has to the energy system (i.e. ways of doing, thinking and organising)

Phase 6: Mapping 70-120 initiatives per country (~November 2019)

Based on this draft development, the country teams continued to map between 70 to 105 initiatives in each country to arrive at the aimed for total of n = 500+ initiatives. For this further mapping, country teams were using a simplified version of the mapping database and focused on the descriptive variables. The country teams also received feedback from the core team regarding their sampling and mapping to date, including an encouragement to also include initiatives that are not community based, or that focus on finance/funding activities, campaign or engage in

political agenda setting, energy distribution, storage, heat and smart solutions. This and additional specific feedback were meant to increase consistency, diversity and readability of the database.

The mapping variables in the final version of the mapping database included descriptive variables only, these were:

- Name of the SIE-Initiative: What is the name of the SIE-I?
- Form: Which form does the SIE-I take?
- Country: In which country is the SIE-I (primarily) located?
- Legal form: What is the legal form the SIE-I is registered by (if at all)?
- Year initiated: What year was the SIE-I initiated?
- Aims: What are the aims of the SIE-I?
- Description of what the initiative is about: What are they consisting of in terms of activities, objects and ideas?
- Issue with the current energy system: How does the SIE-I think that the issue should be addressed/handled (in general)?
- Ways to address this: How does the SIE-I think that the issue should be addressed/handled (in general)?
- Beneficiary: Who are the beneficiaries of the SIE-I?
- Manifestation: What is the manifestation of the SIE-I in the current energy system (as stated by the SIE-I or other sources)?
- Most important energy activity: What is the primary energy-related activity that the SIE-I is engaging in?
- Spatial scale: At which spatial scale are the primary activities of the SIE-I (primarily) focused?

Entry- variables

- Date of entry (What is the current date of entry?)
- Entry by (Name of the person who makes the data entry)
- Link to website (What is the website of this SIE and/or where can we find more information about this SIE?)
- Comments (Do you have any comments you would like to make about this SIE?)

For each of these mapping variables, we included a question, a definition, outlined how it should be answered (e.g. free text, drop-down) and the relevancy for SONNET.

Phase 7: Developing a preliminary typology (~November/December 2019)

Based on the results and considerations from the draft preliminary typology development, the core group decided to focus on two typology variables to include in the typology matrix (see Figure 2) as outlined under section 3.2., namely social interaction, as expressed through different types of interaction; and manifestations, distinguishing between different ways that SIE manifests in the energy sector through different ways of doing, thinking and organising.

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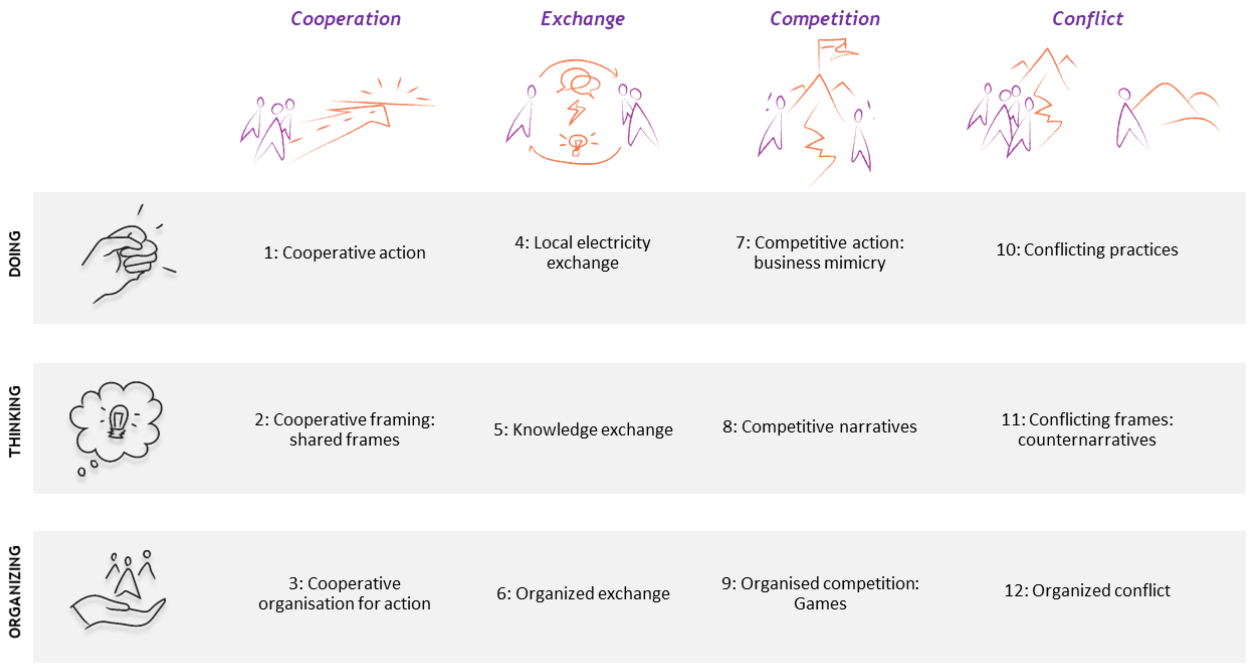
The property space of the typology allows for the existence of 12 types. We have then used a sample of 70 initiatives (between n=10 and n=12 initiatives from each country) to interrogate the empirical relevance of this typology. Initiatives were selected at random, and then replaced if they were too similar to other initiatives within the list to have the sample cover a diversity of SIE-initiatives. The SIE-initiatives were then classified along the 12 types. While a vast majority of the initiatives could be classified along the 12 types, there were also hybrid cases that could not clearly be classified into one or the other type.

Based on this procedure, we found exemplary cases for nine types and we have used these to further describe and expand our understanding of these types. That means three types could not be empirically substantiated by the analysed 70 mapped examples. At this point in time, ruling them out categorically seems premature since we have not classified the complete set of 500+ initiatives yet.

4 RESULTS: DIFFERENT TYPES OF SIE

This section outlines the actual typology of SIE. It provides an overview of the different types of SIE (Table 5) as well as provides a more elaborate description of each type.

Figure 4: Overview of types of Social Innovation in Energy



4.1 Type 1: Cooperative action (cooperation/doing)

Description: The generation, supply and consumption of energy through cooperating actors. Cooperative action involves the cooperation between actors to realise physical changes within the energy system including electricity generation, supply, consumption or storage. Cooperative action links local issues and actions (i.e. increasing energy justice in the local community) to global challenges (i.e. mitigating climate change).

Cooperation: The relations between actors are characterised by cooperation – the working together towards shared goals. This type of SIE is generally driven by member-based, local, citizen-led or grassroots initiatives but also inter-organisational collaborations with a non-profit mentality, striving to realise shared goals together – such as local generation of electricity. The shared goal is what distinguishes it from Type 4, where parties engage in trade holding different goals (e.g. consuming electricity and selling electricity at a profit).

Doing: This type of SIE manifests through electricity generation, supply, storage and efficient consumption, thus through hands-on and practical activities realizing physical changes in the energy system.

Exemplary cases: The **Aardehuizen in Olst** in the Netherlands, an ecovillage of ca. 25 households, are an exemplary case of collective action. They generate electricity through photovoltaics, engage in community energy storage and aim to distribute electricity within the community. Their vision is to "build, work, and live in harmony with nature, in solidarity with each other and to inspire the world around […]"[5] – and thus have an idealistic vision on cooperation. **Spółka Energia Dolina Zielawy**, Poland, a company established by five municipalities was initiated to decrease "local environmental (air) pollution caused using energy from fossil fuels" and to address the "lack of energy security caused by a centralised energy provision"[6]. In Poland, smaller local governments have budget limitations for financing new infrastructure and are outcompeted by larger municipalities in the race for EU subsidies. Therefore, five municipalities formed a partnership with the above-mentioned shared goals in 2007 and implemented two large projects using favorable local conditions for investment in solar energy.

[5] https://www.aardehuis.nl/nl/aardehuizen/visie-missie

[6] https://wiecejnizenergia.pl/dobrepraktyki/parnerstwo-pieciu-gmin-inwestuje-w-lokalne-bezpieczenstwo-energetyczne/

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Table 5: Schematic overview of the typology of social innovation in energy described along several variables.

	Cooperative action	*Cooperative organisation for action*	*Cooperative framing: shared frames*	*Local electricity exchange*	*Organized exchange*	*Knowledge exchange*	*Conflicting action*	*Conflicting organization*	*Conflicting frames: counternarratives*	*Competitive action: business mimicry*	*Organised competition: Games*	*Competing narratives*
Type number	1	2	3	4	5	6	7	8	9	10	11	12
Social Interaction	Cooperation	Cooperation	Cooperation	Exchange	Exchange	Exchange	Conflict	Conflict	Conflict	Competition	Competition	Competition
Manifestation	Doing	Organising	Thinking	Doing	Organising	Thinking	Doing	Organizing	Thinking	Doing	Organising	Thinking
Description of innovation	The collective generation, supply and consumption of energy.	Knowledge dissemination, finance mechanisms and network creation based on cooperation.	The creation of a shared framing, narrative or agenda through cooperating actors	The exchange of electricity at a local level through smart grids and/or blockchain technology.	The organisation of exchanges of tangible and intangible goods between actors.	The exchange of knowledge and skills through education, training and instruction.			The creation of and pushing of a counternarrative through activism and protest	The generation and supply of electricity based on a competitive ethos using mimicry.	Organising games to stimulate energy savings and behaviour change.	
Main activities	Generating, supplying, using, storing and distributing electricity	Offering funding mechanisms, collaboration strategies and (online) information hubs	Pushing a framing, discourse or narrative, constructing a dialogue, transferring knowledge and skills	Peer-to-peer electricity exchange	Offering finance mechanisms for exchange of goods, facilitating supply/demand exchange, facilitating knowledge exchange	Transferring knowledge and skills			Campaigning against political agendas, pushing a framing, discourse or narrative	Generating, supplying, using, storing and distributing electricity	Facilitating energy savings	
Types of initiative engaging in this innovation	Cooperatives, associations, citizen-led initiatives	Policies, service desks, NGOs, municipal campaigns, platforms, networks	Policy think tanks, collaborations, coalitions, NGOs, university initiatives	Communities, living labs, tenants, neighbourhoods	Platforms, social networks, fora, marketplaces	Workshops, education programs			Grassroots initiatives, campaigns	Companies	Games, objects, platforms	
Aims of these initiatives	Acceleration of the transition, Decentralisation of the energy system	Acceleration of the transition	Legitimate the transition	Decentralise the transition, Make exchange efficient	Legitimate the transition, Make information accessible, Make exchange efficient	Change behaviour and knowledge/skill development			Increase fairness, change political agenda	Make profit and increase competitive advantage	Change behaviour	
Dominant technologies	Electricity generation (PV / wind), Housing (efficiency) and storage	n/a	n/a	PV combined with a smart grid, smart meters and storage system	PV, wind, guarantees of origin, bitcoin	Housing (efficiency), Electricity generation			Gas, coal, nuclear	PV electricity generation	Game software	

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	Cooperative action	*Cooperative organisation for action*	*Cooperative framing: shared frames*	*Local electricity exchange*	*Organized exchange*	*Knowledge exchange*	*Conflicting action*	*Conflicting organization*	*Conflicting frames: counternarratives*	*Competitive action: business mimicry*	*Organised competition: Games*	*Competing narratives*
Example of initiative (country code)	Ecovillage: Aardehuizen (NL); Collective of municipalities for subsidization: Spółka Energia Dolina Zielawy (PO)	South Poland Cleantech Cluster (PL), Information hub HIER opgewekt (NL), Funding and advice service desk Mannheim Begrunen (GE)	Berliner Energietisch (GE), Policy laboratory Agora Energiewende (GE), Citizen involvement in decision making in Burgerdiolog Stromnetz (GE), Online platform PVmonitor (PO)	Peer-to-peer trial EDF (UK), Municipality experiment Ostrowski Rynek Energetyczny (PO)	Knowledge exchange platform ForumE (SZ), Energy exchange platform Vandebron (NL), Crowd-investing platform GreenVesting (GE)	Energy lab and teaching Energielab Eneco (NL)			Campaign Just Transition, Friends of the Earth Scotland (UK)	Technology supplier EProsument (PL)	Competition Student Switch Off (UK), App Enerjoy (UK), Game Jeu de l'oie sur les energies (FR)	

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4.2 Type 2: Cooperative organisation for action (cooperation/organising)

Description: Knowledge dissemination, finance mechanisms and network creation based on a cooperative ethos facilitating 'doing'.

Cooperation: The cooperative nature of relations is expressed through open, non-reciprocal access to and push of knowledge, money and contacts. This is in opposition to SIE Type 5, where the focus is on a transaction with membership and reciprocity norms in place. SIE-initiatives driving the open access to knowledge are open knowledge platforms that function as an information 'hub', these can also be foundations, municipal service desks, civil-society initiatives and workshops by non-profit organisations. Other than SIE Type 5, where networks aim for mutual exchange, cooperative networking is geared at collaborating for a common goal. In this sense, the initiatives involved in cooperative networking need each other's participation in the process to realise a shared vision (i.e. the introduction of a novel renewable energy technology).

Organising: Knowledge dissemination, finance mechanisms and network creation are geared at facilitating the 'doing' in the energy sector, e.g. generating or saving energy. This type of SIE in a way facilitates SIE Types 1, 4, and 10 through providing access to knowledge, money and contacts as necessary resources.

Exemplary cases: **HIER opgewekt** is a knowledge platform for local energy prosumers in the Netherlands. The website provides "inspiration, information and knowledge partners". The platform aims to "connect, make energy initiatives visible and develop knowledge together with cooperatives and experts".[7] **Bristol's City Leap** as, in its inception, 'innovative investment scheme' drafted by the city council, invites partners to invest in ventures to achieve the energy goals of the city. The initiative is ""seeking long-term partners […] to achieve our shared goals and build a resilient city where no one is left behind"[8]. The **South Poland Cleantech Cluster** is a company with 30 shareholders from regional industry. They aspire to "create an above average research environment to introduce cleantech technologies and services to various sectors and value chains".[9] In their perspective, "the combination of partners' technologies and competences […] is needed to develop new, sustainable multi-industry solutions."

[7] https://www.hieropgewekt.nl
[8] https://www.energyservicebristol.co.uk/cityleap/
[9] https://spcleantech.pl

4.3 Type 3: Cooperative framing: shared frames (cooperation/thinking)

Description: The creation of and pushing for a shared framing, narrative or agenda through cooperating actors.

Cooperation: This type of SIE is about a shared belief in a certain framing, narrative or agenda. Initiatives driving this type of SIE are engaged with pushing a certain narrative, advocating political agenda-setting, or creating knowledge collectively. These initiatives might be coalitions, collaborations, think tanks or citizen-involvement projects which allow actors to collectively engage towards a shared goal. They are normative in their beliefs, and pacific in their approach.

Thinking: This type of SIE manifests through a collective problem frame (i.e. energy literacy) or the pushing of a certain agenda (i.e. justice in the energy transition).

Exemplary cases: **PV monitor** is an online platform actively advocating heat pumps and focusing on their benefits only. **Berliner Energietisch** is a cross-sectoral collaboration to stimulate citizen investment in the energy transition. It is an alliance of 55 local initiatives and organisations, with different working groups and circles. The alliance is open to everyone, who shares their ambition for a "social, ecological and democratically controlled energy supply in Berlin".[10]

4.4 Type 4: Local electricity exchange (exchange/doing)

Description: Local exchange of electricity using smart grids and/or blockchain technology.

Exchange: Local electricity exchange involves the provision of electricity against payment – a clear form of trade and thus exchange based relations. This type of SIE is driven by communities, companies and citizens engaging in (peer-to-peer) electricity exchanges. Because the current energy system is oriented at centralised electricity distribution, these initiatives are to date mainly experimenting and engaging in temporary projects. Initiatives might have varying motivations: reducing peaks in electricity supply, contributing to peakshaving, or aiming for self-sufficiency and autarky.

Doing: This type of SIE involves the rearrangement of distribution and electricity grids. Other than SIE Type 5, which is driven by platforms and intermediaries facilitating others to exchange, this type is about the actual exchange.

[10] http://www.berliner-energietisch.net

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 837498.

Exemplary cases: **Living Lab Waldorf,** Germany, brings together 40 households and commercial companies, connected through a smart grid. Each household has its own energy generation system. Whenever a need for electricity occurs in the system, one of the households supplies electricity through a local grid. The living lab is framed as a "showcase for energy transitions", aiming to "test the future of decentralised power supply".[11]

4.5 Type 5: Organised exchange (exchange/organising)

Description: The organisation of exchanges of tangible and intangible goods between actors.

Exchange: The exchange-based nature of relations is expressed through the organisation of reciprocal exchanges. The exchange of knowledge, contacts, electricity or for example guarantees of origin; but also, the provision of finance mechanisms with the expectation of a reward. Initiatives engaging in this type of SIE are oriented specifically at establishing a transaction, rather than a collaboration for a shared goal (as does Type 3). They also optimise exchange possibilities currently available; e.g. through increasing the quality of these exchanges by providing more choice and transparency.

Organising: This type of SIE manifests through the organisational structures provided that facilitate these exchanges. Initiatives driving this type of SIE are intermediaries, facilitating through developing or providing the necessary ingredients, such as software, platform or marketplace through which exchanges take place. A specific subgroup are governments providing subsidies in exchange for e.g. renewable energy generation.

Exemplary cases: **Vandebron** is an online marketplace, offering customers to source their electricity from an identified small-scale supplier. In doing so, they aim to bypass the traditional energy supplier, and increase transparency within the market: "Vandebron is working towards a fully sustainable energy network, by only offering energy that is truly green and has been generated locally."[12] **ForumE** is an online user forum on Swiss energy transition. Initiated by the Swiss Association for Solar Energy, it aims "to establish a Swiss reference platform for information and discussion on the energy transition."[13]

4.6 Type 6: Knowledge exchange (exchange/thinking)

Description: The exchange of knowledge and skills through education, training and instruction.

[11] http://www.living-lab-walldorf.de/home/

[12] https://vandebron.nl/over-ons

[13] https://forume.ch/about

Exchange: Knowledge exchange involves the exchange of energy-related knowledge and skills with the expectation of some reward, such as payment or reputation gain.

Thinking: This type of SIE manifests through energy-related knowledge and skills, rather than through pushing a certain framing or narrative (as Type 3 and 9). Initiatives driving this type of SIE are oftentimes involved in arranging workshops and giving lectures.

Exemplary cases: **Energielab** (English: energy lab), Netherlands, is an educational initiative by energy supplier Eneco located at one of its wind farms, inviting primary- and high-school children to the wind farm to learn more about renewable energy and energy savings. According to Eneco, the lab aims to "accelerate the energy transition by investing in knowledge transfer"[14] and make the "become aware of the need to adjust their energy behaviour and encourage their environment to do this."

4.7 Type 7: Conflicting practices (conflict/doing)

No empirical substantiation and therefore also description of this type could be done based on the sample of 70 used for this purpose. However, the type seems empirically relevant since one can think of initiatives which are engaging in action related to the material aspects of the energy system and do so in a way that is characterized by unruled struggle over certain resources. A specific example could be Frack Off, Extreme Energy Action Network (UK) or other activist groups that demolish or tie themselves to infrastructure in protest.

4.8 Type 8: Organized conflict (conflict/organizing)

No empirical substantiation and therefore also description of this type could be done based on the sample of 70 used for this purpose. However, the type seems empirically relevant since one can think of initiatives that engage in setting up governance or organisational structures that are characterised by (driving) conflict. A possible example to be interrogated is **Plateforme opérationelle anti-linky (POAL)**[15], a French platform against the deployment of smart meters.

[14] https://www.enecoenergielab.nl/media/Handleiding%20Eneco%20EnergieLab.pdf

[15] https://www.poal.fr

4.9 Type 9: Conflicting frames: Counternarratives (conflict/thinking)

Description: The creation of and pushing of a counternarrative through activism and protest.

Conflict: This type of SIE does not play by the institutionalized rules for pushing new narratives and framings – what it entails are counternarratives, narratives that are explicitly set in opposition with the mainstream or dominant, often governmental, frames. Initiatives driving this type of SIE, aim to change society through challenging dominant frames and are often grassroots based.

Thinking: This type of SIE manifests through pushing a certain counternarrative.

Exemplary cases: An example of an initiative with conflicting frames, is **Just Transition, Friends of the Earth Scotland**. This is a campaign posing a novel narrative against the current energy practice. In their view, "the Scottish Government has set demanding climate and renewable energy targets, but plans to deliver on them are not transformative."[16] They disagree with the dominant energy narrative of market competition, as they state that "if the transition to a low carbon economy is left to market forces, we risk a repeat of the devastating social dislocation and high unemployment experienced as a result of de-industrialisation and coal mine closures." Through a campaign, they aim to create "industrial policies that can create a just transition to a low carbon economy in Scotland."

4.10 Type 10: Competitive action: Business mimicry (competition/doing)

Description: The generation and supply of electricity based on a competitive ethos using mimicry. This type of SIE entails optimizing current business models through adding innovative elements (rather than questioning the overall approach) to increase competitiveness.

Competition: In current energy markets, most relations are ruled by competition. In these markets, businesses strive to make an economic profit to increase their market share and hence competitiveness. The initiatives driving this SIE are companies and enterprises.

Doing: This type of SIE manifests through active physical changes in the energy system, i.e. supply or generation of electricity.

Exemplary cases: **Eprosument** is a Polish PV installation company securing their funds through crowdfunding. They aim to supply "modern solutions of PV, heating and integrated solutions for a

[16] https://foe.scot/campaign/just-transition/

zero-energy house." Rather than changing the governance or organisational structures, this company optimised their access to monetary resources by using an unconventional channel.

4.11 Type 11: Organised competitions: Games (competition/organising)

Description: The organisation of competitive encounters through serious gaming. This type of SIE involves playful competitions around topics such as energy usage, often to change behaviour and create learning experiences. In the field of the energy transition, gamification is often discussed in the light of changing behaviour through letting participants engage with games provided by researchers (Liu, Wang, and Sun 2018). Alternatively, researchers have used participant games to study heterogeneity, investment risk or participation in members of energy cooperatives (Bourazeri and Pitt 2018; Höfer et al. 2015; Skatova, Bedwell, and Kuper-Smith 2016).

Competition: Serious games create competition around a scarce resource (the prize) regulated by shared rules. It thus stimulates its participants to compete with one another to win a certain game while abiding to the rules (rather than challenging them, as with Type 9).

Organising: This type of SIE manifests through the provision of facilities, the games, that aim at changing behaviour and mobilizing action.

Exemplary cases: An example of an initiative underpinning this innovation, is the Student Switch off from the UK, run by the National Union of Students. The Student Switch off is a competition between students, challenging them to "achieve the biggest savings in energy, water and/or have the best recycling rates."[17] By providing a platform for students to compete against each other, the initiative aims to mitigate climate change through stimulating individual behaviour change.

4.12 Type 12: Competitive narratives (competition/thinking)

No empirical substantiation and therefore also description of this type could be done based on the sample of 70 used for this purpose. However, a further classification of the remaining mapped initiatives is to show the extent to which this type is also empirically relevant.

[17] http://studentswitchoff.org/about/

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5 CONCLUDING THOUGHTS

The typology presented in this report is a preliminary typology of social innovation in energy (SIE). The typology characterises SIE as socio-technical configurations of ideas, action and/or objects that change social relations and involve new ways of doing, thinking and/or organizing. These socio-technical configurations are categorised in a matrix along two variables: (a) social interactions (cooperation, exchange, competition, conflict), and (b) manifestations in the energy system (doing, thinking, organising). The resulting typology includes 12 types of SIE (see Figure 4), each of which are socially innovative to the extent that they actually change social relations and to the extent that their ways of doing, thinking and/or organising energy deviate from the dominant ways of doing, thinking and organising in current energy systems. The typology does not specify to what extent the socio-technical configurations are social innovative, or how social relations are changed. The extent, direction, quality and scale of change is open for empirical exploration.

The typology allowed us to classify a broad diversity of empirical examples of SIE-initiatives included in our mapping. In turn, the classification allowed us to embed the typology empirically and to provide descriptions and flesh to the different types. As such, it serves as starting point to empirically explore SIE.

The typology is preliminary to the extent that there are several open questions to be addressed for it to mature.

- The description of the types to date is based on a classification of 70 SIE-initiatives. To better understand the different types of SIE, there is a need for further empirical exploration and analysis – both in breadth (along more SIE-initiatives) and in depth (to understand SIE beyond taking SIE-initiatives as entry point).
- Increasing the initial sample of 70 to the full sample of 500 mapped initiatives a) will provide insights into whether there are exemplary cases for types 7, 8 and 12, and b) will show whether the tendency that some types have many exemplary cases, while others do have relatively little is substantiated. Such observations will also need to be reflected on considering the mapping strategy used – the mapping was exploratory and was also guided by the emerging understanding of the researchers of what could be considered socially innovative and what not.

The next steps thus include further exploring the different types of SIE empirically – both in breadth and depth. It will also include working with compression and extension strategies (Elman 2005) that allow for eliminating types and/or expanding the typology.

This preliminary typology should allow us to work and compare our results across each of the SONNET work packages. Important in the further work in SONNET remains the distinction between different units of analysis – this report includes at least two: SIE-initiatives and SIE phenomena. While the typology describes different types of SIE phenomena, we have mapped SIE-initiatives, the characteristics of which helped us to describe the SIE phenomena. For other SONNET work packages, there are also other relevant units of analysis, e.g. SIE-fields, -movements, -networks

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and -actors. The typology will help us to explore how these different units of analysis relate to each other and to different types of SIE phenomena.

While providing a steppingstone for the further SONNET empirical work, this typology is thus work in progress. Throughout the project, the different types of SIE will be further explored, unpacked and interrogated to arrive at a refined version towards the end of the project.

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APPENDIX 1: EC SUMMARY REQUIREMENTS

Changes with respect to the DoA

There are no changes in scope and content of the deliverable; but the deliverable is handed in with a 1 month delay in consultation with the project coordinator and the EU project officer.

Dissemination and uptake

This deliverable is the foundation of the empirical work conducted by all SONNET partners, and will be drawn upon for the sampling of SIE. Based on SONNET's empirical findings the typology will be refined and submitted for publication in a peer-reviewed journal. The SIE typology is also intended to be used in SONNET's dissemination activities, e.g. in webinars and a project video. The underlying database of 500 SIE initiatives will be further refined in the continuing empirical work, but is intended to be openly shared on the platform Zenodo towards the end of the project.

Short Summary of results (<250 words)

This report presents a preliminary typology of social innovation in energy (SIE). The typology characterises SIE as socio-technical configurations of ideas, action and/or objects that change social relations and involve new ways of doing, thinking and organizing. These socio-technical configurations are categorised in a matrix along two variables: (a) social interactions (cooperation, exchange, competition, conflict), and (b) manifestations in the energy system (doing, thinking, organising). The resulting typology includes 12 types of SIE, each of which are socially innovative to the extent that they actually change social relations and to the extent that their ways of doing, thinking and/or organising energy deviate from the dominant ways of doing, thinking and organising in current energy systems. The typology does not specify to what extent the socio-technical configurations are social innovative, or how social relations are changed. Instead, the extent, direction, quality and scale of change is open for empirical exploration. This deliverable explains in detail how SONNET's SIE typology was developed, what methodological choices were made, and what empirical data was collected so far to substantiate and describe the different types of SIE. The SONNET team mapped 500+ different SIE initiatives across the six SONNET countries and regions (France, Germany, Poland, Switzerland, United Kingdom, and Benelux), with a specific focus on the SONNET cities.

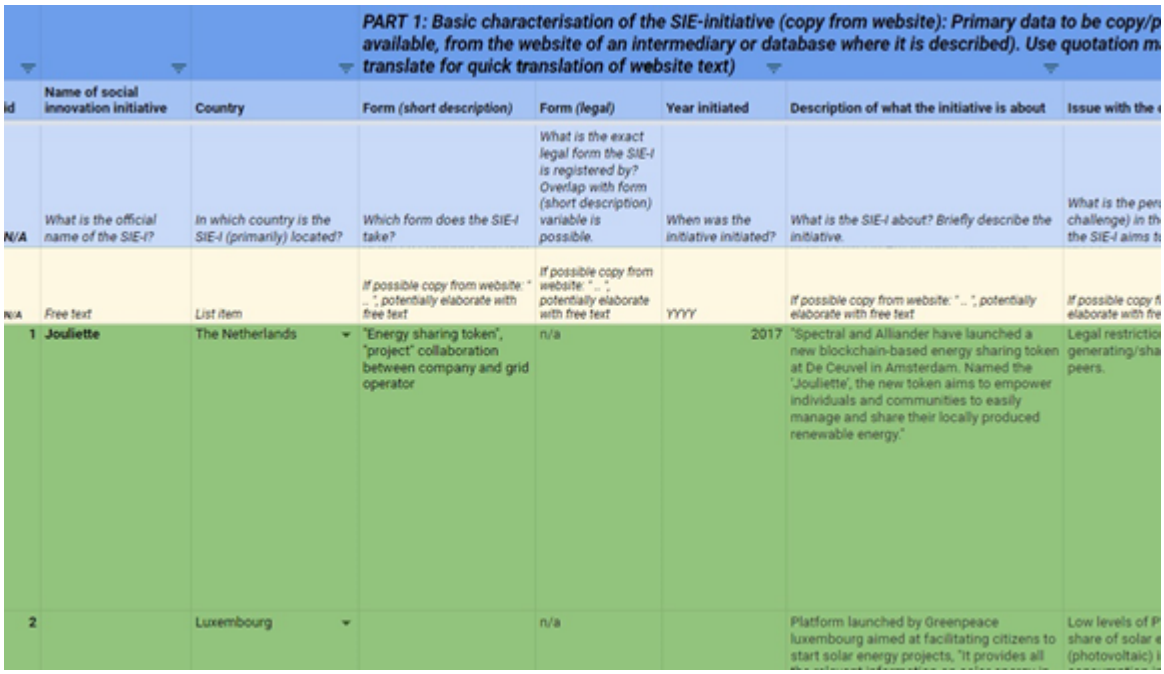
Evidence of accomplishment

The SIE data base supporting this document can be found on SONNET's owncloud folder for WP1 (\SONNET cloud\01_WP1 frame_concept_synthesis\02_T1_2 Mapping\04_Mapped_SIE).

APPENDIX 2: MAPPING

The mapping was done using Excel – see a screenshot of this database below (Figure 5).

Figure 5: Screenshot of Mapping Database



			PART 1: Basic characterisation of the SIE-initiative (copy from website): Primary data to be copy/p available, from the website of an intermediary or database where it is described). Use quotation m translate for quick translation of website text)				
id	Name of social innovation initiative	Country	Form (short description)	Form (legal)	Year initiated	Description of what the initiative is about	Issue with the
N/A	What is the official name of the SIE-I?	In which country is the SIE-I (primarily) located?	Which form does the SIE-I take?	What is the exact legal form the SIE-I is registered by? Overlap with form (short description) variable is possible.	When was the initiative initiated?	What is the SIE-I about? Briefly describe the initiative.	What is the per challenge) in th the SIE-I aims t
N/A	Free text	List item	If possible copy from website: " .. ", potentially elaborate with free text	If possible copy from website: " .. ", potentially elaborate with free text	YYYY	If possible copy from website: " .. ", potentially elaborate with free text	If possible copy f elaborate with fre
1	Jouliette	The Netherlands	"Energy sharing token", "project" collaboration between company and grid operator	n/a	2017	"Spectral and Alliander have launched a new blockchain-based energy sharing token at De Ceuvel in Amsterdam. Named the 'Jouliette', the new token aims to empower individuals and communities to easily manage and share their locally produced renewable energy."	Legal restrictio generating/sha peers.
2		Luxembourg		n/a		Platform launched by Greenpeace luxembourg aimed at facilitating citizens to start solar energy projects, "it provides all	Low levels of P share of solar (photovoltaic)

The following Table 6 provides an overview of all mapped initiatives (for the actual mapping, we refer the interested reader to the underlying database to be later published in Zenodo).

Table 6: Overview of mapped SIE-initiatives in the SONNET SIE mapping database

id	Name of social innovation initiative (SIE-I)	Country
1	Jouliette	The Netherlands
2	Energiebierger	Luxembourg
3	Vereniging Aardehuis	The Netherlands
4	Bristol Green Doors	United Kingdom
5	Selectricity	United Kingdom
6	Together Against Sizewell C	United Kingdom
7	Demand Energy Equality (Bristol)	United Kingdom
8	Bristol Energy Network	United Kingdom
9	Bristol Energy Cooperative	United Kingdom
10	The C.H.E.E.S.E Project (Bristol)	United Kingdom
11	Bedminster Energy Group (Bristol)	United Kingdom
12	Bristol community energy fund	United Kingdom
13	Reepham Green Team	United Kingdom
14	The Big Clean Switch	United Kingdom

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15	Eigg Electric	United Kingdom
16	Repowering London	United Kingdom
17	JoJuSolar	United Kingdom
18	Student Switch Off	United Kingdom
19	Brighton and Hove Energy Services	United Kingdom
20	Transition Town Lewes/ OVESCO	United Kingdom
21	Futureproof (Bristol CSE-led)	United Kingdom
22	Energise Sussex Coast	United Kingdom
23	Community Energy Scotland	United Kingdom
24	Bristol Energy	United Kingdom
25	Bristol's City Leap	United Kingdom
26	Lux Nova Partners	United Kingdom
27	West Sussex County Council BISEPS project	United Kingdom
28	Community Energy Coalition	United Kingdom
29	Thrive Renewables (Bristol)	United Kingdom
30	Regen Ewire, developed by Regen South West	United Kingdom
31	Open LV, by Western Power Distribution	United Kingdom
32	OVO Energy (Bristol)	United Kingdom
33	Coal Action Network	United Kingdom
34	Frack Off, Extreme Energy Action Network	United Kingdom
35	Forest Row Energy - Power partners project	United Kingdom
36	YouGen	United Kingdom
37	Energiesprong	United Kingdom
38	Manchester's Carbon Co-op	United Kingdom
39	Meadows Ozone Energy Service Company	United Kingdom
40	Piclo part of Open Utility	United Kingdom
41	Findorn Eco-village	United Kingdom
42	Community Energy Contact Group	United Kingdom
43	Pure Leapfrog	United Kingdom
44	10:10 Climate Action & Community Energy South (Riding Sunbeams)	United Kingdom
45	Owen Square Community Energy (Bristol)	United Kingdom
46	National Energy Agency	United Kingdom
47	Community Energy England	United Kingdom
48	Energy System Catapult	United Kingdom
49	Ofgem Regulatory Sandbox	United Kingdom
50	South East London Community Energy (SELCE)	United Kingdom
51	Being warm being happy - Project	United Kingdom
52	Community Energy Strategy, DECC	United Kingdom
53	Awel Coop Windfarm	United Kingdom
54	Communities for Renewables	United Kingdom
55	Community Owned Renewable Energy	United Kingdom
56	Energy4All	United Kingdom
57	Gwent Energy Community Interest Company (CIC)	United Kingdom

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58	Low Carbon Across the South East (LoCASE)	United Kingdom
59	Low Carbon Hub	United Kingdom
60	Meadow Blue Energy	United Kingdom
61	PowerPaired (Forum for the Future)	United Kingdom
62	PowerUp North London	United Kingdom
63	Raine Power	United Kingdom
64	Sandford Hydro	United Kingdom
65	Schools Energy Cooperative	United Kingdom
66	UniSolar/Solar SOAS	United Kingdom
67	Springbok Sustainable Wood Heat Co-operative	United Kingdom
68	Welcome to our Woods	United Kingdom
69	Yealm Community Energy	United Kingdom
70	Association for Decentralised Energy (ADE)	United Kingdom
71	Community Energy Plus	United Kingdom
72	Ecodyfi	United Kingdom
73	Marches Energy Agency	United Kingdom
74	Lammas Ecovillage	United Kingdom
75	Coed Hills Rural Artspace	United Kingdom
76	Community Energy South	United Kingdom
77	Green Open Homes/ Eco Open Houses Brighton	United Kingdom
78	Energise London	United Kingdom
79	Urban Community Energy Fund, Centre for Sustainable Energy	United Kingdom
80	Smart Energy GB	United Kingdom
81	Smart Energy Island, Orkney	United Kingdom
82	Peer to peer energy trading trial in Brixton organised by EDF	United Kingdom
83	Fuel poverty service by Changeworks	United Kingdom
84	Energy Knowledge Exchange by Energy Systems Catapult	United Kingdom
85	Extinction Rebellion, Brighton	United Kingdom
86	Just Transition, Friends of the Earth Scotland	United Kingdom
87	Tempus Energy	United Kingdom
88	No to Nuclear Power	United Kingdom
89	Knowle West Media Centre, Replicate Project in Bristol	United Kingdom
90	Wales Community Investment Network/ Community Energy Wales	United Kingdom
91	Co-op Community Energy	United Kingdom
92	Vandebron	The Netherlands
93	Achterhoekse Groene Energiemaatschappij	The Netherlands
94	Lochem energie	The Netherlands
95	Qurrent	The Netherlands
96	Texel Energie | om	The Netherlands
97	WeKa Daksystemen	The Netherlands
98	De Windcentrale	The Netherlands
99	Deltawind	The Netherlands
100	ThuisBaas	The Netherlands

101	Boer zoekt Buur	The Netherlands
102	coöperatieve vereniging Pekela Duurzaam U.A.	The Netherlands
103	Energiecoöperatie duurzaam Assen	The Netherlands
104	Energie Coöperatie Ten Boer (ECTB)	The Netherlands
105	Coöperatieve vereniging Berkelland Energie U.A.	The Netherlands
106	De Groene Reus	The Netherlands
107	Energiecoöperatie Zonnedorpen U.A.	The Netherlands
108	Energiecoöperatie U.A. ZummerePower	The Netherlands
109	Drechtse Energie	The Netherlands
110	Zonnig Zieuwent	The Netherlands
111	Buurtcoöperatie Meer Energie	The Netherlands
112	Haarlem Noorderlicht	The Netherlands
113	Amsterdam 02025	The Netherlands
114	Nationale Energiecommissie	The Netherlands
115	Buurtbatterij Weert	The Netherlands
116	Samen-Sneller-Duurzaam	The Netherlands
117	De buitenkans Almere	The Netherlands
118	De Warren	The Netherlands
119	Gasless house 1905	The Netherlands
120	Groningen Woont Slim	The Netherlands
121	NDSM energie	The Netherlands
122	De EnergyParty	The Netherlands
123	Kracht in NL	The Netherlands
124	Transition Castricum	The Netherlands
125	Energierealisten Enexis	The Netherlands
126	Energiebank Nederland	The Netherlands
127	Blijstroom	The Netherlands
128	Energie Coöperatie Hooghalen	The Netherlands
129	Tegenstroom	The Netherlands
130	Groene Mient	The Netherlands
131	EnergieLab (Eneco)	The Netherlands
132	Energieplus	The Netherlands
133	EnergyFlex	The Netherlands
134	Doe mee en bespaar energie'	The Netherlands
135	Energiearmoede Toolkit	The Netherlands
136	Energielegioen	The Netherlands
137	Startblok Elzenhagen	The Netherlands
138	Energiekaart	The Netherlands
139	Missie Energie	The Netherlands
140	Iedereen doet wat campagne	The Netherlands
141	HIER opgewekt	The Netherlands
142	Levend platform Energie & Omgeving (LEO)	The Netherlands
143	Powerpeers	The Netherlands

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144	Platform 31	The Netherlands
145	Summerschool Energiearmoede	The Netherlands
146	Training sociale innovatie in de Energietransitie / topsector energie	The Netherlands
147	Topvrouw@Work (now: "topvrouw van het jaar')	The Netherlands
148	Vrouwen in Energie Noord Nederland (VIEN)	The Netherlands
149	UNETO-VNI	The Netherlands
150	Assocation EcoWare	The Netherlands
151	Kennis en Praktijkcentrum Energietransitie	The Netherlands
152	Energia	The Netherlands
153	Energy for Refugees TU Delft	The Netherlands
154	The green village	The Netherlands
155	Energieloket Flevoland	The Netherlands
156	Schoonschip	The Netherlands
157	EnergieSamen	The Netherlands
158	Nieuw Zuid	Belgium
159	Zuidrand Antwerpen	Belgium
160	Ecohuis Antwerpen	Belgium
161	Energiesnoeiers	Belgium
162	Samen klimaatactief	Belgium
163	Flux50	Belgium
164	Stadslab2050	Belgium
165	Energy Ville	Belgium
166	Klimplant Antwerpen	Belgium
167	Postcoderoosregeling	The Netherlands
168	Exit policy of shareholdes in community energy projects	Luxembourg
169	PRIME-House subsidies for PV systems	Luxembourg
170	thermovault	Belgium
171	Q-pinch	Belgium
172	Restore	Belgium
173	POM Antwerpen	Belgium
174	Green energypark	Belgium
175	KampC	Belgium
176	Zonnekaart Vlaanderen	Belgium
177	Wind voor A	Belgium
178	Assist2gether	Belgium
179	EnergieID	Belgium
180	Samenslimaankopen	Belgium
181	Blue Village Franklin	Germany
182	Square Mannheim	Germany
183	Living Lab Walldorf	Germany
184	Berliner Energietisch	Germany
185	FlurfunkE	Germany
186	GreenVesting	Germany

187	Heidelberger Energiegenossenschaft	Germany
188	Mannheim begrünen	Germany
189	Agora Energiewende	Germany
190	GermanWatch	Germany
191	Sonneninitiative e.V.	Germany
192	Agentur für erneuerbare Energien (AEE)	Germany
193	Forum Synergiewende	Germany
194	3malE	Germany
195	StromDAO	Germany
196	VIC Sonnenspeicher	Germany
197	Bündnis Bürgerenergie	Germany
198	Clean Energy Wire	Germany
199	Climathon	Germany
200	Bündnis Energiewende Wiesbaden Taunus	Germany
201	Change!Energy	Germany
202	Elblox	Germany
203	Energie Route im Aller-Leine-Tal	Germany
204	Stromspar-Check Aktiv – Klima- und Umweltschutz im Alltag für Haushalte mit geringem Einkommen	Germany
205	Sanierungsmanagement Käfertal	Germany
206	Econeers	Germany
207	Bürgerdialog Stromnetz	Germany
208	Ubitricity	Germany
209	Aktionskreis Energie e.V.	Germany
210	Lichtblick	Germany
211	Grüne Sachwerte	Germany
212	WestfalenWindBeyond	Germany
213	Transition Initiativen	Germany
214	BUZZN People Power	Germany
215	Alliander	Germany
216	Dynamis	Germany
217	Discovergy	Germany
218	Meistro	Germany
219	Bioenergiedorf Jühnde	Germany
220	Ökodorf Sieben Linden	Germany
221	netzwerk n	Germany
222	Solar-Allerfähre Otersen	Germany
223	MetropolSolar	Germany
224	Deutsche Energie Agentur (dena)	Germany
225	Suburbane Wärmewende	Germany
226	Energiegenossenschaft Odenwald	Germany
227	100ee Region Flecken Steyerberg	Germany
228	Energiewende Genossenschaft	Switzerland

229	Climate school from myblueplant: Every cell counts ("Jede Zelle zählt – Solarenergie macht Schule")	Switzerland
230	Optima Solar Schweiz Genossenschaft	Switzerland
231	Quartierstrom	Switzerland
232	Stromallmende of Energiegenossenschaft Schweiz	Switzerland
233	sunraising	Switzerland
234	VESE	Switzerland
235	Suhrsolar	Switzerland
236	Energieallianz Linth	Switzerland
237	Urban settlement "Reitmen"	Switzerland
238	"Basel renewable - for a secure and affordable energy provision"	Switzerland
239	ForumE	Switzerland
240	Pupils at the centre of the energy transition	Switzerland
241	EVG Zentrum	Switzerland
242	Energiequartier "Hohlen" Huttwil	Switzerland
243	Baugenossenschaft mehr als wohnen	Switzerland
244	Photovoltaik forum	Switzerland
245	Erlenmatt Ost EVG	Switzerland
246	Buyeco	Switzerland
247	Younergy	Switzerland
248	enerjoy	Switzerland
249	Incubator program of Albert-Köchlin Stiftung	Switzerland
250	ADEV Energiegenossenschaft	Switzerland
251	Energie- und Klimapioniere	Switzerland
252	PEP Energy	Switzerland
253	Fleco Power AG	Switzerland
254	e-can suisse	Switzerland
255	GemeindePOWER project Hohentannen	Switzerland
256	Energietal Toggenburg	Switzerland
257	sun21	Switzerland
258	Suffizienz-Netzwerk-Schweiz	Switzerland
259	Solarify	Switzerland
260	Solafrica	Switzerland
261	Ökostrombörse Schweiz	Switzerland
262	egon	Switzerland
263	Wohnwerk Teiggi Kriens	Switzerland
264	Solarspar (international projects)	Switzerland
265	MuKEn 2014	Switzerland
266	Project „Helionauten the Movement"	Switzerland
267	ewb.HYDROSPEICHER	Switzerland
268	St.Galler Solar Community	Switzerland
269	ewz.solarzüri	Switzerland
270	Community solar of eniwa	Switzerland

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271	The World Alliance for Efficient Solutions (Solar Impulse)	Switzerland
272	Rischer Energie Genossenschaft	Switzerland
273	ZEV	Switzerland
274	Powergia / energy market	Switzerland
275	ILEK	France
276	SOLIHA	France
277	Sol Solidaire	France
278	Enercit	France
279	Je change	France
280	gaz d'ici	France
281	enerfip	France
282	Tepos	France
283	Buxia Energies	France
284	Begawatts	France
285	centrales villageoises	France
286	Ulisse énergie	France
287	le fond OSER	France
288	123 soleil	France
289	Prats de mollo - la preste	France
290	EPI	France
291	DAISEE	France
292	Mur Mur	France
293	ForestEner	France
294	Gazpar	France
295	Urban solar	France
296	campus zero carbonne	France
297	elecocité	France
298	mountain riders / label Flocon Vert	France
299	connaissances des énergies	France
300	jeu de l'oie sur les énergies	France
301	eco gator - topten	France
302	energic	France
303	j'apprends l'énergie	France
304	POAL (Plateforme opérationelle anti-linky)	France
305	POTE (Pionniers ordinaires de la transition énergétique)	France
306	La plateforme verte	France
307	Enercoop	France
308	Negawatt	France
309	les voix du nucléaire	France
310	ABC (Bouygues Construction)	France
311	Métamorphose	France
312	défi "famille à énergie positive"	France
313	Défi "Écoles à énergie positive"	France

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314	Extinction Rebellion	France
315	Bonneuil Fabien	France
316	CLER	France
317	AlterReno	France
318	Citoyens pour le climat	France
319	La fresque du cimat	France
320	Energ'Y Citoyennes	France
321	Projet Solaire d'ici - Energ'y Citoyennes	France
322	Klaster Energii Górniczo-Rolniczej Gminy Gierałtowice	Poland
323	Gorzowski Klaster Energii	Poland
324	Cieszyński Klaster Energii	Poland
325	Gmina Kisielice	Poland
326	Wrocławska Elektrownia Słoneczna	Poland
327	Wirtualna Elektrownia Tauron Ekoenergia	Poland
328	Pilot Maker Elektro ScaleUp	Poland
329	Polski Alarm Smogowy	Poland
330	Eprosument	Poland
331	Więcej niż Energia	Poland
332	Free Volt	Poland
333	Ostrowski Rynek Energetyczny	Poland
334	Obóz dla Klimatu	Poland
335	Młodzieżowy Strajk Kilmatyczny	Poland
336	JiTiV	Poland
337	Konstantynów Łódzki / Centrum Transferu Technologii OZE	Poland
338	Solace	Poland
339	Sepin	Poland
340	Trzymaj ciepło Poznań	Poland
341	Green Communities	Poland
342	CLIKIS	Poland
343	FARMA WIATROWA LOTNISKO W KOPANIEWIE	Poland
344	South Poland Cleantech Cluster	Poland
345	Stowarzyszenie Gmin Polska Sieć „Energie Cités"	Poland
346	Centrum OZE w Bielawie	Poland
347	ANew Institute	Poland
348	ZIELONY PUNKT EDUKACYJNY W SŁUPSKU	Poland
349	Climathon in Warsaw	Poland
350	Spółdzielnia Nasza Energia - Sieć Biogazowni Rolniczych	Poland
351	AgroFresh Park	Poland
352	Seedia	Poland
353	CENTRUM DEMONSTRACYJNE OZE W BYDGOSZCZY	Poland
354	PVmonitor	Poland
355	Social Innovation to Tackle Energy Poverty Solutions Accelerator	Poland

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356	Warszawski Panel Klimatyczny	Poland
357	Potegowo Wind Project	Poland
358	TergoPower Swięciechowa	Poland
359	Spółka Energia Dolina Zielawy	Poland
360	Renewable energy in the block of flats	Poland
361	The Wielkopolska Hydrogen Platform	Poland
362	VPPlant Group	Poland
363	Grinfinity	Poland
364	EuroPACE Project	Poland
365	The Polish National Energy Conservation Agency (KAPE)	Poland
366	Warsaw Power Engineering Students' Conference	Poland
367	Smogathon	Poland
368	Agroenergia	Poland
369	"Dom bez rachunków"	Poland
370	Polska Grupa Biogazowa	Poland
371	Inteligentna Stacja Transformatorowa SPS (Smart Power Station)	Poland
372	Związek Stowarzyszeń Polska Zielona Sieć	Poland
373	Interdisciplinary Division for Energy Analyses	Poland
374	UrbanWind	Poland
375	Spółdzielnia 300 - wypożyczalnia samochodów niskoemisyjnych	Poland
376	Linie-e	Switzerland
377	ibk.myPVstrom	Switzerland
378	Solarstrom-Pool Thurgau	Switzerland
379	Cantonal People's Initiative Zürich "Strom für morn"	Switzerland
380	Cantonal People's Initaitive Thurgau "Ja zu effizienter und erneuerbarer Energie – natürlich Thurgau"	Switzerland
381	Stromsparvreneli	Switzerland
382	SOnnen-Scheine Regio Energie Solothurn	Switzerland
383	Forum Energie Zürich	Switzerland
384	Convention citoyenne pour le climat	France
385	Le grand débat national	France
386	Territoires à énergie positive pour la croissance verte	France
387	cadastre solaire	France
388	sunchain	France
389	energy class factory	France
390	médiateur de l'énergie	France
391	Subvention pour le stockage virtuel (canton de Vaud)	Switzerland
392	SIG-éco21	Switzerland
393	Le-lab	France
394	Direktvermarktung Groupe E	Switzerland
395	Move in Pure	France
396	eGreen	France

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397	FAIRE	France
398	LIGER	France
399	Geosophy	France
400	Tryon	France
401	In Sun We Trust	France
402	Ecojoko	France
403	Ökostrom Schweiz: Biomasse Börse	Switzerland
404	SUSI Partners	Switzerland
405	Repic	Switzerland
406	Klimafonds Stadtwerk Winterthur	Switzerland
407	SOS maires	France
408	swisscleantech	Switzerland
409	Klima Stiftung	Switzerland
410	South Pole	Switzerland
411	blueyellow	Switzerland
412	Impact Hub Fellowship Energy-Cleantech	Switzerland
413	SRM Swiss Renewables Marketplace	Switzerland
414	LinthGegenwind	Switzerland
415	Pro Landschaft Schwyz	Switzerland
416	Freie Landschaft Schweiz	Switzerland
417	Jugend Pro Windrad	Switzerland
418	Klar! Schweiz	Switzerland
419	Allianz Atomausstieg	Switzerland
420	Energiestadt Label	Switzerland
421	UES Habiter 12	France
422	Great challenge - energy	Poland
423	PORT PC (Polish Org. for Development of Heat Pump Technology)	Poland
424	Młodzi Liderzy w Energetyce (MLE)	Poland
425	Koalicja Klimatyczna (The Climate Coalition)	Poland
426	Aeris Futuro	Poland
427	Instytut Energetyki Odnawialnej (IEO)	Poland
428	Energetyka obywatelska w Wieruszowie	Poland
429	Alternator	Poland
430	Cohabitat	Poland
431	Teraz energia	Poland
432	Stowarzyszenie Energii Odnawialnej	Poland
433	Zielona Transformacja Śląska	Poland
434	Energy Transformation Forum	Poland
435	RE-ENERGY Expo	Poland
436	Fine Energy	Poland
437	Co2mmunity	Poland
438	volterres de sun'r	France
439	Sun agri (Sun'R)	France

440	Bâtiment à Energie positive & réduction carbone	France
441	Licht aus	Switzerland
442	Solarzins Canton of Valais	Switzerland
443	Steering levy Canton of Basel	Switzerland
444	BG Zurlinden	Switzerland
445	Sponti-Car	Switzerland
446	Pôle Bois du Grésivaudan	France
447	Le village vertical de villeurbanne	France
448	Gecco	France
449	je-roule-en-electrique.fr	France
450	GREENFIN	France
451	Plüm energie	France
452	Rev3	France
453	Tenerrdis	France
454	Getslib'	France
455	InnovationCity Ruhr	Germany
456	fifty/fifty	Germany
457	Energienetz Berlin Adlershof	Germany
458	Smart Sustainable District Green Moabit	Germany
459	c.HANGE	Germany
460	Polarstern	Germany
461	Clean Energy Global	Germany
462	Servicestelle energetische Quartiersentwicklung Berlin	Germany
463	DACH - energieeffiziente Stadt	Germany
464	energie experten	Germany
465	Bund-Länder-Dialog Contracting	Germany
466	Neue-Energien-Forum Feldheim	Germany
467	zukunftskommunen	Germany
468	Bürgerenergie Tauberfranken	Germany
469	BürgerEnergieGenossenschaft Wolfhagen eG	Germany
470	Carrotmob macht Schule	Germany
471	Green City AG	Germany
472	Leitstern Energieeffizienz	Germany
473	ClimateCulture-Lab	Germany
474	kommunal-erneuerbar	Germany
475	Fördergesellschaft Erneuerbare Energien e.V.	Germany
476	Energieatlas Sachsen-Anhalt	Germany
477	Deutschland macht's effizient	Germany
478	Kom.EMS	Germany
479	Reallabor: Energieavantgarde Anhalt	Germany
480	Energie fürs Quartier	Germany
481	100 prozent erneuerbar stiftung	Germany
482	Energiewendetag	Germany

483	fresh energy	Germany
484	Bürgerwindpark Hollich Sellen	Germany
485	GreenITown	Germany
486	Cities4People Mobilitätslabor Altona	Germany
487	Energie-Detektiv EDe	Germany
488	Dr Watt	France
489	Déclics	France
490	Terragir	Switzerland
491	Conversations carbone	Switzerland
492	ALISEE	France
493	Noé21	Switzerland
494	Energy Coin Foundation	The Netherlands
495	Luxembourg Clean Tech Cluster: Luxinnovation	Luxembourg
496	Transition town luxembourg	Luxembourg
497	National Energy Efficiency Action Plan Luxembourg	Luxembourg
498	EUROSOLAR Lëtzebuerg a.s.b.l	Luxembourg
499	Nearly Zero-Energy Buildings	Luxembourg
500	Energy Performance Certificate (Energiepass) for a building	Luxembourg
501	Energy of Life	Luxembourg
502	Financial consult energy in housing	Luxembourg
503	Vincotte Energie	Luxembourg
504	Smart Energy Cities and Regions	Luxembourg
505	Energy Transition Dialogue in Luxembourg	Luxembourg
506	Workshop - smart grids energy and big data analytics	Luxembourg