

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



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

D3.2: Report on the findings on the diversity, processes and contributions of SIE-fields and their SIE-initiatives in six countries

Deep dives into social innovation in energy through investigating three SIE-fields and their SIE-initiatives in the Netherlands/Belgium

Project Coordinator: Fraunhofer ISI

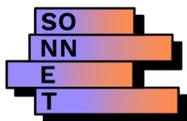
Work Package: 3

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Version: 1.0

March 2021



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GA#: 837498

Funding type: RIA

Deliverable number (relative in WP)	D3.2
Deliverable name:	Report on the findings on the diversity, processes and contributions of SIE-field and their SIE-initiatives in six countries
WP / WP number:	3
Delivery due date:	31/04/2021 (extended to 31/07/2021)
Actual date of submission:	16/04/2021
Dissemination level:	Public
Lead beneficiary:	Science Policy Research Unit (SPRU), University of Sussex
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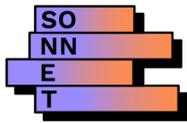
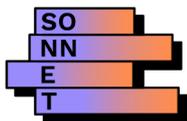
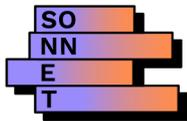


Table of Contents

1	Background	5
1.1	A brief reminder of concepts and research questions.....	5
1.1.1	Emergence, development and institutionalisation of SIE and SIE-field over time	6
1.1.2	SIE-field-actors and other field-actors' interactions with the 'outside' institutional environment.....	7
1.1.3	Enabling and impeding factors for SIE-field-actors and other field-actors to conduct institutional work.....	8
1.2	Embedded, multiple case study approach.....	9
2	Introduction to SIE-fields and SIE-initiatives studied in the Netherlands/belgium .	11
2.1	Participatory Incubation and Experimentation.....	11
2.2	Financing and Subsidy Mechanisms for Renewable Energy	12
2.3	Framings against Fossil Fuel Energy Pathways	13
3	Brief introduction to the Dutch energy sector relevant for SIE	16
3.1	Description of national energy system and governance of energy system (major changes over time).....	16
3.2	Major energy policy changes relevant for SIE.....	18
3.3	Key economic, cultural, historical and social developments relevant for SIE .	20
4	Methodology	21
4.1	Researchers' relations to the cases.....	21
4.1.1	Proximity – distance.....	21
4.1.2	Reciprocity and mutual benefits.....	21
4.1.3	Social innovation actors as research subjects or objects	21
4.1.4	Normativity, transparency and diversity in data sources.....	21
4.2	Short description of methods	22
4.2.1	Document review.....	22
4.2.2	In-depth interviews	22
4.2.3	Participant observation	23
4.3	Description of analysis	23
4.4	Reflections on overall methodology.....	24
5	Summary of each case study report: Three SIE-fields and their SIE-initiatives.....	25
5.1	Case study 1: Participatory Incubation and Experimentation	25
5.1.1	How have the SIE and SIE-field emerged, developed and institutionalised over time?.....	25
5.1.2	How do SIE-field actors and other field actors interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?.....	43
5.1.3	What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the 'outside' institutional environment?	69
5.2	Case study 2: Financing and Subsidy Mechanisms for Renewable Energy	81



5.2.1	How have the SIE and SIE-field emerged, developed and institutionalised over time?	81
5.2.2	How do SIE-field actors and other field actor interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?.....	92
5.2.3	What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the 'outside' institutional environment?	111
5.3	Case study 3: Framings against Fossil Fuel Energy Pathways	121
5.3.1	How have the SIE and SIE-field emerged, developed and institutionalised over time?	121
5.3.2	How do SIE-field actors and other field actor interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?.....	129
5.3.3	What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the 'outside' institutional environment?	134
6	Reflections From a Belgian perspective	140
6.1	Case 1: Participatory incubation and experimentation	141
6.2	Finance and subsidy mechanisms for RE (wind and solar)	143
6.3	Framings against fossil fuel energy pathways	145
7	References	149
8	Appendix: Three case study reports	154



Figures

Figure 1: Summary of overall visual conceptual map	9
Figure 2: Illustration of SONNET’s embedded, multiple case study applied, including national context.....	10
Figure 3 Multi-actor perspective of Avelino and Wittmayer (2015) as adopted from Evers and Laville (2004, p. 17).....	29
Figure 4 Multi-actor perspective of Avelino and Wittmayer (2015) adopted from Evers and Laville (2004, p.17).....	82
Figure 5 Multi-actor perspective (Avelino and Wittmayer, 2015) as applied to this case study. The figure shows that the SIE-field increasingly formalises and privatises over time. It also shows an increasing for-profit logic within the state.....	82
Figure 6 Activities of actors in this SIE-field: subsidising or financing (blue), lobbying for (green) or against (red), and formalising (orange).....	84
Figure 7: Overview of the primary energy sources in Belgium	140

Tables

Table 1: Overview SIE-field, SIE and SIE-initiative examined in the Netherlands.....	14
Table 2 Summary of the various formats over time.....	25
Table 3 Examples from the case study where a new actor takes up an existing role	27
Table 4 Relevant activities and narratives developed and manifested by SIE-field actors and other field actors over time.....	30
Table 5 The largest events, shocks and trends that enabled this SIE-field.....	46
Table 6 The most relevant events, shocks and trends that impeded this SIE-field.....	55
Table 7 Overview of networks and how these emerged from events within the case study.	63
Table 8 Types of institutional work, copied from Fuenfschilling and Truffer, 2015, as adapted by Lawrence and Suddaby, 2006.....	69
Table 9 Types of institutional work of SIE-field actors.....	69
Table 10 The most important activities linked to creating, maintaining and transforming institutions in two examples from the case study.....	77

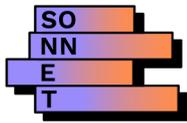
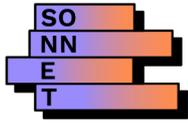


Table 11 Factors that have enabled or impeded institutional work through power 'with' and power 'to', based on the example of Aardehuizen, Buiksloterham and Stadslab2050.....	78
Table 12 Relevant activities and narratives developed and manifested by SIE-field actors and other field actors over time.....	84
Table 13 Main finance and subsidy mechanisms for solar/wind RE in the Netherlands discussed in this case study.....	87
Table 14 Type of role innovations in this case study for actors, the SIE-field and the outside institutional environment.....	89
Table 15 Types of networks in this case study.....	91
Table 16 Overview of which institutions in the 'outside' institutional environment have translated to the SIE-field.....	92
Table 17 The largest events, shocks and trends that enabled this SIE-field.....	94
Table 18 The largest events, shocks and trends that impeded SIE.....	96
Table 19 Types of institutional work, copied from Fuenfschilling and Truffer, 2015, as adapted by Lawrence and Suddaby, 2006.....	111
Table 20 Types of institutional work of SIE-field actors.....	112
Table 21 The most important activities linked to creating, maintaining and transforming institutions in two examples from the case study.....	116
Table 22 The types of institutional work around the institutionalisation of crowdfunding platforms in chronological order.....	118
Table 23 The types of institutional work around the institutionalisation of Invest-NL in chronological order.....	118
Table 24 Factors that have enabled institutional work through power 'with' and power 'to', based on the example of crowdfunding and Invest-NL.....	119
Table 25 The contributions of institutional work of SIE-field actors to the SIE-field (incomplete list).	120
Table 26: Overview of SIE initiatives studied in Belgium.....	141



1 BACKGROUND

SONNET (Social Innovation in Energy Transitions) brings diverse groups together to make sense of how social innovation can bring about a more sustainable energy sector in Europe. The project aims to co-create a rich understanding of the diversity, processes, contributions, successes and future potentials of social innovation in the energy sector (SIE). We define SIE as a combination of ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy. For example, organising under cooperative principles to generate renewable energy.

As part of the WP3 case study work, we have produced 18 embedded case studies of SIE-fields across all six SONNET countries (including 36 cases of SIE-initiatives nested within them). This report outlines the case study work conducted in the Netherlands/Belgium. It contains the following sections:

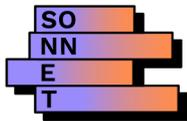
Section 1 provides some reminders of the concepts and research questions. Section 2 introduces the SIE-fields investigated in the Netherlands/Belgium. Section 3 outlines the Dutch energy sector, in particular, the national energy system, the governance of the energy system, major energy policy changes, and social and cultural changes linked to the energy sector. Section 4 details the methodology of the Netherlands/Belgium work, including reflections on researchers' relations to the case. Section 5 contains a summary of each SIE-field studied in the Netherlands/Belgium through answering the major and minor research questions that have guided the empirical work. A list of references can be found in section 6. The three case study reports about the emergence and development of SIE-fields in the Netherlands/Belgium can be found in the appendix.

The country report builds on the previous SONNET work as outlined in deliverable 1.1, 1.2 and 3.1. It should therefore be read in combination with these deliverables. For example, the conceptual work is only briefly introduced in this report. For more detailed information, the reader should turn to D1.2 and 3.1.

1.1 A brief reminder of concepts and research questions

This section introduces three intertwined (and also distinct) empirical foci that have been investigated in WP3 (including definitions of key concepts and a visual conceptual map). The foci are: 1) emergence, development and institutionalisation of SIE and SIE-field over time, 2) SIE-field-actors and other field-actors' interactions with the 'outside' institutional environment, and 3) enabling and impeding factors for SIE-field-actors and other field-actors to conduct institutional work. The following three major research linked to these foci are:

- ▲ How do SIEs and SIE-fields emerge, develop and institutionalise over time?



- ▲ How do SIE-field-actors and other field-actors interact with the ‘outside’ institutional environment and thereby co-shape the SIE-field over time?
- ▲ What are the enabling and impeding factors for SIE-field-actors and other field-actors to conduct institutional work and change the ‘outside’ institutional environment?

For more detail on this work see D1.2 and D3.1.

In the following sub-sections, we introduce each of the three parts with short empirical narratives, conceptual working definitions, and a brief characterisation of the key aspects of the SIE-field that we investigate in our case studies.

1.1.1 Emergence, development and institutionalisation of SIE and SIE-field over time

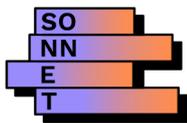
Diverse SIE initiatives (and other SIE-field-actors) work on SIE and interact with other field-actors (who enable and/or impede the same SIE) within an SIE-field over time. SIE-field-actors (who work on SIE) and other field-actors (who enable and/or impede SIE) are actors within the SIE-field. These actors take one another and their activities into account and have a shared (but not necessarily consensual) understanding of an SIE and of their relationship to one another. Over time, SIE-field-actors’ and other field-actors’ patterns of activities can become more and more held in place, and practically taken for granted within an SIE-field. Actors can start to recognise (but not necessarily follow) shared norms, beliefs and rules.

The main focus in this part is on the emergence and development of SIE within an SIE-field as well as the development of SIE-initiatives, SIE-field-actors and other field-actors. We want to empirically identify how actors manifest around specific SIE and develop collectives (e.g. informal and formal alliances/networks/collaborations) and shared (but not necessarily consensual) narratives and activities (and associated norms, beliefs and values) over time. We are also interested in understanding what is ‘socially innovative’, by specifying the ideas, objects and actions these actors and collectives are working on within an SIE-field, and how these demonstrate a change in social relations and new ways of doing, organising and thinking.

Social innovation in the energy sector (SIE) is a combination of ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy. An example: Organising under cooperative principles to generate renewable energy.

SIE-initiative is a localised version/manifestation in time and space of a SIE. It includes SIE-field-actors, as those actors working on SIE. They can be from every sphere of society (community, market, state, third sector = SIE as multi-actor phenomena). Examples are: Ecovillage Aardehuizen and Living Lab Walldorf.

SIE-field-actors are individuals, organisations or other collectives who are part of a certain SIE-field and actively work on SIE. They can be from every sphere of society (community, market, state, third sector = SIE as multi-actor phenomena). Examples are: Cooperatives, citizen initiatives, energy companies, start-ups, local governments, intermediaries and NGOs.



Other field-actors are individuals, organisations or other collectives who are part of a certain SIE-field – these can enable and/or impede SIE. They can be from every sphere of society (community, market, state, third sector). Examples are: Local governments, national governments, professional organisations, industry actors and citizens.

A SIE-field is an arena/space that includes a specific SIE as well as SIE-field-actors working on it and other field-actors enabling and/or impeding it. In this space these actors take one another and their actions into account and have a shared (but not necessarily consensual) understanding of a SIE and of their relationship to other actors. They recognise (but not necessarily follow) shared norms, beliefs and rules. SIE-fields are often not homogenous but are composed of actors with diverse and contradictory aims and interests. An example: The UK cooperative energy field includes SIE-initiatives and SIE-field-actors (e.g. Brighton Energy Co-op, Cooperative UK, Community Energy England, UK Government, City of Brighton), who have a shared understanding of an SIE, which exists as 'organising under cooperative principles to generate renewable energy'.

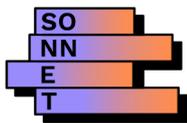
Institutionalisation is a process by which a pattern of activities comes to be regulative, normatively and cultural-cognitively held in place, and practically taken for granted within a SIE-field. The degree of institutionalisation is linked to the emergence and stability of a SIE-field.

1.1.2 SIE-field-actors and other field-actors' interactions with the 'outside' institutional environment

The SIE-field (and its actors) are nested within an 'outside' institutional environment linked to an energy system. This environment is constituted by formal and informal institutions that shape the activities of SIE-field-actors and other field-actors within the SIE-field. Although energy systems consist of a wide range of institutionalised rules, norms, and beliefs, these institutions have been object to profound changes over the past decade. These changes are due to manifold developments and can be grounded in field events and contestations, inter-field interactions, external shocks and societal trends.

The main focus is on the interactions of SIE, SIE-field-actors and other field-actors with the 'outside' institutional environment, thereby co-shaping the SIE and its SIE-field and potentially creating institutional changes or maintaining the existing environment. We are interested in the 'outside' institutional environment that 'surrounds' and 'penetrates' the SIE-field. We want to understand how dominant institutions (regulative, normative and cultural-cognitive elements) within the 'outside' institutional environment influence the emergence and development of SIE (i.e. their social relations and patterns of doing, organising and thinking) within an SIE-field.

To understand how SIE-field-actors and other field-actors interact with the 'outside' institutional environment, we also need to identify and examine field events and contestations, inter-field interactions of SIE-fields and external shocks and societal trends. We are interested in how these events, contestations, relations, shocks and trends influence SIE-field developments and 'outside' institutional environments, as they co-shape each other over time. A particular focus is on political and policy developments.



Formal and informal institutions constitute the institutional environment. The SIE-field itself constitutes an environment (= SIE-field institutional environment) but also is nested with the larger encompassing institutional environment (= outside institutional environment). The SIE-field and its institutional environment consist of institutions and actors who interact with each other. The 'outside' institutional environment consists of institutions that can 'penetrate' (i.e. shape/ influence/ interact with) the SIE-field.

Institutional change is any change in form, quality or state in an institution or arrangement of institutional elements.

Institutions are made up of regulative, normative and cultural-cognitive elements. They are tacitly or explicitly agreed upon rules constraining or enabling activities of actors that provide stability and meaning to social life. These can be: 1) Regulative institutions: laws, rules, standards, policies, 2) Normative institutions: norms and value systems, and 3) Cultural-cognitive institutions: shared conceptions of reality, binding expectations, common beliefs.

Field events are events, which might influence actors' relations and interactions within the SIE-field and can 'unsettle' the existing 'outside' institutional environment (but not necessarily change it). An example: A community energy advocacy group that was set up at a conference and started to talk to policy makers about their activities.

Field contestations are debates among SIE-field-actors and/ or other field-actors over SIE-field structures and processes. These contestations can 'unsettle' the existing 'outside' institutional environment (but not necessarily change it). An example: Contestations over regulatory and industrial policy linked to energy infrastructure developments.

Inter-field relations are interactions between SIE-fields (they can be nested and/ or overlapping). An example: Cooperative energy is nested within community energy in the UK.

External shocks and societal trends are, for instance, climate change, national elections, capitalism, ageing population, and economic crises that influence SIE-fields structures. Examples: Economic crises, weather disasters, and pandemics.

1.1.3 Enabling and impeding factors for SIE-field-actors and other field-actors to conduct institutional work

SIE-initiatives, other SIE-field-actors, and other field-actors perform institutional work. This means they engage in creating, maintaining and transforming institutions to be able to work on, enable and/ or impede SIE developments. Not all of the actors might be able to conduct this work (e.g. depending on skills, capacities, intentions and resources). There might be factors that can support or hinder institutional work. Some of the work conducted might have intentional or unintentional effects. Institutional changes can occur if the work and its activities appear to be more and more legitimate over time while previously institutionalised practices become eroded.

The main focus is on studying the practices of institutional work conducted by SIE-field-actors and other field-actors, in particular, aiming to understand the factors that allow (or not) for these activities to be performed. We examine why, how, when and where actors work at creating,

maintaining and transforming institutions. This then enables us to build an understanding of the different forms of institutional work, types of work conducted (boundary work, strategy work, etc.), actors who are engaged (or not) in this work and enabling and impeding factors to be able to conduct this work.

Drawing attention to the practices rather than purely accomplishments of institutional work allow for an investigation of intended effects but also unintended consequences, i.e. success as well as failure, winners and losers, and acts of resistance and transformation. This then enables us to study how SIE-field-actors and other field-actors potentially contribute to institutional changes and/or maintain existing ‘outside’ institutional environments.

Institutional work refers to the activities of SIE-field-actors and other field-actors that aim to create, maintain and transform institutions. Examples: 1) Attempts to influence policy makers and the general public through direct lobbying, research reports, positioning papers, advertising, and the setting of technical standards and 2) Attempts to influence informal institutions, such as values, norms, binding expectations, common beliefs, habits, and routines, among the wider public (Arenas 2017).

These foci are visualised in Figure 1 below (black = ‘outside’ institutional environment; blue = SIE-field and its SIE and actors; orange = change/ maintain processes).

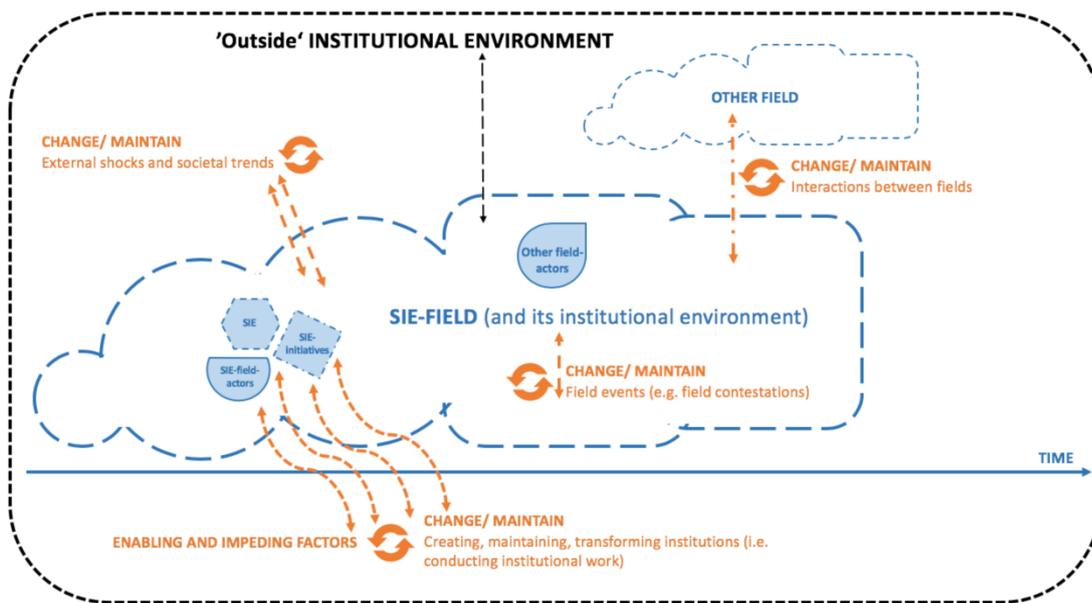
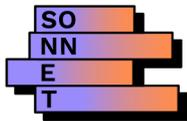


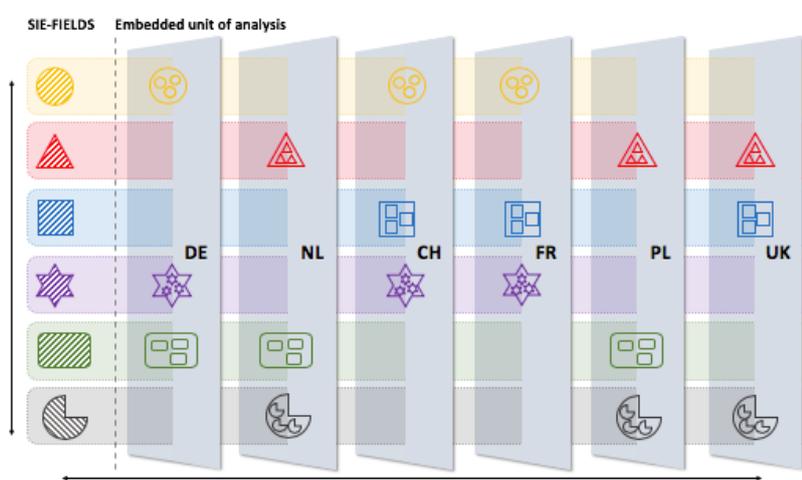
Figure 1: Summary of overall visual conceptual map

1.2 Embedded, multiple case study approach

In SONNET, we have identified eighteen clustered SIEs that together with SIE-field-actors and other field-actors make up the SIE-fields (for more detail see D1.1 and D1.2). To be able to study the



SIE-fields in-depth and compare them, we have first delineated the national context as an important factor in the development and emergence of SIE and have included a diverse mix of country contexts (FR, DE, CH, PL, UK, NL/BE). We then developed a SIE-typology (see deliverable D1.1) and identified SIE clusters (see deliverable D1.2) and selected six SIE-fields for further investigation. The selection of SIE-fields was grounded in a purposive sample including the following selection criteria: 1) recognisability and prevalence of SIE-fields in each national context (i.e. SIE-fields had to be empirically recognisable in each SONNET country); 2) full coverage of interactions and manifestations that have been identified for the SIE-typology in WP1 (e.g. cooperative/doing and conflict/thinking); and 3) practical considerations including synergies with other SONNET work and building upon consortium expertise, relations in the field and interests of country teams. The following six SIE-fields have been selected in different national contexts:

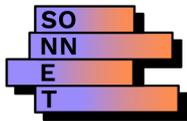


Circle: Cooperative organisation models for renewable energy; Triangle: Framings against fossil fuel energy pathways; Square: Local electricity exchange; Star: City level competition for sustainable energy; Rectangle: Participatory incubation and experimentation; Half Moon: Financing and subsidies for renewable energy.

Figure 2: Illustration of SONNET's embedded, multiple case study applied, including national context

In the UK, we have produced case study reports for the following SIE-fields: 1) Framings against fossil fuel energy pathways, 2) Local electricity exchange and 3) Financing und subsidies for renewable energy.

See deliverable 3.1 for more information about SONNET's embedded case study approach.



2 INTRODUCTION TO SIE-FIELDS AND SIE-INITIATIVES STUDIED IN THE NETHERLANDS/BELGIUM

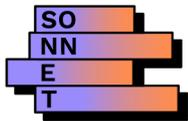
In the Netherlands/Belgium, we have examined three SIE-fields including at least three initiatives each. These SIE-fields are the following three: 1) Participatory incubation and experimentation, 2) Financial and subsidy mechanisms for renewable energy, and 3) Framings against fossil fuel energy pathways. For each of these SIE-fields, we have researched how they emerged and developed over time – these historical accounts are outlined in three case studies (see Appendix). In this section, we provide a short introduction to each of these.

In studying these SIE-fields, we focused on the Netherlands and broadened this out to cover Belgium in different ways. Firstly, we analysed Flanders, Belgium as part of the Participatory incubation and experimentation in the actual case study; while for the other two fields, we added reflections on the Dutch case studies from a Belgian perspective as well as introduced five additional SIE-initiatives as part of this country report (see Section 6).

2.1 Participatory Incubation and Experimentation

SONNET studies 'Participatory incubation and experimentation' in Germany, Poland and the Netherlands/Belgium. These are multi-actor, collaborative formats that aim to experiment with and/or try out novel energy solutions in specific local settings. This includes formats that bring together actors from different societal spheres to work together (rather than to have a dialogue only) in a project-like setting. To qualify, a collaboration needs to be considered by at least one of the actors as an 'experiment' meaning that it aims at testing, investigating or trialling a specific solution and/or clearly aims at learning from putting certain solutions in practice. Such experimentation focuses on energy topics such as electricity, heat, (bio)gas (not including transport).

The innovation history in the case study report covers the development of several multi-actor collaborative experimentation formats in the Netherlands/Belgium during the period between 2000 and 2020. This includes formats originating from and being funded by the Dutch government and therefore mirroring changes in the emphasis of each Research & Development (R&D) policies (e.g. transition experiments, Topsector R&D formats, smart grid testbeds, regulatory sandboxes, testbeds for gas-free neighbourhoods). In our analysis, these are joined by more locally originating formats, such as Living Labs (e.g. technical and societal Living Labs). The main storyline in this innovation history is situated in the Dutch context and includes reflections with regards to the developments in Flanders, Belgium. Specifically, we have chosen the development and implementation of the fourth Dutch National Environmental Policy Plan in 2001 in the Netherlands as a starting point for the innovation history, since it signifies a proliferation of energy-related experiments – framed as transition experiments and set in a context of learning processes for structural societal changes, i.e. energy transitions.



In this SIE, actors experiment with and learn from novel energy solutions. These solutions may include new technologies, funding mechanisms or governance structures (i.e. objects). The actors that partake in this experimentation operate in novel collaborative formats. These formats draw upon new ideas of collaboration between actors (i.e. ideas). The main changes that we traced for these formats in the innovation history outlined in chapter 5, refer to the actors collaborating, the roles that these actors take and the main parameter of the experiment. Three actors who work on this SIE are featured in our work on 'participatory incubation and experimentation', these are:

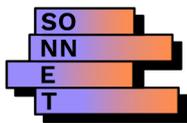
- **Living Lab Buiksloterham** brought together citizens to self-organise and build an energy efficient neighbourhood in Amsterdam after the financial and economic crisis of 2008/09. Living Lab Buiksloterham is one of the more established, well documented, and ongoing Living Labs in the Netherlands.
- **Stadslab 2050**, the Living Lab approach of the city of Antwerp heralds several trajectories focusing on energy topics (next to a broader climate change agenda). In Stadslab2050 businesses, citizens and local energy stakeholders have experimented with ways to i.e. decrease the energy consumption of shops.
- **Aardehuizen, an ecovillage in Olst**, is formalised as a housing organisation in which 26 households work together to reduce regional grid congestion by peakshaving electricity (i.e. through installing a local battery and exchanging energy locally).

2.2 Financing and Subsidy Mechanisms for Renewable Energy

SONNET studies 'Financing and subsidy mechanisms for renewable energy' in the UK, Poland and the Netherlands. Reflections from a Belgian perspective are part of this country report. In studying this field, we focus on renewable energy (RE) subsidies and financial instruments geared at energy technology diffusion, such as public and private equity (i.e. ownership of shares) and corporate debt (i.e. bank loans). In particular, we elaborated on the following set of financing and subsidy mechanisms for RE projects installing wind and solar energy in the Netherlands: national subsidies, regional funds, crowdfunding through online crowdfunding platforms and state loans through a national promotional bank. This focus has emerged through interactive explorative research. We study the time period between 1998-2020. The case study starts with the first step towards liberalisation through the Gas and Electricity Act in 1998 and ends at the time of producing the case study in December 2020.

This field discusses the social innovation rendered by finance and subsidy mechanisms for solar and wind energy. The socially innovative aspect is the fact that these mechanisms change the social relations amongst actors (i.e. municipalities, national governments, banks, institutional investors, citizens) and change their current way of doing, thinking and/or organising. Two actors who work on this SIE are featured in our work on 'Financing and subsidy mechanisms for renewable energy', these are:

- **Invest-NL** is a national promotional bank with 1.7 billion EUR available to invest in the



energy transition (among others). It was selected to be studied in this case study for two reasons. Firstly, because its focus on financing rather than subsidisation marks the changing tides in the government around 2012-2015: from a government focused on subsidising RE, it became more interested in investing in RE. Secondly, because it portrays an example of institutional work through institutional entrepreneurship.

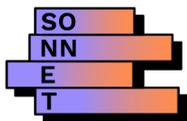
- **DuurzaamInvesteren** is a crowdfunding platform, which was included in this case study because tells the story of increasing financial citizen participation in the energy transition.

2.3 Framings against Fossil Fuel Energy Pathways

SONNET studies ‘framings against fossil fuel energy pathways’ in the United Kingdom, Poland and the Netherlands. Reflections from a Belgian perspective are part of this country report. The boundaries of the SIE-field are defined by framings that are being produced and are grounded in anti-fossil fuel energy pathways, that means all types of framings against different fossil energy sources. These are non-renewable resources that are either imported and/or extracted through drilling and mining and then burnt to produce electricity or refine them for use as fuel for heating. **In the Netherlands, this report focuses on three framings: (1) anti-gas extraction from the Groningen gas field; (2) anti-fracking of shale gas; (3) divestment from fossil fuel industries.** The report does not touch upon anti-coal, since in 2019 the government announced to close all coal-based power plants by 2029 after it had halted coal extraction already in 1974. Also, the report does not touch upon anti-oil framings. There are only a few onshore oil fields within the geographical boundaries of the Netherlands, in which oil is currently extracted.

The emergence and development of those three framings against fossil fuel energy pathways and the diverse actor constellations and activities are studied over a period of just more than ten years, starting in 2009 until 2020. We have taken 2009 as a starting point since it marks the start of a period that sees a surge in framings against fossil fuels in the Netherlands: protest and framings against the fracking of shale gas in several locations in the Netherlands (2010), followed by protest against gas extraction in the province of Groningen (especially after a severe earthquake in 2012) and framings around fossil fuel divestment (in 2013). Also, it has proven to be difficult to draw clear boundaries between activities through which actors engage actively in framing and frame changes from other types of activities (such as direct action, civic disobedience, awareness raising). In exploring the emergence and development of ‘framings against fossil fuel energy pathways’ in the Netherlands, we included different activities within these three main framings while concentrating on the relationship between those activities and actual frames and frame shifts.

The SIE that we investigated refers to configurations of novel ideas against fossil fuel energy pathways. These are combined with actions such as protesting, campaigning or lobbying using both established means (e.g. banners, bodies, sites). Moreover, these novel ideas against fossil fuel energy pathways make use of novel digital infrastructures (e.g. websites, social media). These actions and ideas aim to change dominant (societal) discourses about existing energy

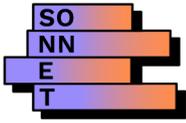


pathways, influence policymaking and/or ‘stop’ local fossil fuel production and include imaginaries of novel social relations. Three actors who work on this SIE are featured in our work on ‘framings against fossil fuel energy pathways’. These are:

- **Groninger Bodem Beweging** (GBB, Groningen Soil Movement) is a member-based association that was founded in 2009. It represents the interests of all those who suffer (emotionally and/or financially) from consequences of gas extraction in Groningen.
- **Schaliegasvrij Nederland** (Shalegasfree Netherlands) is a foundation established in 2012. It aimed at a moratorium on the exploitation of unconventional natural gas through fracking.
- **Fossielvrij NL (Fossil Free NL)** is a foundation established in 2016 to institutionalise the activities of 350.org in the Netherlands. It aims at building a civil society movement to accelerate the transition towards a just and renewable energy system specifically focusing on dismantling the fossil fuel industry.

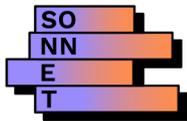
Table 1: Overview SIE-field, SIE and SIE-initiative examined in the Netherlands

Name of SIE-field	Description of SIE-field and its boundaries	SIE definition linked to SIE-field	SIE-initiatives investigated	Other SONNET countries, in which they are being studied
Framings against fossil fuel energy pathways	Focusing on three framings: anti-gas extraction from the Groningen gas field; anti-fracking; divestment from fossil fuel industries. Tracing the development and emergence of different frames within these framings and the activities through which these are advocated. Time period: 2009-2020	Configurations of novel ideas against fossil fuel energy pathways combined with actions such as protesting, campaigning or lobbying using both established means (e.g. banners, bodies, sites) as well as more novel digital infrastructures (e.g. websites, social media), which aim to change dominant (societal) discourses about existing energy pathways, influence policymaking and/or ‘stop’ local fossil fuel production.	<ul style="list-style-type: none"> • Groninger Bodem Beweging • Schaliegasvrij Nederland • Fossielvrij NL 	United Kingdom and Poland
Participatory experimentation and incubation	Multi-actor, collaborative formats that aim to experiment with and/or try out novel energy solutions in specific local settings. It includes formats that bring together actors from different societal spheres to work together (rather than to have a dialogue only) in a project-like setting. Time period: 2000- 2020	Combination of experimenting with and learning from (i.e. action) novel energy solutions including new technologies, funding mechanisms or governance structures (i.e. objects) in formats that draw upon new ideas of collaboration between actors (i.e. ideas).	<ul style="list-style-type: none"> • Living Lab Buiksloterham • Stadslab 2050 • Aardehuizen 	Germany and Poland
Financing and subsidies for RE (solar and wind)	RE subsidies and financial instruments geared at energy technology diffusion, such as public and private equity (i.e. ownership of shares) and	finance and subsidy mechanisms for solar and wind energy change the social relations amongst actors (i.e. municipalities, national governments, banks, institutional investors, citizens)	<ul style="list-style-type: none"> • InvestNL • Duurzaam Investeren 	United Kingdom and Poland



	corporate debt (i.e. bank loans). Time period: 1998-2020	and change their current way of doing, thinking and/or organising		
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For an in-depth reading of the emergence and development of the different fields, please see the appendix. Following this introduction, section 3 provides a general overview of the Dutch energy sector while section 4 provides a comparative overview of the methods used and methodological considerations in each of the three case studies. Section 5 is the core of this report and provides the answers to the main research questions derived from every case study.



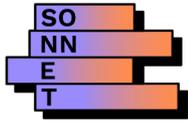
3 BRIEF INTRODUCTION TO THE DUTCH ENERGY SECTOR RELEVANT FOR SIE

This section briefly outlines the Dutch energy sector, in particular, the national energy system, the governance of the energy system, major energy policy changes, and social and cultural changes linked to the energy sector. Rather than providing an in-depth outline, the purpose of this section is to highlight key aspects and changes that are relevant for the SIE. It provides a context for reading the three case study reports (see Appendix).

3.1 Description of national energy system and governance of energy system (major changes over time)

To make sense of the Dutch national energy system, two geological phenomena are key. The first is the **Groningen ‘gas bubble’**, one of the largest onshore gas fields in Europe, discovered in the 1950s, which marks the start of a long history of Dutch gas extraction (Correlje, van der Linde and Westerwoudt, 2003). divided this history into three periods up to 2012 A first period started with the discovery of the gas field in the province of Groningen. Gas extraction started in the 1960s by the NAM (a joint venture between Shell and ExxonMobil), and a national gas grid for Dutch households and industry was built by Gasunie (a joint venture between the Dutch State, Shell and ExxonMobil). The latter was also responsible for sales and secured export contracts with neighbouring countries. This period was characterised by “the perception of energy abundance, low oil prices, economic growth, a relatively closed process of political decision-making, and a rapidly increasing share of natural gas in Dutch energy supply” (Correlje, van der Linde and Westerwoudt, 2003, p. 20). Towards the end of this period, coal extraction in the province of Limburg came to a definite halt (1974) after the discovery of the gas field¹. The second period started with the 1973/74 oil shock which was triggered by a rise in oil prices and increased the importance of natural gas resources. Economic recession, scarcity and increasing environmental awareness led to the encouragement to search for new on- and offshore gas fields and to a stimulation to exploit smaller fields – supply. The higher priced gas from these fields was bought by Gasunie and supplemented by cheaper gas from the large Groningen field to meet national demand and sold at a steady price to customers. In 2020, about half of the gas originates from 175 smaller fields and half from the Groningen field. The third period started with the process of liberalisation of European energy markets in the late 1980s by the EU Commission. These were met with resistance in the Netherlands, but eventually led to a radical separation of gas transport and trading activities (at that time in the hands of Gasunie) and to propose an unbundling of

¹ See <https://www.canonvannederland.nl/nl/kolenengas> (accessed March 2021)



ownership of the trading activities. The prospects for natural gas in the Netherlands changed dramatically between 2012 and 2018 due to rising concerns over climate change and induced earthquakes in the gas-producing province of Groningen. This led to a shift in policy focus from financial to environmental and safety concerns (Beckman and van den Beukel, 2019). Overall, the share of natural gas in primary energy consumption in the Netherlands has been relatively constant over the last decade, fluctuating around 40%. This is significantly higher than the EU average of 23%. This high share (the highest within the European Union) is related to a number of factors: large domestic production, the existence of a distribution grid that covers the entire country, the dominant role that gas plays in the heating of buildings (95 %), and the historically relatively low cost of gas for large industrial and agricultural users which promoted the use of gas in these sectors (Beckman and van den Beukel, 2019). In 2018, the Dutch government decides to phase out natural gas extraction in the area by 2022², adding to the urgency of energy transition strategies away from natural gas, as imported gas scores worse in terms of CO₂ emissions, and comes with geopolitical implications.

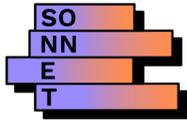
The second geological future of the Dutch landscape shaping the country's energy transition discourse is **the 'polder'**: a term denoting rural and residential land reclaimed from the sea, comprising roughly a fourth of the Netherlands. The process of 'poldering' has also become a metaphor for a type of consensus government prevalent in the Netherlands, building on the image of wide-sweeping coalitions across class structures necessary for land reclamation. In this model, major legislative moves (like changes to the national energy or pension systems) are often preceded by dialogue with a variety of civil society actors such as labour unions and employer organisations, preferably resulting in an accord or agreement, which will be described in the next sections.

So where do the Groningen 'gas bubble' and the 'polder' leave us when it comes to describing the national energy system and its governance?

In the 2019 Dutch energy production mix³, **natural gas is the number one, at 79% of the national energy production** (in petjoules, PJ), although this number is now expected to decrease by 2022. Renewable resources account for 13%, and oil, nuclear and other sources make up the remaining 8%. Together these account for 2 metric tons of CO₂ emissions. Combined with energy imports and exports, primary use looks different, with natural gas at 41%, just ahead of oil use at 39%, and coal at 12%. Renewable resources make up 6% of the primary energy use, but over two thirds of that energy comes from biomass. The extent to which biomass is 'clean' or 'sustainable' is a frequent topic of national debate.

² <https://www.rijksoverheid.nl/onderwerpen/gaswinning-in-groningen>

³ https://www.ebn.nl/wp-content/uploads/2019/01/EBN_Infographic2019_14JAN19.pdf



With a mere 7.38% renewables in 2020, the Netherlands has a low share of renewables as compared to the rest of the EU, ranking third-worst⁴ of all EU member states, surpassing only Malta and Luxembourg. The top three of 2019, Sweden, Finland and Latvia, score higher than 40% each.

Since the liberalisation of the Dutch energy market, the system can be characterized as “radically unbundled”⁵ with no utility bearing responsibility for the national energy chain, but commercial energy activities (electricity, gas) split from network operations. The resulting energy supply chain consists of six links: generation, trading, transmission, distribution, metering and supply, with different companies responsible for each link in the chain.⁶ Six energy companies (Delta, EON, Eneco, Engie, Essent and Nuon) are responsible for electricity generation. The Nederlandse Aardolie Maatschappij (NAM) is responsible for most of the domestic gas exploitation. The NAM is owned by Shell and Exxonmobil, who both own 50% of its shares.

In the Netherlands, there are various groups of grassroots energy organisations, most of which formed in the 2010s, although there were functional energy cooperatives as early as the 1920s and 1980s. The **citizen-owned cooperative** is the most common legal entity, but there are also energy groups organized as foundations, societies, working groups or limited liability companies (NL: besloten vennootschap, BV). In 2019, there were 582 renewable energy cooperatives in the Netherlands, which is a 20% increase compared to 2018⁷.

3.2 Major energy policy changes relevant for SIE

In this section, we introduce the major energy policy changes that are relevant for the three SIE-fields under study (rather than for SIE in general).

For most of the 20th century, the Dutch energy system was state-owned and highly centralised, but the 1998 liberalisation of the energy sector through the new **Electricity and Gas Act** prompted a switch to a sector structured around market actors selling electricity, and public organisations involved in grid operation and regulation. This was initiated by the EU’s **First Energy Directive** of 1996.⁸

Gas exploration and extraction is regulated by the Mining Law⁹ from 2002 on the exploration and extraction of mineral resources and mining related activities, and the Gas Law from 2000 on the transport and supply of gas¹⁰. Both laws have been amended and adapted throughout the

⁴ <https://ec.europa.eu/eurostat/statistics-explained/pdfscache/7177.pdf> p2

⁵ http://www.comets-project.eu/CONTENTS/Publications/Deliverables/D%204.1_Context_Analysis.pdf p57

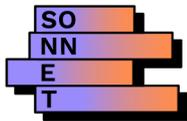
⁶ Tanrisever, F., Derinkuyu, K., & Heeren, M. (2013). Forecasting electricity infeed for distribution system networks: An analysis of the Dutch case. *Energy*, 58, 247–257. <https://doi.org/10.1016/j.energy.2013.05.032>

⁷ Proka, A. Organising for power change: Transformative business models for the energy transition, 2021

⁸ <https://www.europarl.europa.eu/factsheets/en/sheet/45/internal-energy-market>

⁹ <https://wetten.overheid.nl/BWBR0014168/2020-07-01>

¹⁰ <https://wetten.overheid.nl/BWBR0011440/2020-07-10>

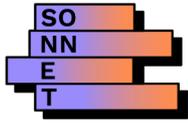


last decade with regards to fracking of unconventional gas and extraction from the Groningen gas field. Fracking unconventional gas led to changes in the Mining Law. This changed to 1) transfer burden of proof by damage to the operator, instead of the victim 2) extend the ground of refusal to protection of the environment, safety or public health, and 3) to have a role for decentral governments in the decision making process related to the mining act. In relation to gas extraction from Groningen, there are numerous policies and regulations, to highlight a few:

- 2014, governmental decision 'Gas extraction in Groningen', including: reduction of extraction, compensation package, future perspective; and administrative agreement 'Trust in repair and repair of trust' (Kamp et al., 2014; Ministerie van Economische Zaken, 2014)
- 2018, governmental decision 'Mining damage Groningen' including a new protocol for handling damage from ground movements and a compensation package of 18 billion EUR by the NAM and the government (Ministerie van Economische Zaken en Klimaat, 2018c)
- 2018, governmental decision to end gas extraction in the Groningen area by 2030 (Ministerie van Economische Zaken en Klimaat, 2018a), which was followed by changes in the **gas law and the mining law** to minimize gas extraction 'Not more than necessary' (Ministerie van Economische Zaken en Klimaat, 2018c)
- In 2020, the **Temporary Law Groningen** came in place which regulates that damage and reinforcement claims are to be handled under public law (Ministerie van Economische Zaken en Klimaat, 2020b), and the first preparations for changes in the mining law got underway to prohibit gas extraction from the Groningen field (Ministerie van Economische Zaken en Klimaat, 2020a)

Also important for how the Netherlands deals with its gas fields is the 'Small Field Policy' introduced in 1974, which (financially) encouraged the exploration and extraction from smaller gas fields.

A key piece of Dutch energy legislature in the 2010s is the 2013 **Energy Agreement**, a "poldered" national agreement between 47 parties, including state and local governments, employer organizations, unions, nature and environmental societies, and other societal and financial institutions. The agreement placed the responsibility of the energy transition with local governments, as well as societal actors and citizens. A more recent policy to consider is the **Dutch Climate Agreement**, the national response to the 2015 Paris Agreement. It is similar to the 2013 Energy Agreement, but specifically geared towards reducing CO₂ emissions. The policy generated follow-up policies and programs, such as the PAW (Programma Aardgasvrije Wijken), a program to stimulate the switch from natural gas to renewable energy sources in Dutch neighbourhoods.



3.3 Key economic, cultural, historical and social developments relevant for SIE

The pace and direction of social innovation in energy is influenced by more than policy, as macro developments in Dutch society also play a large part. The 2008 global financial crisis led to an economic recession that lasted until 2011, which resulted in an overall decentralization of government, with tasks being shifted from central bodies towards municipalities. As a result of austerity measures, the Dutch welfare state was retreating.

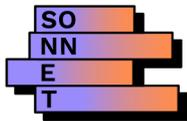
By 2013, there was an increasing responsibility for citizens on a broad array of public questions, as summarised under the term '**participation society**' (equivalent to the UK's Big Society) in the Netherlands, but often not appropriately resourced. The vacuum created by the retreating central state created space for bottom-up activities, coinciding with the 2010s boost in Dutch energy cooperatives.

2015, the year that concluded with the Paris Agreement, was also the year that the Dutch government lost the landmark Urgenda Climate case. The suit, which was brought on behalf of 886 citizens and upheld by the Dutch Supreme Court in 2019, argues that **the Dutch government has a legal duty to protect its citizens** from the harm presented by climate change, more specifically to reduce emissions by 25% by end of 2020 compared to 1990 levels. The Guardian characterized it as "climate action under extreme duress", noting that it the ruling is positive for the uptake of carbon reduction policies.¹¹

In a larger European context, the EU's 2018 Renewable Energy Directive (RED II) and the 2019 Internal Electricity Market Directive (IEMD) provide a boost to SIE initiatives in the Netherlands. In these directives, the EU carves out a formal legal status for 'citizen energy cooperatives' or 'renewable energy cooperatives', creating "an inclusive mechanism to involve citizens and consumers in the producing, consumption and sharing of energy".¹² At the time of writing, these directives have yet to make it into Dutch legislature, and with the 2021 fall of the third coalition government led by Mark Rutte, and elections upcoming in March 2021, it is yet to be seen when and how these will be translated into law.

¹¹ <https://www.theguardian.com/environment/2020/may/04/climate-action-under-duress-how-dutch-were-forced-into-emissions-cuts>

¹² <https://drift.eur.nl/nl/publicaties/veranker-energiegemeenschappen-in-wet-en-regelgeving/>



4 METHODOLOGY

4.1 Researchers' relations to the cases

4.1.1 Proximity – distance

The researchers aimed to **balance proximity and distance**. Proximity with some interviewees was guaranteed since these were known from **previous (research) experience** or were even colleagues with knowledge about the SIE-fields. Distance was already given due to the fact that **covid-19** regulations did not allow for on-site visits and physical interviews. For the finance and subsidisation case, three **open calls for interviewees** were posted on the social media platform LinkedIn, which led to 3 interviewees volunteering. This open attitude towards interviewees created more distance between researchers-interviewees. However, it also provided a challenge in terms of time-management to dive deeper into the backgrounds of organisations and interviewees.

4.1.2 Reciprocity and mutual benefits

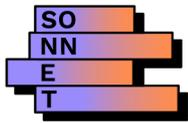
Reciprocity was addressed primarily through being transparent about the basis of the relationship as well as the research process and outcomes. These were documented and shared in a participant information sheets and confirmed through signing consent forms. The main form of giving back to the interviewees is by **sharing the research findings** – both through reports as well as through publishing online contributions such as blogs. Other ways to give back to the interviewees were by joining a reflection group on the new energy law, where outcomes of the SONNET research on the SIE initiative (SIE-I) Aardehuizen were shared in a group of policy workers; or through discussing findings with one of the SIE-initiatives in relation to their future strategies.

4.1.3 Social innovation actors as research subjects or objects

For all three cases, **interviewees were put in a position to review (a part of) the research report and to provide us with comments and reflections**. We also invited them to be involved in follow-up activities, such as online blogs or articles on the matter. In return, their input was acknowledged in the report and the final version of the report was shared with all interviewees. In one instance, an excerpt of the report was created and shared with a social innovation initiative on demand.

4.1.4 Normativity, transparency and diversity in data sources

There are certain biases within our research. Firstly, all interviewees and researchers had a positive understanding or were open to the ideas of social innovation and energy transition. Secondly,



many of the interviewees had a positive understanding of bottom-up initiatives. In more than one instance, an interviewee equated social innovation with energy cooperatives or other citizen-led organisational forms. This created a bias in our research towards bottom-up citizen-led activity. Secondly, the depth and breadth of the fields upon investigation proved difficult to capture within the resource limits of this case study – meaning we had to prioritise certain research foci over others.

4.2 Short description of methods

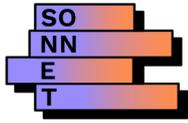
The research has been conducted between March 2020 and March 2021. This section provides a comparative overview of the methods used in each of the three case studies.

4.2.1 Document review

All three case studies made use of grey literature, newspaper articles, policy documents, scientific literature and (SIE-initiatives') websites – however they used the different sources in different orders and intensities. For example, while for some of the fields academic literature dominates (e.g. anti-fracking in the Netherlands), for others this is not the case (e.g. divestment in the Netherlands). Generally, policy documents retrieved from a governmental website were important. Whereas Participatory incubation and experimentation focused mainly on policy documents, and started with a narrow focus on Living Labs, the Finance and subsidy case study had a broader focus at the start and focused less on policy documents and more on grey literature and newspaper articles. For the Framings against fossil fuel energy pathways case study, the websites of SIE-initiatives were specifically important since these document activities and the developments in the field thoroughly – but for each of the three framings a different starting point and focus for the document review was taken: academic literature for anti-fracking, newspaper articles for divestment, and SIE-initiatives websites for anti-Groningen gas.

4.2.2 In-depth interviews

We conducted between 7 to 12 interviews per case, each taking about 60 minutes and all via an online conferencing tool such as Zoom. The interviews were recorded and transcribed. The selection of interviewees was different across the three cases. In researching Participatory incubation and experimentation, we selected them according to: 1) Prominence and visibility in the SIE-field, 2) expertise – both in-depth about certain aspects as well as bird's eye views, and 3) access feasibility starting with people we knew in the field and snowballing from there. In researching the finance and subsidisation case study, interviewees included mainly non-academic interviewees. We recruited them through our existing professional network and an open call on LinkedIn. For the Framings against fossil fuel energy pathways case study, we prioritised interviewing persons involved with the SIE-initiative and subsequently covered other perspectives on their activities.



4.2.3 Participant observation

With regards to two case studies, we did not perform participant observation, as no relevant events took place – which can also be partly attributed to covid-19 regulations. Participant observation in the Finance and Subsidisation of Renewable Energy case was used to gain insights into the topic. Also, actual observations is difficult through a screen, and because of the limited time for interaction in webinars and lectures.

4.3 Description of analysis

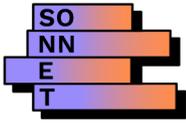
For each of the case studies, we used an **iterative and exploratory research approach**. Rather than being clear from the start, it was through the research that the boundaries of the different fields became apparent.

A first approach was to find an entry point to the field and from there open the field up, gaining a bird's eye perspective and then closing down again by zooming in on specific episodes, activities or actors. For the 'Participatory Incubation and Experimentation' case study, we took Living Labs as an entry point and from there gained an overview on the phenomenon. To uncover other formats and increase the comparability of this Dutch/Flemish case study with the case studies in other SONNET countries (Germany and Poland), we then included other formats that were driven more strongly by national innovation policy. A second round of interviews and document reviews then zoomed in on these formats.

A second approach was to start broadly through a scoping step – both through informal conversations with experts and through a thorough web search, resulting in a long list of about 70 instruments and initiatives related to finance, subsidies or taxes. After the scoping step, a first round of interviews and document reviews were done. Simultaneously, findings and research directions were aligned with the SONNET researchers doing the same case study in other countries. As the research progressed, more specific research foci were found through the outcomes of the interviews. These foci were then deepened through further document reviews.

A third approach includes both of the above. For each of the three framings of the 'Framing against Fossil Fuel Energy Pathways' case study, we chose another strategy:

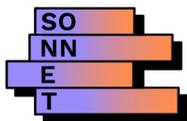
- Anti-fracking: we started with a first round of reviewing academic literature, and from there chose our SIE-initiative and possible interviewees. The analysis of the interviews guided a second round of document reviews, specifically policy documents.
- Anti-Groningen gas: Due to the complexity of this framing, we took two involved SIE-initiatives that are known for their involvement as a starting point – both in terms of interview choice and website review. From there we broadened out and analysed documents from institutional actors in a second round.
- Divestment: Here, we also started with scoping based on a LexisNexis search, then focused on one SIE-initiative and two specific campaigns, and in a second round mainly focused



on complementing our analysis through targeted online searches.

4.4 Reflections on overall methodology

Overall, there have been severe budget constraints that did not allow us to dig deeper into several issues that we would have liked to explore. A total of 25 working days was allocated for data collection, analysis, writing up the case study and liaising with the case study researchers working on the comparative cases of other SONNET countries. This had a number of consequences that future research could address through: 1) strengthening the empirical basis for the cases, 2) supplementing the cases with a more in-depth policy analysis; 3) triangulating facts and insights better; 4) searching for counterevidence and alternative explanations in order to make the storylines more robust.



5 SUMMARY OF EACH CASE STUDY REPORT: THREE SIE-FIELDS AND THEIR SIE-INITIATIVES

The full research reports of the three SIE-fields and their SIE-initiatives studied in the Netherlands can be found in 'Appendix 1: Three case study reports'. This section provides three summaries of each SIE-field through answering the major and minor research questions that have guided the empirical work (see background section and deliverable 3.1).

5.1 Case study 1: Participatory Incubation and Experimentation

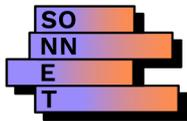
5.1.1 How have the SIE and SIE-field emerged, developed and institutionalised over time?

5.1.1.1 What is 'socially innovative' about the SIE (including SIE-initiatives and/or SIE-field actors)? How and to what extent do which ideas, objects and/or actions demonstrate a change in social relations and new ways of doing, thinking and/or organising energy?

In SONNET, social innovation is defined as combinations of ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy (Avelino et al., 2019; Pel et al., 2020; Wittmayer, Hielscher, Rogge, and Avelino, 2020). In 'Participatory experimentation and incubation', we analyse the combinations of: experimenting with and learning from (i.e. action) novel energy solutions including new technologies, funding mechanisms or governance structures (i.e. objects) in formats that draw upon new ideas of collaboration between actors (i.e. ideas). We refer to these as 'multi-actor collaborative experimentation formats' and in the context of the Netherlands and Flanders, these formats have been referred to as: living labs, city labs, pilots, trials, testbeds, experiments, transition experiments or arenas over the last two decades (Table 2).

Table 2 Summary of the various formats over time.

Format (phase)	Actor constellation	Main parameter of the experiment	Narrative / vision aim	Example
Transition experiments (A)	National government Local governments Businesses Academia	Technological innovation	To see how a new energy system behaves in a specific practical situation and how the surrounding area reacts to this new system.	Nationally funded collaboration between energy supplier Essent Warmte B.V., a local government and a B.V. of local farmers to



				generate heat for a new local district in Zeewolde municipality ¹³ .
Topsector R&D pilots (A, B)	National government Businesses Academia	Technological innovation	To generate innovations and rapid uptake in market to stimulate the Netherlands to become one of the top five global knowledge economies.	Collaboration between wood processing company Houtindustrie Schundel BV, heatpower BV, InnoEnergy and Eindhoven University of Technology to experiment with novel power from micro-heat generator to increase flexibility of electricity system. ¹⁴
Technical Living labs (B, C)	Users Local governments Knowledge institutes Local energy stakeholders Businesses	Technological innovation	To facilitate a speedy uptake in the market of technological innovations.	Collaboration between WoonFriesland, Bouwgroep Dijkstra Draisma, YES!Delft, The Green Village and De Bewonersraad Friesland to test energy performance of housing retrofit solutions. ¹⁵
Societal Living labs (B, C)	Citizens Societal actors Local governments Technical knowledge institutes Local energy stakeholders Businesses	Behaviour Governance arrangements Business models Networking	To realise sustainability through participation and activated local citizens and businesses.	SIE-I Stadslab2050 experimenting with solutions to stimulate behaviour change around energy savings in a commercial neighbourhood (also SIE-I Buiksloterham).
Smart grid testbeds (B)	Local governments Housing cooperations Local energy stakeholders	Technology	To find the potential of smart grid technology in the Netherlands (Lammers and Diestelmeier, 2017).	Collaboration between energy supplier Eneco, grid operator Stedin, city of Rotterdam, housing cooperation Woonbron and the World Nature Federation to experiment with prosumerism in Heijplaat district, Rotterdam. ¹⁶
Regulatory sandboxes (B, C)	National government Associations Project developing companies Real estate companies Research centres	Governance, Technology	To investigate the potential of new governance structures around smart-grid technologies (Lammers and Diestelmeier, 2017).	The housing association and ecovillage Aardehuizen experiments with local energy generation and storage to reduce grid congestion.
Testbeds Gas-free Neighbourhoods (C)	Municipalities Societal actors Knowledge institutes Local energy actors	Technology Participation principles	To test solutions to realise gas-free neighbourhoods in local settings and scaling-up solutions nationally.	The municipality of the Hague experiments with gas-free apartment buildings in the district of Bouwlust/Vrederust. ¹⁷

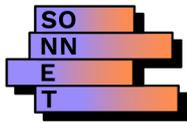
¹³ <https://www.rvo.nl/subsidies-regelingen/projecten/poldergas-voor-polderwijk> accessed 11/10/2020

¹⁴ <https://www.Topsectorenergie.nl/sites/default/files/uploads/Energie%20en%20Industrie/Brochure%20projecten%20TKI%20Energie%20en%20Industrie%20NL.pdf> accessed 11/10/20

¹⁵ <https://www.thegreenvillage.org/projects/dreamh%C3%BBs> accessed 11/10/20

¹⁶ <https://www.rvo.nl/sites/default/files/bijlagen/Proeftuinen%20intelligente%20netten%202011-2015.pdf> accessed 10/11/20

¹⁷ <https://www.rijksoverheid.nl/documenten/convenanten/2019/05/22/den-haag-bouwlust---aanvraag-en-convenant-proeftuinaardgasvrij-wijk> accessed 10/11/20



One might distinguish two types social innovation. The first type is where a ‘new’ actor in the SIE-field, taking up an existing role. The second type is when a new role is created within the SIE-field. The case study mainly demonstrates the first type of role innovation, where a new actor takes up an existing role (Table 3). For example, the regulatory sandboxes shifted the role of grid operation from grid operators to citizens. Thus, the role was only innovative in respect to the actor itself (citizens), and not to the wider SIE-field.

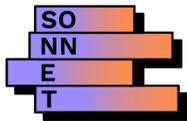
Table 3 Examples from the case study where a new actor takes up an existing role

Collaborative format	Actor	Phase <i>old role</i> → <i>new role</i>
Regulatory sandboxes (i.e. SIE-I Aardehuizen)	Citizens	B <i>Citizens</i> → <i>grid operator</i>
Societal Living Labs (community-led, i.e. Buiksloterham)	Citizens	B <i>Citizens</i> → <i>area developers</i>
Societal Living Labs (state-led, i.e. Stadslab2050)	Local government	B <i>Facilitating innovation in market through i.e. funding</i> → <i>actively execute experiment themselves</i>
Smart grid testbeds	Market	B <i>Innovate independently</i> → <i>collaborate with knowledge institutes</i>

5.1.1.2 How has the SIE developed over time (and space)?

During this **first phase of experimentation and incubation (2000-2013)** the formats used were transition experiments, in which business, state and science were collaborating towards addressing a 40-60% reduction in carbon dioxide emissions by 2030 (as compared to 1990) (Ministerie van Volkshuisvesting Ruimtelijke Ordening en Milieubeheer, 2001). These formats thus followed a triple-helix approach and had the ambition to be part of a broader societal learning process, to combine technology with social and cultural factors and to involve broader actor constellations and thus increase actor diversity in the energy sector. However, in the implementation, these experiments maintained dominant institutions rather than challenging those or creating new ones: with a focus on business solutions, efficiency and technology, it remained a technocratic (Smith and Kern, 2009) and “*corporatist approach*” (Hendriks (2008), p.196 chapter 9 of Kemp, 2012). Also, after the financial crisis of 2007/08 and the ensuing recession, the Dutch government continued with this approach and triple-helix collaboration in formats such as Topsector R&D pilots and smartgrid testbeds. This phase is thus testimony to formats that focus on a strong collaboration between public actors, (technical) universities and (large) energy business.

The **second phase of experimentation and incubation (2009-2017)** began in the aftermath of the financial crisis and the following recession. This crisis made space for and demanded citizens and civil society at large to take up new tasks and responsibilities that had hitherto been taken up by the now financially struggling state – often without additional funds or resources (e.g. Tonkens, Grootgegoed and Duyvendank, 2013). Since the decentralisation of several tasks in the social domain also fell in this timeframe, local levels of governance increasingly became more important players. During this phase, new collaborative multi-actor formats emerged allowing



local governments, citizens and users, as well as non-profit organisations to take up a role in experimentation – this meant that also the composition of the SIE-field changed since these new actors started playing a role and new SIE-initiatives, working on such formats emerged. The emergence of Living Labs as a collaborative multi-actor format was driven by local municipalities and researchers, often with national research funding (e.g. from NWO) that was channelled via international programmes (e.g. EU Joint Programming Initiative Urban Europe). We differentiate between Living Labs that have a focus on developing and implementing technology and others that address issues and questions around appropriate business models and governance arrangements of energy related challenges (e.g. energy poverty or decentral grid management). While the latter Living Labs were the strongest in broadening the scope of the field and its actor constellations, national innovation policy started to also include new actors, namely those that are motivated by environmental concerns (rather than or in addition to profit orientation): energy cooperatives and associations. The 2013 Energy Agreement led to experimentation by energy cooperatives with crowdfunding and the 'Electricity Law Experimentation Decree' (NL: Experimenten Electriciteitswet 2015-2018) allowed associations to take up tasks that had been reserved to grid operators. Both were meant to learn about legal and regulatory barriers.

The **third phase (2017 – now)** is marked by an increasing push for reflection, learning and stocktaking, which is set against a background of heightened environmental pressures leading to the adoption of the international Paris Agreement in 2015 in the context of the United Nations Framework Convention on Climate Change, and the ensuing climate agreement in the Netherlands in 2019. Especially the Living Lab formats are evaluated linked to discussions of mechanisms for sharing learnings, scaling up results or anticipating drivers and barriers. Addressing those issues means addressing open questions towards the further institutionalisation of these formats. It is too early to fully understand the implications of the re-evaluated national R&D and innovation policy, the 'Mission driven Topsector and Innovation Policy' which is to be closely linked to the implementation of the Dutch Climate Agreement and was adopted in 2019. Its focus on 'key technologies' and on triple-helix experimentation suggest a continuation of earlier experimentation formats rather than a radical reorientation. Notwithstanding, actors who entered the field during the second phase broadened their foci towards social innovation, global climate and energy problems. A point in case is the currently running neighbourhood scale experimentation to arrive at gas free heating systems, which is financed by national innovation policy and puts local governments in the driving seat of experimentation.

5.1.1.3 What are the relevant SIE-field actors and other field actors within the SIE-field and what are their roles within the SIE-field? How have these changed over time?

The most relevant SIE-actors are **citizen initiatives** (Living Labs, regulatory sandboxes), **knowledge institutes** and **governments** (local, regional, national and European governments).

To provide an indication as to which roles these actors have played in the SIE-field over time, we will use the multi-actor perspective of Avelino and Wittmayer (2015) (Figure 3).

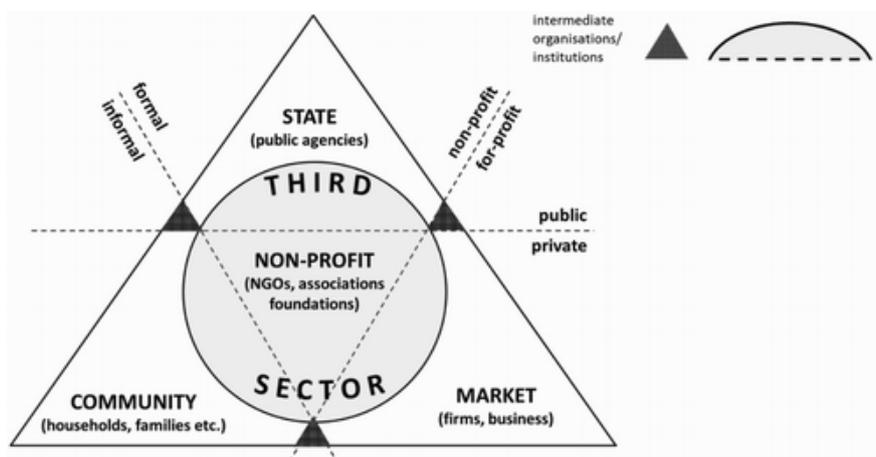


Figure 3 Multi-actor perspective of Avelino and Wittmayer (2015) as adopted from Evers and Laville (2004, p. 17).

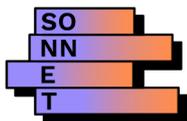
The **state** (local/regional/national government and the EU) plays an important role in the emergence and development of multi-actor collaborative formats for experimentation and incubation. Their main role is to **facilitate these formats** by providing them with resources. These resources can take the form of funding. The national government funded transition experiments, Topsector R&D pilots and smart grid testbeds or testbeds for gas-free neighbourhoods. The EU provided funding for societal Living Labs through JPI Europe. Besides funding, the national government also **provides citizen-led initiatives with exemptions from regulations to allow experimentation** (i.e. the experimental status of the regulatory sandboxes).

The **role of the market is to provide (technical) innovations**. In the first phase (A), for example, the goal of the Topsector R&D pilots was to generate innovations and rapid uptake in the market to stimulate the Netherlands to become one of the top five knowledge economies globally. Over time, community-led and state-led experimental formats started to emerge, however triple-helix experimentation has not lost much of its dominance throughout the years.

The community sphere (i.e. households, families) mainly play a role as **test-subject** of innovations within experimental formats, or as a **target group for behavioural change**. For example, Stadslab2050 Living Labs experimented with solutions to stimulate behaviour change around energy savings in a shops.

As this case study focuses on multi-actor collaborative formats, many of the examples of formats and the SIE-Is in this case study are part of the **hybrid sphere**:

1. **Formalised communities** that take an active role in experimenting in the energy transition (formal, non-profit, private). In particular, the following hybrids seem to exist:



- Collaborative formats between **community and market**, such as community-led societal Living Labs providing space for businesses to develop marketable technologies (i.e. Buiksloterham).
 - Collaborative formats between **state and community**, such as regulatory sandboxes where communities formalised into associations are given the right to take over the governmental role of grid management (i.e. Aardehuizen-Oolst)
2. Collaborative formats between the **state and market**, such as technical Living Labs in which (local) governments and companies experiment together with issues around i.e. grid operation.

5.1.1.4 What are relevant activities, aims/goals and narratives that have been developed and manifested by SIE-field actors and/or other field actors within the SIE-field over time?

Table 4 demonstrates the relevant activities and narratives developed by SIE-field actors and other-field actors over time.

Table 4 Relevant activities and narratives developed and manifested by SIE-field actors and other field actors over time.

Actor(s)	Activity	Activities and the associated narrative	Empirical data from case study (page no.)
National government	Policy making	Implementing the transition approach in a long-term environmental policy NMP4.	<i>In 2001, the fourth Dutch National Environmental Policy Plan (NMP4) adopted the concept of transitions and transition management (Ministerie van Volkshuisvesting Ruimtelijke Ordening en Milieubeheer, 2001). It outlined that persistent problems, such as climate change needed to be addressed through fundamental changes in societal systems. For the energy system, the aim was a 40-60% reduction in carbon dioxide emissions by 2030 (as compared to 1990) (Ministerie van Volkshuisvesting Ruimtelijke Ordening en Milieubeheer, 2001). [...] In implementing the transition approach in the energy sector, the Dutch Ministry of Economic Affairs took the lead. It created seven energy transition platforms, each with 10-15 individuals from the private and the public sector, academia and civil society. They came together to develop goals for 2020 and pathways towards those goals (Kern and Smith, 2008; Kemp and Rotmans, 2009; Smith and Kern, 2009; Kemp, 2012). In the following years, transition experiments were to practically explore those pathways. (p16)</i>
		Assign task force to find the potential of smart grid technology in the Netherlands	<i>In 2009, just before the formal launch of the Topsectorenbeleid, the Dutch Ministry of Economic Affairs instated a 'taskforce smart grids' (NL: taskforce intelligente netten) that was to evolve into the Innovation Programme for Smart Grids (IPIN, NL: innovatie programma voor intelligente netten). P20</i>

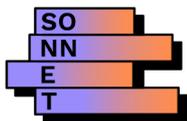
		<p>Create experimental-status for housing associations to experiment with governance arrangements of smart grids.</p>	<p><i>These rising concerns about legal barriers around smart-grid developments seem to have influenced the development and implementation of the ‘Electricity Law Experimentation Decree’ (NL: Experimenten Electriciteitswet 2015-2018). This experimental status made “individual exemptions to Article 16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators” (Lammers and Diestelmeier, 2017b; p.216). The decree made it possible for the Ministry of Economic Affairs to grant selected (housing) associations¹⁸ a formal experimental-status. This status allowed associations to derogate from the electricity and gas act of 1998, and to take up tasks that are legally reserved to be conducted by the grid operator. In particular, the decree was used by associations to carry out peer-to-peer grid management. The goal of this Experimentation Decree was to reveal which adjustments to the legal framework were needed to facilitate the energy transition.</i></p> <p><i>Besides legal innovation, the Experimentation Decree aimed to find new modes of governance. The IPIN projects had shown that the grid operator was a leading actor in all projects, being a potential threat to actually finding these new modes of governance (Lammers and Diestelmeier, 2017). Thus, the experimentation status was only made available for housing associations and energy associations. The requirement was that these associations had to be controlled by their members, impeding grid operators and energy suppliers to control the experiments (decree article 7(1j) as cited in (Lammers and Diestelmeier, 2017)). [...] A total of 27 projects were granted formal experimental status, including the housing association Aardehuizen in Olst. P30</i></p>
		<p>Making a national climate agreement to find a package of measures with the widest possible societal support wo achieve the political reduction target 49% by 2030.</p>	<p><i>In the meantime, in 2019, several Ministries initiated a national climate agreement as a response to the Paris Climate Agreement of 2016. The goal of the agreement was to find a "package of measures with the widest possible social support, which has the active support of as many contributing parties as possible and which will achieve the political reduction target of 49% by 2030" (Klimaatakkoord, 2019; p.2). Like the energy agreement, the climate agreement was to emerge from a collaboration of actors across all societal spheres – focusing discussions on a number of sectors with each their ‘table’ for negotiation - in Dutch poldering fashion. Allegedly, this would lead to “continuity and acceleration</i></p>

¹⁸ In the Netherlands, an association is a legal form which is not allowed to make profit for their members. The association must have a specific goal they are pursuing, such as knowledge sharing, charity or collective purchases by tenants of a house (housing association, NL: vereniging der Eigenaren, VvE).

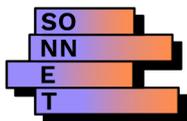
			<p><i>in the energy transition”(Klimaatakkoord, 2019; p.6). Next to the traditional parties such as the Ministry of Economic Affairs and Climate Policy, the waterboards, the major energy companies, grid operators and a technical university, the Electricity sector table also included environmental organisations, a start-up and an interest organisation for citizen- and community driven energy production. As a result, demonstrations, pilots and experiments are to be subsidised for a total worth of 30-40 million EUR. A taskforce innovation was responsible for the cross-cutting innovation agenda, the KIA (NL: Kennis-en Innovatieagenda). The KIA integrated the innovation agendas of the climate agreement, as well as that of the Topsector Energy.</i></p>
		<p>Deliberate and agree upon future vision of the energy sector in an Energy Agreement to increase continuity, cohesion and predictability of the energy sector.</p>	<p><i>In 2012, the Social and Economic Council (SER) of the Netherlands evaluated Dutch energy policy on request of the Ministry of Economic Affairs. It concluded that there was a lack of continuity, cohesion and predictability in energy policy leading to investment insecurity, and a lack of innovation and investment in large energy transition projects (Smelt and Bolhuis, 2018). As a remedy, the SER facilitated a dialogue: more than 100 people from diverse organisations joined the deliberation tables at the beginning of 2013, including societal organisations, financial actors, state actors and market players from small businesses and energy companies (Smelt and Bolhuis, 2018). The proposed long-term solutions and ambitions were being calculated by an external party to understand their effects – this increased trust in the achievability of the agreement (Smelt and Bolhuis, 2018). In September 2013, the Energy Agreement was signed by 47 organisations. [...] The Energy Agreement prescribed several experimental formats: energy suppliers experimenting with variable energy tariffs in 2014, grid operators experimenting with variable transport tariffs and energy cooperatives experimenting with legal barriers for crowdfunding as a financial basis for financing their cooperatives. The Energy Agreement envisioned that any obstacles found in the experiments “will be removed by the market and government together”¹⁹ (Energieakkoord, 2013; p.85). P22</i></p>

¹⁹ NL: “Gevonden belemmeringen worden door markt en overheid samen weggenomen.”

	Provide funding	Subsidising transition experiments to see how a new energy system behaves in a specific practical situation and how the surrounding area reacts to this new system	<i>The government funded transition experiments through the 'Unique Chance Scheme' (NE: Unieke Kansen Regeling), granting 118.3 million EUR of subsidy between 2004 and 2007 (Kemp, 2012). Besides government funding, a remaining 957.8 million investment was sourced from market parties in this time period (Kemp, 2012). In order to be eligible for this funding, transition experiments had to be part of an official transition pathway, involve stakeholders and have learning goals (Loorbach, 2007; Kemp and Rotmans, 2009). In the period between 2004 and 2007, 48 experiments were selected as part of seven energy transition platforms (new gas, chain efficiency, green resources, sustainable mobility, greenhouse as energy resource, sustainable electricity, built environment). These experiments started in 2005 and their aim was "to see how a new energy system behaves in a specific practical situation and how the surrounding area reacts to this new system" (Ministry of Economic Affairs, 2004a p. 19 in Kern and Smith 2008). (p17)</i>
		Subsidise Topsector R&D pilots to generate innovations and rapid uptake in market to stimulate the Netherlands to become one of the top five global knowledge economies.	<i>With the election of a new Dutch government in 2010, the energy transition experiments were replaced by an innovation policy focusing on excelling in specific sectors, including the energy sector (NL: Topsectorenbeleid) rather than on small-scale experiments (interviewee 3). The Topsectorenbeleid, as stated on its website, was to bring actors from science, governments and business together to generate innovations and the rapid uptake of technology in the market to stimulate the knowledge economy of the Netherlands. P19</i>
Market actors	Experiment	Experiment to see how a new energy system behaves in a specific practical situation and how the surrounding area reacts to this new system.	<i>These transition experiments and the transition approach in which they had been embedded have received critical appraisals.</i> <i>These often relate to the gap between underlying theoretical concepts and their implementation by Dutch policymakers, as reflected on by Kemp and Rotmans (2009). To start with, the strategic system change ambition got watered down while the focus was on creating sustainable energy businesses (Loorbach, 2007). For example, the final decision on whether an experiment was granted was taken by the Ministry of Economic Affairs based on criteria such as "costs and benefits of the experiment, likelihood of business investment, strength of demand, and chances of technical success" (Ministry of Economic Affairs 2004a, p. 29, Energy Transition Taskforce 2006, p. 14 in Smith and Kern 2009). Exemplary of the wider implementation of the transitions approach, these fall short of the expectations raised by a transitions approach with a focus on structural change where one might expect criteria that allude to institutional learning or social innovations (Kern and Smith, 2008; Paredis, 2013). Rather,</i>



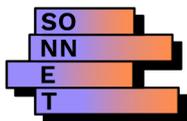
			<p>it has been raised that “transitions policy perpetuates technocratic routines in energy policy” (Smith and Kern, 2009) and that it fell short on democratic grounds with no broad civic dialogue about desirability and future directions in sight (Hendriks, 2009). Due to the high involvement and representation of business and industry, next to government and the occasional scientist and only low involvement of intermediary organisations and NGOs (Loorbach, 2007), it has been referred to as “highly corporatist approach” (Hendriks (2008), p.196 chapter 9 of Kemp, 2012). (p17)</p>
Research institutes	Develop thinking	Develop scientific knowledge and societal practices around system innovation and transitions to further develop the thinking behind the transition approach.	<p>While the implementation of a transition approach to the energy transition was directed by the Ministry of Economic Affairs, the researchers involved in the development of the fourth Dutch National Environmental Policy Plan further developed the thinking and grounding of concepts such as system innovation and sustainability transitions. A loose network formed in 2000, and eventually was formalised in 2005 as the Dutch Knowledge Network on System Innovations and Transitions (KSI). Eleven universities and research institutes aimed to develop scientific knowledge and societal practices around system innovation and transitions. These were funded through the Decree on Subsidies Investments Knowledge Infrastructure scheme (NL: Besluit Subsidies Investerings Kennisinfrastructuur, BSIK). The BSIK was based on the proceeds from natural gas resources from the Ministry of Economic Affairs. These proceeds were intended for strengthening the knowledge infrastructure (Van der Hoeven, 2010). With its 85 researchers, it stood at the cradle of what has developed today into a vibrant and global community of scholars united in the Sustainability Transitions Research Network (STRN) (Grin, Rotmans and Schot, 2011). (p17)</p>
		Evaluate the diversity and scalability of Living Lab formats to increase impact of Living Labs and go beyond local enthusiasm.	<p>Having witnessed the development of many Living labs across the Netherlands, the Rathenau Institute (charged with providing insights on the societal aspects of science and technology) initiated two evaluations of the phenomena in 2017 and 2020 (Maas et al., 2017b; van den Broek, van Elzaker, Maas, and Deuten, 2020). According to interviewee 3, these reports arose from the feeling that “if you put money into it, you can also ask yourself: what do we get for that in return? And in which way does it contribute to the public goals and the private goals? In particular because of the large promises that were made.” (interviewee 3). The first report took stock of Living labs in the Netherlands: it provided an overview of the variety of Living labs in the Netherlands, the actors involved and their contributions</p>



			<p>(Maas et al., 2017a). The second report specifically focused on scaling up to increase the impact of Living labs and go beyond “local enthusiasm”:</p> <p>“The aim of this study is to help prevent Living labs from getting stuck in local enthusiasm. We want to do this by developing a perspective on upscaling of experimental solutions from Living labs to innovations that are applied in multiple places by multiple users.” (van den Broek et al., 2020) P38</p>
<p>Grid operators and the Netherlands Enterprise Agency (NL: Rijksdienst voor Ondernemend Nederland, RVO)</p>	Experiment	Pilot to find the potential of smart grid technology in the Netherlands	<p>In 2017, twelve smart grid pilot projects were installed, carried out by the Netherlands Enterprise Agency (NL: Rijksdienst voor Ondernemend Nederland, RVO) – as smart grid testbeds. They were mostly technology oriented, focusing on the development of new services and products around smart grids. While the IPIN documentation paid attention to the problematic dominance of grid operators, and noted the importance of changing roles of actors in the energy system, in nine out of twelve IPIN projects, the grid operator became the dominant actor in the project (Lammers and Diestelmeier, 2017). P20</p>
<p>National and European (scientific) funding institutes JPI Europe and NWO</p>	Provide funding	Provide funding to Living Labs to accelerate the energy transition and smart grids in cities or neighbourhoods.	<p>The Joint Programming Initiative (JPI) Urban Europe funded dozens of living projects via national research funding institutions (The Nederlandse Organisatie voor Wetenschappelijk Onderzoek, or NWO in the Netherlands and Fonds Wetenschappelijk Onderzoek, or FWO, in Flanders) starting in 2012. The ambition of JPI Urban Europe is “to address the global urban challenges of today with the ambition to develop a European research and innovation hub on urban matters and create European solutions by means of coordinated research”²⁰. While the first calls were more general, the calls between 2014-2016 and in 2020 focused specifically on the energy transition and also on smart grids in cities or neighbourhoods. To differentiate those Living labs focusing on technology as parameter for experimentation – which is the majority in the Netherlands, from those focusing on governance arrangements or business models, we refer to the latter as societal Living Lab. An example of the latter, which also received funding by JPI Urban Europe (via the URB@Exp²¹) is the SIE-I Stadslab2050 in Antwerp, found in 2013 (see box Stadslab2050). P24</p>
	Agenda-setting	Putting Living Labs on the European research agenda	<p>JPI Europe was putting ‘Living labs’ as “co-creative workshops and collaborative formats” on the European research agenda. P26</p>

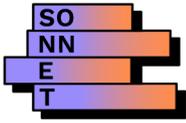
²⁰ <https://jpi-urbaneurope.eu/about/intro/> accessed 2.10.2020

²¹ <https://jpi-urbaneurope.eu/project/urbexp/>, accessed 11/12/2020



(Societal) Living Labs	Experiment	Experiment together to realise sustainability through participation and activated local citizens and businesses, thereby leading to new behaviour, governance arrangements, and networks.	<p><i>Stadslab2050 was found by the municipality of Antwerp in 2013, as part of their sustainability vision. The goal was to aid in making Antwerp CO₂ neutral by 2050. The initiative is funded by the Flemish government and the city of Antwerp. Incidental funding is acquired through EU-funded (research) projects. According to the Flemish government:</i></p> <p><i>“Working on a sustainable city requires a different approach, in which experimentation and innovation are key words. Moreover, it is not a task for the city government alone. It requires a unique partnership between government, companies, residents and organisations in the city. Stadslab2050 is a platform for everyone who is involved in sustainable processes in the city.” P24</i></p>
	Create vision	Create vision of a neighbourhood with sustainable housing, exchanging energy and energy savings.	<p><i>In 2017, the residents of the area sat together to share ideas and create a neighbourhood vision for Buiksloterham from their perspective. The residents envisioned sustainable housing, exchanging energy and energy savings. These citizens collaborate with housing corporations, the municipality of Amsterdam, the water company to realise their vision. Other players develop new technologies in Buiksloterham that might be applied beyond the area. The area has its own, citizen-run website, which includes sections on local news and planning of the local area.</i></p>
	Learning	Learning amongst each other in informal/formal networks to increase continuity of experiments.	<p><i>Living labs also started to address issues around the continuity of their experiments. Whereas the Living labs of the start of the decade had focused primarily on learning within their project, the end of the decade was characterised by increasing attention on learning between projects. In the words of interviewee 4, “we [Living Lab researchers] are currently also busy by just seeing each other in between and just exchange and develop knowledge together”. However, as stated by interviewee 4, funding for these informal learning meetings was lacking and proved a barrier to realise such exchanges. As more formal learning opportunity between Living labs, the Urban Living Lab Summit was organised by the AMS institute - for the first time in 2019 with the intent to provide a yearly learning platform. The idea of the summit was to “explore tools that are used [in Living labs] and ways to standardise them” (AMS institute, 2020). Invitees to the summit were actors, who were working in Living labs and wanted to take part in knowledge sharing: researchers, municipalities, and businesses.</i></p>
Municipality of Amsterdam	Grant space	Allow citizen-led initiative Buiksloterham to use unused territory for area development.	<p><i>In 2009, as the concept of Living labs was gaining recognition in the Netherlands, an initiative in the Buiksloterham area of Amsterdam emerged. In the wake of the financial crisis of 2008, and the resulting cuts in municipal budgets, a housing development project in the North of Amsterdam had been cancelled due to a lack of funds. At the same time, several city makers and civil</i></p>

			<p>society actors had started to gain interest in the local area. In the absence of municipal initiatives, these city makers started to develop ideas and plans for activities for that unused territory. For example, the area of De Ceuvel started to experiment with self-sufficiency, by testing whether electricity could be exchanged locally. In the words of interviewee 3:</p> <p><i>“I think the municipality was more than happy that there were a couple of enthusiasts who wanted to do something there themselves. So, in that sense, [...] they were happily supporting them because [they thought that] at least there was happening something, and maybe we can get something out of it.” (interviewee 3)</i></p>
	Formalise	Formalising the Buiksloterham area into a Living Lab as per request of the initiators.	<p>Whereas the Buiksloterham Living Lab is often considered one of the leading Living labs of the Netherlands, the SIE-I was not framed as a Living Lab from its inception. In the words of interviewee 4:</p> <p><i>“At a certain point those city makers [...] started calling themselves Living Lab Buiksloterham because they also had to institutionalise themselves. But they were also very actively looking for such a Living Lab status. Just say that they could actually give more of a label to everything they did and for a kind of recognisability.” (interviewee 4). However, this label did not formally offer anything, but was merely an “empty shell” (interviewee 4). The formalisation also led to the fact that “a lot of the initiators from the very beginning [...] find it difficult to continue to recognise themselves [...], or they think it is there now and then we can do something else” (interviewee 4). In the view of interviewee 4, this often occurs with initiatives: “a kind of maturity that you can achieve of which it is difficult to take that step at a given moment and then also continue to have meaning.” “In the end they got there, so indeed the city council said: ‘Okay then you are now a Living Lab.’ But otherwise it was actually an empty shell. So then they could call themselves that, but then there was nothing attached to it, no budget attached to it, no authority attached to it.” (Interviewee 4) P29</i></p>
Regulatory sandboxes (National government Associations Project developing companies Real estate companies Research centres)	Experiment	Experiment together to investigate the potential of new governance structures around smart-grid technologies.	<p><i>In 2017, the Aardehuizen became part of the regulatory sandbox agreement from the RVO. Consequently, the Aardehuizen were legally allowed to operate their local electricity grid. The formal experimental-status gave them the right to take up the role of local electricity exchange. It did not, however, provide them resources (funding, network, knowledge) to do so, nor did it enforce other actors to collaborate, without whom the experiment would not be able to succeed. P31</i></p>
Testbeds Gas-Free Neighbourhoods (Municipalities,	Experiment	Experiment together to test solutions to realise gas-free	<p><i>The climate agreement was characterised by a large focus on regions, neighbourhoods, cities and civil society, and an exemplary innovation programme is 'Program Testbeds Gas Free Neighbourhoods' (NL: Proeftuin</i></p>



societal actors, knowledge institutes, local energy actors)		neighbourhoods in local settings and scaling-up solutions nationally.	Aardgasvrije Wijken, PAW), in which 27 testbeds experiment with gas-free heating solutions. The partners involved are 31 municipalities, societal actors, knowledge institutes and energy actors. This programme emphasizes the importance of upscaling and rolling-out the knowledge acquired after the project ends (Klimaatakkoord, 2019, p.19). It is planned to receive 435 million EUR of funding in its running time between 2019-2028 (van Elburg et al., 2018).
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5.1.1.5 What types of interactions/ relations exist between SIE-field actors and/or other field actors? What types of informal and formal alliances, networks, collaborations have existed (and possibly still do)?

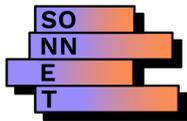
This section describes two types of networks:

- **Tangible networks** are defined here as networks that are relatively formalised, meet regularly, and have a shared goal they are working towards (i.e. learning from each other).
- **Intangible networks** are defined here as networks that are invisible (no meetings or gatherings), but rather connected through co-dependency or a shared discourse.

The case study shows multiple networks geared at learning from each other. These are either organised top-down or bottom-up. **Top-down learning networks are, for example, the ‘topconsortia for knowledge and innovation’, or TKIs** (NL: Topsector voor kennis en innovatie) which accompanied the Topsector R&D pilots of phase A. According to the website about the policy, in these TKIs “*entrepreneurs and scientists are looking for ways to bring innovative products and services to the market. They do this with fundamental research, industrial research, experimental development or a combination of these. The TKI ensures that the network is formed, that knowledge is shared and that projects are managed.*”²² Each TKI involved at least three businesses and three publicly financed research organisations. The TKIs were financed by the involved businesses and subsidised by the Ministry of Economic Affairs. The energy sector had five affiliated TKIs: TKI Biobased Economy, Energy and Industry, New Gas, Urban Energy and Wind at Sea. Between 2012 and 2017, more than 2100 R&D pilots projects were realised. Similarly, the **Testbeds Gas-free Neighbourhood** were accompanied with learning and reflection networks that allow exchanges between testbeds.

Phase A marks another emerging learning network established in 2005: **Dutch Knowledge Network on System Innovations and Transitions (KSI)**. This network stemmed from a loose

²² NL: “Binnen een TKI zoeken ondernemers en wetenschappers naar manieren om vernieuwende producten en diensten naar de markt te brengen. Dat doen ze met fundamenteel onderzoek, industrieel onderzoek, experimentele ontwikkeling of een combinatie hiervan. Het TKI zorgt dat het netwerk wordt gevormd, dat kennis wordt gedeeld en dat er regie op de projecten zit.” (Topsectoren.nl, no date)



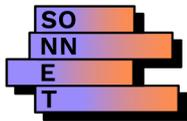
network from around 2000, where researchers involved in the development of the fourth Dutch National Environmental Policy Plan further developed the thinking and grounding of concepts such as system innovation and sustainability transitions. Eleven universities and research institutes aimed to develop scientific knowledge and societal practices around system innovation and transitions. These were funded through the Decree on Subsidies Investments Knowledge Infrastructure scheme (NL: Besluit Subsidies Investerings Kennisinstructuur, BSIK). With its 85 researchers, it stood at the cradle of what has developed today into a vibrant and global community of scholars united in the Sustainability Transitions Research Network (STRN) (Grin et al., 2011). This network and research funding have led to a further spread of thinking around reflexive and experimental forms of governance (Loorbach, 2010; Sengers, Wiczorek, and Raven, 2019; van Buuren and Loorbach, 2009) and has developed transition experiments as a specific form of innovation project (Sengers et al., 2019; Van den Bosch, 2010). In close collaboration with other BSIK-funded programmes, transition experiments in different sectors (excluding energy since that was covered by the energy transition programme) were implemented – these experiments also brought together multiple actors, namely government, business and research institutes (Avelino, 2011).

Another learning network is the **European Network of Living labs (ENOLL)**²³. In the Netherlands, networking and coalition building around the Living lab format emerged slowly. Only few Dutch Living labs (currently four, and 11 in Belgium) are connected to it. ENOLL started in 2006. According to interviewee 1, ENOLL represented an “older understanding of the Living Lab concept, because they are coming a bit more from this user integrated innovation and user focused product development.” In its current set-up, it was mainly seen as ‘networking’ organisation. The Amsterdam Metropolitan Solutions (AMS) institute - established by the municipality of Amsterdam in 2013, with the objective to “help us solve metropolitan questions” (interviewee 2) - did not join because they “do not see what [the AMS institute] can get out of it, besides networking”²⁴ (interviewee 2). The AMS itself assembles the expertise from different technical universities across the country and beyond (Delft University of Technology, Wageningen University of Life Sciences and the Massachusetts Institute of Technology).

Another (intangible) learning network is the **informal learning between Living Labs**. Whereas the Living labs of the start of the decade had focused primarily on learning within their project, the end of the decade was characterised by increasing attention on learning between projects. In the words of interviewee 4, “we [Living Lab researchers] are currently also busy by just seeing each other in between and just exchange and develop knowledge together”. However, as stated by interviewee 4, funding for these informal learning meetings was lacking and proved a barrier to realise such exchanges. As more formal learning opportunity between Living labs, the **Urban Living Lab Summit** was organised by the AMS institute - for the first time in 2019 with the intent

²³ See <https://enoll.org/network/living-labs/>, accessed 11/12/20

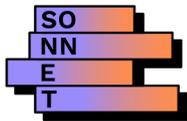
²⁴ NL: “[...] zie niet wat [het AMS-instituut] eruit kan halen, behalve netwerken.”



to provide a yearly learning platform. The idea of the summit was to “explore tools that are used [in Living labs] and ways to standardise them” (AMS institute, 2020). Invitees to the summit were actors, who were working in Living labs and wanted to take part in knowledge sharing: researchers, municipalities, and businesses

Networking across actors was found to be necessary for the functioning of the energy system. For example, the SIE-I Aardehuizen did not have contact with the grid operator, and thereby could not overcome several (technical) barriers around experimenting with local grid management. In the words of interviewee 12: “it’s not like the Netherlands Enterprise Agency [RVO] calls Enexis [the grid operator] or something”. Interviewee 11 noted that “it seems like they [the grid operator] don’t feel like a partner in the experiment.” An employee of the grid operator was involved in the experiment through a co-creation workshop for a European project PROSEU. However, this employee was not able to help the Aardehuizen in their experiment. He was part of the innovation department of the grid operator, and not a member of the strategic management. Interviewee 11: “It used to be the case that the large network operator did not consider local initiatives, now it seems that the more innovative parts of this organization cannot convince the rest. Unfortunately, the result is the same, namely that there is no cooperation [between the grid operator and initiatives].” Interviewee 12 concurs and stated that this contact person was “well-wishing, and willing to think along, but also indicated that he had no power to make the decision on [his] requests. In turn, Interviewee 12 reflected that “to get experimental things done with an organisation like a grid operator, it often depends on talking to the right person at the right time. [...] For this, Enexis is difficult to understand for a private individual or group of private individuals.”

Lastly, the **Living Lab status forms an intangible network** (discourse coalition) between actors working on the SIE. This discourse coalition has a legitimising power to new entrants (i.e. communities). Whereas the Buiksloterham Living Lab is often considered one of the leading Living labs of the Netherlands, the SIE-I was not framed as a Living Lab from its inception. In the words of interviewee 4: “At a certain point those city makers [...] started calling themselves Living Lab Buiksloterham because they also had to institutionalise themselves. But they were also very actively looking for such a Living Lab status. Just say that they could actually give more of a label to everything they did and for a kind of recognisability.” (interviewee 4). However, this label did not formally offer anything, but was merely an “empty shell” (interviewee 4). In the words of interviewee 4: “[...] In the end they got there, so indeed the city council said: ‘Okay then you are now a Living Lab.’ So then they could call themselves that, but then there was nothing attached to it, no budget attached to it, no authority attached to it.” In the case of this SIE-I, the discourse of ‘Living Lab’ did not provide what they were looking for: legal authority and financing. Yet it did provide some kind of legitimacy, especially in the beginning of the initiative.



5.1.1.6 How can the interactions/ relations between SIE-field actors and/or other field actors be characterised (e.g., cooperation, exchange, competition and conflict)? How have they changed over time?

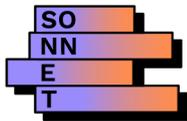
Overall, this case study mainly demonstrates **cooperation** between SIE-field actors. Throughout a range of multi-actor collaborations, actors **work together towards a shared goal** (i.e. bringing innovation to the market in the Topsector R&D pilots, changing behaviour, or finding new governance arrangements through regulatory sandboxes). Moreover, as discussed in the previous section, actors **exchange information** throughout the case study in multiple occurrences to **increase social learning** (i.e. Living Lab network ENOLL). It could be argued there are several instances of **role competition between new entrants in the system, and incumbent actors** (i.e. transferring the role of the grid operator from Enexis to Aardehuizen).

5.1.1.7 How/ to what extent do narratives and activities by SIE-field actors and other field actors refer to power issues and include ambitions to improve them?

An overview of all narratives of actors in this case study is shown in Table 4. **Many narratives do not relate to power issues**, but rather focus on providing a technological solution (i.e. the Topsector R&D pilots, or the technical Living Labs). However, several collaborative formats discussed in this case study do relate themselves to power issues: the **regulatory sandbox experiments and societal Living Labs**. This section will further discuss this topic through the case of the SIE-I Aardehuizen.

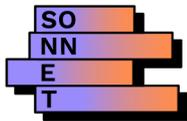
In 2017, the Aardehuizen became part of the regulatory sandbox agreement from the RVO. Consequently, the Aardehuizen were legally allowed to operate their local electricity grid. The Aardehuizen applied for the formal status because they aspired **increased power by private individuals** in local grid management. However, even though their narrative was thus oriented at improving power relations, the outcome of the sandbox experiment was different.

The formal experimental-status gave them the right to take up the role of local electricity exchange. It did not, however, provide them resources (funding, network, knowledge) to do so, nor did it enforce other actors to collaborate, without whom the experiment would not be able to succeed. This is a crucial difference, which will be reflected upon later in this paragraph. Whereas the merits of the experimental status were low, applying for the status and updating it regularly cost time and energy (it is “a bureaucratic challenge” interviewee 12). The Aardehuizen wished to apply their newly acquired experimental-status to be able to solve grid congestion issues, by installing a local battery, and by experimenting with exchanging electricity locally. This experiment faced two main issues. Firstly, lack of financial aid. As such, the Aardehuizen had to acquire funding for their project elsewhere. However, the costs of the local battery and grid were only partially covered by a subsidy. They were left with the cost of 25.000 EUR for peripherals (such as wiring). Secondly, lack of cooperation of the grid operator, which eventually led to large difficulties in realising the experiment. In the words of interviewee 12: “it’s not like the Netherlands



Enterprise Agency [RVO] calls Enexis [the grid operator] or something". For example, the Aardehuizen requested to gather user-data in a central phase transformer outside the neighbourhood. This request was denied by the grid operator. Instead, user-data were extrapolated to a virtual transformer. This delayed the data so much, that the exchange of electricity was not possible. Moreover, the Aardehuizen did not have the appropriate data reading devices in 3 out of the 24 households. The Aardehuizen requested the grid operator to get three devices without external readability (as the households did not want to share their data due to privacy reasons). These requests were not accepted, which made it impossible to the Aardehuizen to gather the required data necessary for local electricity exchange. In the words of interviewee 12, "based on their societal function and their role of facilitating the energy transition, you would expect a more pro-active role of the grid operator." The lack of cooperation from the grid operator came unexpected. This is because peakshaving by private individuals would be profitable to them. As such, interviewee 11 stated that he "had expected that Enexis (and the other regional grid operators) to look more actively for opportunities to limit hard investments (grid reinforcement)". The grid operator itself is not allowed to invest in local storage because of legal restrictions. In the words of interviewee 11, "[...] grid operators may not trade in electricity because they manage a collective good (the networks). If they acted, they would out-compete the other suppliers and producers [...]. The network operators themselves also see this as a problem, because making networks heavier is much more expensive." Interviewee 11 noted that "it seems like they [the grid operator] don't feel like a partner in the experiment." An employee of the grid operator was involved in the experiment through a co-creation workshop for a European project PROSEU. However, this employee was not able to help the Aardehuizen in their experiment. He was part of the innovation department of the grid operator, and not a member of the strategic management. Interviewee 11: "It used to be the case that the large network operator did not consider local initiatives, now it seems that the more innovative parts of this organization cannot convince the rest. Unfortunately, the result is the same, namely that there is no cooperation [between the grid operator and initiatives]." Interviewee 12 concurs and stated that this contact person was "well-wishing, and willing to think along, but also indicated that he had no power to make the decision on [his] requests, like replacing the electric meters and monitoring hardware for user profiles on neighbourhood level." In turn, Interviewee 12 reflected that "to get experimental things done with an organisation like a grid operator, it often depends on talking to the right person at the right time. [...] For this, Enexis is difficult to understand for a private individual or group of private individuals."

In conclusion, **while the experimental-decree gave the Aardehuizen the right to experiment, it did not give them resources (funding, network, knowledge) nor did it approach the problem within the wider actor system.** The latter resulted in a lack of cooperation from the grid operator, thereby impeding experimentation.



5.1.1.8 What have been (shared) narratives, activities, knowledge, learnt lessons, etc. between alliances/networks/collaborations of SIE-field actors and/or other field actors? How have they been reproduced, adopted and replicated in the SIE-field? To which extent have they been legitimised and/or contested by several actors within the SIE-field? Have there been any key changes over time (if so)?

Most relevant issues have already been described in section 5.1.1.5. In particular, a shared narrative has been formed around the notion of **Living Labs**. Furthermore, there is a wider discourse around the **need for broad societal deliberation** to solve persistent problems, through multi-actor agreements (i.e. through the Energy Agreement and Climate Agreement).

The dominant discourse is in favour of **techno-optimism**, which resulted in the repeated institutionalisation of **triple-helix collaborations in policy** (i.e. Topsector R&D pilots). These triple-helix collaborations have been contested over the course of this case study, in particular by a contrasting narrative where **citizen engagement** and **bottom-up experimentation** are listed as key players in accelerating the energy transition. This narrative of **bottom-up experimentation** has been adopted by policy makers in the SIE-field with the experimental decree.

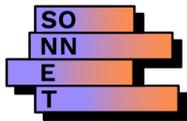
5.1.2 How do SIE-field actors and other field actors interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?

5.1.2.1 Which institutions (regulative, normative, cultural-cognitive) within the 'outside' institutional environment have shaped (including enabled/ impeded) SIEs and its SIE-fields (and how)?

SONNET studies the institutions that have shaped the SIE-field. These include regulative institutions (laws, rules, standards, and policies), normative institutions (norms and value systems) and cultural-cognitive institutions (shared conceptions of reality, binding expectations, common beliefs) (Hielscher *et al.*, 2020; Wittmayer *et al.*, 2020).

Regulative institutions play an important role in shaping the SIE-field. In particular, environmental and innovation policy have had a large impact on the SIE-field. Examples are the transition policy of the 2000s, the Topsector policy of the 2010s in the Netherlands and the VIA policy in Flanders. These policies incentivise the collaboration of market, science and state actors in experiments and innovation.

A main **cultural-cognitive institution** is that of **techno-optimism**. Techno-optimism is when technological innovation is key in solving persistent societal problems (i.e. climate change). The Topsector policy R&D pilots and the Technical Living labs are exemplary of this. According to



interviewee 3, many Living Lab formats are optimistic about the potential of technology in the Netherlands, "without awareness of how difficult it is to get a new technology to develop, and to make a technology really useful to the new problems that those technologies pose."

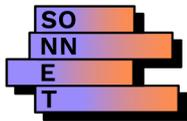
Perceptions of actor roles are subject to normative ideas. These norms were especially robust in the 2000s, when the transition experiments of the NMP4 and VIA policies envisioned a large role for societal actors, the experiments became dominated by large incumbents. In later stages of the innovation history, an increasing involvement of prosumers, associations and societal actors in the energy transition started to shift these perceptions.

5.1.2.2 What are the key events, external shocks, trends and inter-field interactions that enable/impede SIEs and its SIE-fields (now and in the past)

The SIE-field is nested within a larger institutional environment of rules, norms and cultural beliefs. In SONNET, we refer to this as the 'outside' institutional environment and we are interested in the shocks and trends within this environment that unsettle the SIE-field, and thereby co-shape its direction (Hielscher et al., 2020; Wittmayer, Hielscher, et al., 2020). This section spotlights two developments that have affected this SIE-field from the outside institutional environment, and an analysis of the enabling/impeding factors.

Firstly, **raising environmental concerns** have been an increasing trend from the outside institutional environment that has affected the SIE-field. The first phase of experimentation outlined in this report, using transition experiment format, was initiated in the energy sector in the wake of the Dutch National Environmental Policy Plan in 2001. The latter being inspired by ongoing efforts and studies testifying to long term systemic thinking in environmental discourse. Also, the last phase, the one of taking stock of the SIE-field and reorientation, is related to heightened environmental pressures leading to the adoption of the Paris Agreement in 2015 and ensuing climate agreement in the Netherlands in 2019.

Another outside institutional trend has been the **decentralization of government tasks**. In the Netherlands, the recession, and the accompanied governmental budget-cuts, led to an overall decentralisation of governmental tasks towards municipal level. The welfare state was retreating, 'making space' for and demanding from citizens to step up. This trend of increasing responsibility for citizens on a broad array of public questions has been summarised under the term 'participation society' (equivalent to the UK's Big Society) in the Netherlands, but often was not appropriately resourced. The King's speech in 2013 is exemplary in summarising the dominant narrative: "It is undeniable that in our current network and information society people are more empowered and independent than before. Combined with the need to reduce the government deficit, this leads to the traditional welfare state slowly but surely changing into a participatory society. Everyone who can, is requested to take responsibility for his or her own life and environment" (Throne speech, 2013). The financial crisis led to two institutional changes: the notion in the King's throne speech that 'everyone who can, is requested to take responsibility' (change in normative institutions), and large-scale cuts in governmental budgets (change in



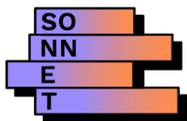
regulative institutions). The latter budget-cuts affected the SIE-field in two ways. On the one hand, the governmental budget-cuts led to a decrease of funding for innovation and R&D and innovation between 2008-2011. Subsequently, with the advent of a new government, the Netherlands was to become one of the top 5 knowledge economies of Europe and a testbed for innovation. To this end, the Topsector Policy was installed. It aimed at bringing actors from science, governments and business together to generate innovations and to accelerate the uptake of technology. It resulted in about 2100 triple-helix R&D projects with 1.6 billion EUR of funding. On the other hand, tight municipal budgets also created space for and the 'participation society' frame demanded citizens and bottom-up activity - opening space for quadruple-helix constellations. For example, the citizen-led SIE-I Living Lab Buiksloterham experimented with sustainable living in their neighbourhood, because municipal plans for the area had to be put on hold (see also box on the SIE-I Buiksloterham).

The next paragraphs and the table will illustrate the **various enabling and impeding effects** of the outside institutional environment on the SIE-field. In line with the definition of social innovation (*combinations of ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy* (Wittmayer, Hielscher, Rogge and Avelino, 2020)), we understand enabling/impeding factors as follows:

- **Enabling factors:** events, shocks, trends or interactions that enable the emergence and development of combinations of ideas, objects and/or actions that change social relations and involve new ways of doing, thinking and/or organising energy.
- **Impeding factors:** events, shocks, trends or interactions that impede the emergence and development of combinations of ideas, objects and/or actions that maintain social relations and involve new ways of doing, thinking and/or organising energy.

The tables below illustrate the largest enabling (**Table 5**~~Error! Reference source not found.~~) and impeding factors (**Table 6**). When looking at the tables, several observations might be made:

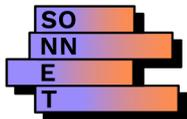
- On the one hand, **shocks can enable SIE** because they provide space to SIE-Is to develop where the status-quo is unsettled and creates space in the SIE-field. Citizen-led Living Lab Buiksloterham took over municipal building plans of the Buiksloterham area, after the financial crisis dissolved municipal budgets. In this way, the emergence of the multi-actor collaborative format 'Living Lab' was able to emerge and institutionalise further.
- On the other hand, **shocks can impede** SIE because they provide a mode of 'crisis and repair management' within policy-makers, in which there is little space for more radical innovation. For example, the financial crisis resulted in several years of low governmental spending on innovation programmes because of budget-cuts. In 2011, the Topsector policy was installed to invest in (technical) innovation. The triple-helix collaborations that emerged from this Topsector policy were part of a discourse of 'bringing innovation to market'. This market-oriented thinking was not novel to the Dutch energy sector, as it had been the dominant way of thinking in the 2000s during the transition experiments.
- **Events often institutionalise a broader societal trend or shock.** The importance of such trends is often described by the events, rather than the underlying trends or shocks. For



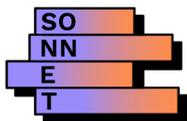
example, citizen participation, the increasing role of local governments and raising environmental concerns were institutionalized by the Agenda 21/Brundtland report.

Table 5 The largest events, shocks and trends that **enabled** this SIE-field.

Time (phase)	What happened?	Characterising quote	Type?	How did it enable SIE? <i>Empirical background from case study. (page number in case study in which original content can be found)</i>
+/- 2000 (pre-A)	Increasingly letting go of linear models of innovation	<p><i>"If you look back 30 years, this word [innovation] was hardly used, the focus was on research and development or the like, or research. Gradually, more attention was given to ensuring that you would work more in practice instead of in a factory or in a laboratory"</i> (interviewee 2)</p>	Trend	<p>State market and community spheres adopted the role of the researcher, whereas the researcher adopted more the role of practioners.</p> <p><i>Traditional research and development policy (focusing on subsidies, regulation and intellectual property rights) was increasingly supplemented by innovation policy focused towards bringing actors together and stimulating private-public partnerships (Schot and Steinmueller, 2018). This included an increasing focus on including consumers and users in product development (Ballon, Pierson, and Delaere, 2005; Kaulio, 1998) but also the rise of triple-helix collaborations between universities, governments and industries which focused on situated knowledge and innovation generation, diffusion and use (Etzkowitz</i></p>



				<p><i>and Leydesdorff, 1995; Ranga and Etzkowitz, 2013). In the Netherlands, this change of thinking was influenced by a number of programmes and networks in policy, technological innovation and sustainable development– an example of the latter was the Dutch National Initiative for Sustainable Development (NIDO) that focused on pushing sustainable development of different sectors through bottom-up processes (Loorbach, 2007). P9</i></p>
+/- 1987-1992 (pre-A)	Brundtland report and Agenda 21	n/a	Policy events	<p>Increasing emphasis on the role of local actors (i.e. local governments) and transdisciplinary collaboration.</p> <p>The Brundtland report on ‘our common future’ (1987) and Agenda 21 emphasised the need for collaboration of actors from different societal spheres. Agenda 21 specifically pointed out the importance of the local governments as “the level closest to the people” and considered their participation and cooperation as “decisive” in addressing the problems outlined since these often originate locally (United Nations Conference on</p>



				Environment and Development (UNCED), 1992). P8
2008	Financial crisis	<i>"I think the municipality was more than happy that there were a couple of enthusiasts who wanted to do something there themselves. So, in that sense, [...] they were happily supporting them because [they thought that] at least there was something happening, and maybe we can get something out of it." (interviewee 3)</i>	Outside institutional environment: shock	<p>Increasing role for citizens and bottom-up movements as experimenters. Governments take a backseat.</p> <p>The financial crisis and the governmental budget-cuts that followed created space for SIE-Is to develop and institutionalise where other projects had fallen through. See also previous section on the outside institutional environment.</p>
B	Energy Agreement signed by 47 organisations	<i>Any obstacles found in the experiments "will be removed by the market and government together"²⁵</i>	Policy event	<p>The Energy Agreement institutionalised a new and more active role for citizens in the energy transition. In this sense, it contributed to the formalisation and professionalisation of citizen engagement. It included actors from societal spheres, civil society, and decentralised energy suppliers. This was different from the more traditional triple-helix configurations.</p> <p><i>In 2012, the Social and Economic Council</i></p>

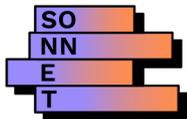
²⁵ NL: "Gevonden belemmeringen worden door markt en overheid samen weggenomen."

				<p>(SER) of the Netherlands evaluated Dutch energy policy on request of the Ministry of Economic Affairs. It concluded that there was a lack of continuity, cohesion and predictability in energy policy leading to investment insecurity, and a lack of innovation and investment in large energy transition projects (Smelt and Bolhuis, 2018). As a remedy, the SER facilitated a dialogue: more than 100 people from diverse organisations joined the deliberation tables at the beginning of 2013, including societal organisations, financial actors, state actors and market players from small businesses and energy companies (Smelt and Bolhuis, 2018). The proposed long-term solutions and ambitions were being calculated by an external party to understand their effects – this increased trust in the achievability of the agreement (Smelt and Bolhuis, 2018). In September 2013, the Energy Agreement was signed by 47 organisations. [...] The Energy Agreement prescribed several experimental formats: energy suppliers experimenting with variable energy tariffs</p>
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				<p>in 2014, grid operators experimenting with variable transport tariffs and energy cooperatives experimenting with legal barriers for crowdfunding as a financial basis for financing their cooperatives. The Energy Agreement envisioned that any obstacles found in the experiments “will be removed by the market and government together”²⁶ (Energieakkoord, 2013; p.85). P22</p>
B	<p>National and European (scientific) funding institutes JPI Europe and NWO fund Living Lab programmes throughout Europe</p>	<p>“Working on a sustainable city requires a different approach, in which experimentation and innovation are key words. Moreover, it is not a task for the city government alone. It requires a unique partnership between government, companies, residents and organisations in the city. Stadslab2050 is a platform for everyone who is involved in sustainable processes in the city.”²⁷</p>	<p>Policy event</p>	<p>Increasing empowerment of local governments and citizens as active participants in experimental formats through Living Lab funding.</p> <p>The Joint Programming Initiative (JPI) Urban Europe funded dozens of living lab projects via national research funding institutions (The Nederlandse Organisatie voor Wetenschappelijk Onderzoek, or NWO in the Netherlands and Fonds Wetenschappelijk</p>

²⁶ NL: “Gevonden belemmeringen worden door markt en overheid samen weggenomen.”

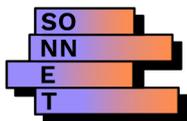
²⁷ NL: “Werken aan een duurzame stad vraagt een andere aanpak, waarin **experimenteren** en **innoveren** sleutelwoorden zijn. Het is bovendien geen taak voor de stedelijke overheid alleen. Het vraagt een uniek samenwerkingsverband tussen overheid, bedrijven, bewoners en organisaties in de stad. Stadslab2050 is een platform voor iedereen die met duurzame trajecten in de stad bezig is.” <https://www.antwerpenmorgen.be/nl/projecten/stadslab-2050/over>, accessed 11/12/20



				<p>Onderzoek, or FWO, in Flanders) starting in 2012. The ambition of JPI Urban Europe is “to address the global urban challenges of today with the ambition to develop a European research and innovation hub on urban matters and create European solutions by means of coordinated research”²⁸. While the first calls were more general, the calls between 2014-2016 and in 2020 focused specifically on the energy transition and also on smart grids in cities or neighbourhoods. To differentiate those Living labs focusing on technology as parameter for experimentation – which is the majority in the Netherlands, from those focusing on governance arrangements or business models, we refer to the latter as societal Living Lab. An example of the latter, which also received funding by JPI Urban Europe (via the URB@Exp²⁹) is the SIE-I Stadslab2050 in Antwerp, found in 2013 (see box Stadslab2050). P24</p>
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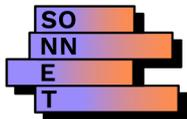
²⁸ <https://jpi-urbaneurope.eu/about/intro/> accessed 2.10.2020

²⁹ <https://jpi-urbaneurope.eu/project/urbexp/>, accessed 11/12/2020

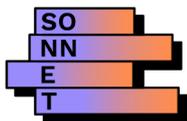


<p>2015-2018 (B)</p>	<p>'Electricity Experimentation Decree' (NL: Experimenten Electriciteitswet)</p>	<p>Law (NL: "individual exemptions to Article 16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators" (Lammers and Diestelmeier, 2017b; p.216).</p>	<p>Policy event</p>	<p>Formalisation of citizen participation within experimental formats of the energy transition. It shifted citizens from the 'community' sphere, towards the third sector.</p> <p><i>This experimental status made "individual exemptions to Article 16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators" (Lammers and Diestelmeier, 2017b; p.216). The decree made it possible for the Ministry of Economic Affairs to grant selected (housing) associations³⁰ a formal experimental-status. This status allowed associations to derogate from the Electricity and Gas Act of 1998, and to take up tasks that are legally reserved to be conducted by the grid operator. In particular, the decree was used by associations to carry out peer-to-peer grid management (i.e. in the SIE-I Vve Aardehuizen, see also box below on the</i></p>
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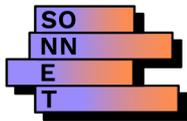
30 In the Netherlands, an association is a legal form which is not allowed to make profit for their members. The association must have a specific goal they are pursuing, such as knowledge sharing, charity or collective purchases by tenants of a house (housing association, NL: vereniging der Eigenaren, VvE).



				<p>Aardehuizen). The goal of this Experimentation Decree was to reveal which adjustments to the legal framework were needed to facilitate the energy transition. P30</p>
2015 (C)	Paris Climate Agreement	Climate	n/a	<p>Outside institutional environment: policy event</p> <p>Increasing attention on climate change issues by SIE-field actors. It did not necessarily result in a change in social relations directly, but it did legitimise a national response (next row in this table) which had an effect on social relations.</p> <p>The signed Paris Climate agreement and the environmental pressures it stands for, also put Dutch innovation policy and the different multi-actor collaborative formats it promoted under pressure. From 2017, the SIE-field went into a phase of taking stock and reorientation. P36</p>



2019	National Climate Agreement	Climate	n/a	<p>Policy event</p> <p>Increasing emphasis on regions, neighbourhoods, cities and civil societies.</p> <p>The agreement stressed the importance of residents' active involvement: "the cabinet supports the possibility for residents to participate in local energy projects." (Klimaatakkoord, 2019, p.16). P43</p> <p>The climate agreement was characterised by a large focus on regions, neighbourhoods, cities and civil society, and an exemplary innovation programme is 'Program Testbeds Gas Free Neighbourhoods' (NL: Proeftuin Aardgasvrije Wijken, PAW), in which 27 testbeds experiment with gas-free heating solutions. The partners involved are 31 municipalities, societal actors, knowledge institutes and energy actors. This programme emphasizes the importance of upscaling and rolling-out the knowledge acquired after the project ends (Klimaatakkoord, 2019; p.19). It is planned to receive 435 million EUR of funding during its running time between 2019-2028</p>
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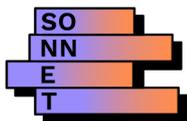
				(van Elburg et al., 2018), P42
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Table 6 The most relevant events, shocks and trends that **impeded** this SIE-field.

Time (phase)	What happened?	Characterising quote	Type?	How did it impede SIE? <i>Empirical background from the case study.</i>
2001	NMP4 policy launched	n/a	Policy event	The fourth Dutch National Environmental Policy Plan (NMP4) institutionalised new social relations between academia, civil society and the public and private sectors: state, market and community spheres adopted the role of the researcher, whereas the academic researcher became more practice-oriented. However, it became dominated by vested interests and regime players. Thus, the policy maintains rather than changes the existing social relations of the SIE-field. <i>The NMP4 adopted the concept of transitions and</i>

				<p>transition management (Ministerie van Volkshuisvesting Ruimtelijke Ordening en Milieubeheer, 2001). The Dutch Ministry of Economic Affairs created seven energy transition platforms, each with 10-15 individuals from the private and the public sector, academia and civil society. They came together to develop goals for 2020 and pathways towards those goals (Kern and Smith, 2008; Kemp and Rotmans, 2009; Smith and Kern, 2009; Kemp, 2012). In the following years, transition experiments were to practically explore those pathways. P15 These transition experiments and the transition approach in which they had been embedded have received critical appraisals. These often relate to the gap between underlying theoretical concepts and their implementation by Dutch policymakers, as reflected on by Kemp and Rotmans (2009). To start with, the strategic system change ambition got watered down while the focus was set on creating sustainable energy businesses (Loorbach, 2007). For example, the final decision on whether an experiment was</p>
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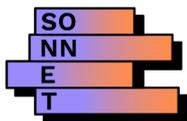
				<p>granted was taken by the Ministry of Economic Affairs based on criteria such as “costs and benefits of the experiment, likelihood of business investment, strength of demand, and chances of technical success” (Ministry of Economic Affairs 2004a, p. 29, Energy Transition Taskforce 2006, p. 14 in Smith and Kern 2009). Exemplary of the wider implementation of the transitions approach, these fall short of the expectations raised by a transitions approach with a focus on structural change where one might expect criteria that allude to institutional learning or social innovations (Kern and Smith, 2008; Paredis, 2013). Rather, it has been raised that “transitions policy perpetuates technocratic routines in energy policy” (Smith and Kern, 2009) and that it fell short on democratic grounds with no broad civic dialogue about desirability and future directions in sight (Hendriks, 2009). Due to the high involvement and representation of business and industry, next to government and the occasional scientist and only low involvement of intermediary</p>
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				<p>organisations and NGOs (Loorbach, 2007), it has been referred to as a “highly corporatist approach” (Hendriks (2008), p.196 chapter 9 of Kemp, 2012). P17</p>
2008	Financial crisis	<p>“At the beginning of the 2010s - certainly with cabinet 1 - it was still quite neoliberal in that sense. [...] Experiments cost money, are small, and yield little. If you look at it that way, [...] you're like, we're not going to do that. We are doing a crisis and recovery law and we are just going to build those wind turbines.”³¹</p>	Policy event	<p>The financial crisis leads to a mind-set of crisis and recovery in the political cabinet, reducing the opportunity for more radical experiments where social relations are changed.</p> <p>The financial crisis leads to large budget-cuts within innovation budgets 2008-2011.</p>
2011	Topsector policy launched	<p>“Entrepreneurs and scientists are looking for ways to bring innovative products and services to the market.” (p. 19 case study)</p>	Policy event	<p>By this time, the triple-helix collaborations (state/market/science) as proposed by the Topsector policy was not novel in the Netherlands anymore. Rather, it catered to the status-quo where large regime actors and technical science plays a central part in innovation.</p> <p>With the election of a new Dutch government in 2010, the energy transition experiments were replaced by an innovation policy focusing on excelling in specific sectors,</p>

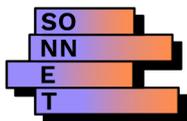
³¹ NL: “in het begin van de jaren 10 - toch zeker met kabinet 1 - was het nog bestwel neoliberal in die zin. [...] Experimenten die kosten geld, zijn klein, en leveren zo weinig op, als je het zo bekijkt, [...] dan heb je zoiets van, dat gaan we niet doen. We doen een crisis en herstelwet en we gaan gewoon die windmolens neerzetten.” (interviewee 3)

				<p>including the energy sector (NL: Topsectorenbeleid) rather than on small-scale experiments (interviewee 3). The Topsectorenbeleid, as stated on its website, was to bring actors from science, governments and business together to generate innovations and the rapid uptake of technology in the market to stimulate the knowledge economy of the Netherlands. P19</p>
2011	Smart grid testbeds			<p>The reconfirmation of pre-existing roles of grid operators and citizen-led innovation, despite efforts to change roles of grid operation to other societal spheres/actors.</p> <p>In 2009, just before the formal launch of the Topsectorenbeleid, the Dutch Ministry of Economic Affairs instated a 'Taskforce Smart Grids' (NL: taskforce intelligente netten') that was to evolve into the Innovation Programme for Smart Grids (IPIN, NL: innovatie programma voor intelligente netten). In 2011, twelve smart grid pilot projects were installed, carried out by the Netherlands Enterprise Agency (NL: Rijksdienst voor Ondernemend Nederland, RVO) – as smart grid testbeds.</p>



				<p>They were mostly technology oriented, focusing on the development of new services and products around smart grids. While the IPIN documentation paid attention to the problematic dominance of grid operators, and noted the importance of changing roles of actors in the energy system, in nine out of twelve IPIN projects, the grid operator became the dominant actor in the project (Lammers and Diestelmeier, 2017). P20</p>
2020	Change in political climate of Antwerp	<p><i>“The ‘Mindlab’ of the Danish has dropped a year or a year and a half ago. They had a fantastic lab where everybody looked up to, and with a shift in politics that has been changed to a technical lab. [...] It has an end date” (interviewee 7B).³²</i></p>	Trend / policy event / SIE-I event	<p>The end of a socially innovative Living Lab (SIE-I Stadslab2050) because of a new political climate.</p> <p>Stadslab2050 notes that they currently face issues with continuity. Because of a shift in political climate, “there is too little support” on a political level for the brand Stadslab2050. The Stadslab2050 will be integrated in the overarching climate policy of the city, and the brand Stadslab2050 will disappear. In the words of interviewee 7B, such continuity</p>

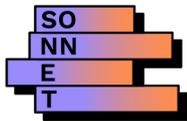
³² NL: ““Het ‘Mindlab’ van de Denen is een jaar of anderhalf jaar geleden opgeheven. Ze hadden een fantastisch lab waar iedereen naar opkeek, en met een verschuiving in de politiek is die veranderd in een technisch lab. [...] Het heeft een houdbaarheidsdatum.”



				issues due to shifting political climates are more common throughout Europe. P26
2015-2020	Problems with continuity of Living Labs	“[...]you also see that a few of those projects [...] especially in that start-up phase, have enormous struggles because then you quickly start making promises as a research consortium that you cannot deliver at all” ³³ (interviewee 4).	Trend	<p>Living labs collaborative formats through i.e. co-creative workshops with cities/citizens, which would create novel social relations between community/state/science. However, many Living Labs were struggling to meet these promises, thereby impeding these novel relations to develop.</p> <p>These JPI funding calls led to a proliferation of living labs in the Netherlands, and to a certain extent Flanders. It also resulted in “many initiatives relabelling themselves as Living Labslabs” (interviewee 4). An example of the latter is the living lab Buiksloterham, which started to use the label around 2015 (see box Living Lab Buiksloterham).</p> <p>Next to SIE-Is relabelling themselves as living labs, JPI Europe was putting ‘Living Labslabs’ as “co-creative workshops</p>

³³ NL: “[...] je ziet ook dat een paar van die projecten [...] zeker in die opstartfase enorme worstelingen hebben, want dan ga je als onderzoeksconsortium al snel beloftes maken die je helemaal niet kunt waarmaken.”

				<p>and collaborative formats” on the European research agenda. Following on from this, the Dutch Research Council NWO started their funding programme VerDuS SURF, ‘connecting sustainable cities’ (NL: verbindend van duurzame steden) in 2016. While the living lab format was no requirement, it was stimulated by the programme manager who suggested to use this format to research consortia (interviewee 4). As such, many of the consortia started to integrate Living Labs in their proposals. However, they also struggled with the format, since promises were hard to keep: “[...] you also see that a few of those projects [...] especially in that start-up phase, have enormous struggles because then you quickly start making promises as a research consortium that you cannot deliver at all” (interviewee 4). Interviewee 2 similarly noted that “[...] the impression was that people stumbled quite a bit. The government wanted it, so everyone wrote it in the grant application, but it</p>
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				didn't quite work out. ³⁴ P25-6
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5.1.2.3 How (if so) have the SIEs and their SIE-fields and 'outside' institutional environment been shaped by these events, external shocks, trends and inter-field interactions (now and in the past)?

This question has been integrated in the columns 'what happened?' and 'how did it affect SIE' in **Table 5** and Table 6.

5.1.2.4 What have been the most important alliances/networks/collaborations SIE-field actors and/or other field actors that emerged from these events, shocks, trends, and inter-field interactions (when, how and for what reasons)?

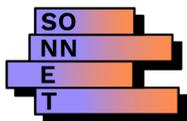
As described in a previous section, there are two types of networks within this case study: tangible and intangible networks. Table 7 gives an indication how the networks, alliances or collaborations within this case have stemmed from events, shocks, trends and inter-field interactions.

An observation from the table is that all the tangible networks have originated from policy programmes, and that their narrative is similarly oriented at improving social learning between experimenting actors. For example, the Learning Network Testbeds Gas Free Neighbourhoods envisions to "find out the wheel together" (Aardgasvrijewijken.nl, no date). As the root of these networks are policies, these networks are often highly institutionalised from the get-go, with multiple learning programmes, sub-networks and other formalised interactions in place.

Table 7 Overview of networks and how these emerged from events within the case study.

Network	Narrative and activities of network (<i>quote</i>)	Type	How has this network stemmed from events, shocks, trends, and inter-field interactions?	
			Event (<i>date: type of event</i>)	How did the network emerge from this event?

34 NL: "Wat je nu soms ziet gebeuren . Is dat dan een hele wijk bijvoorbeeld als Living Lab wordt bestempeld maar dat heeft natuurlijk ook nogal wat gevolgen voor mensen die in die wijk buurt wonen of daar gebruik van maken . Die zijn dan ook opeens allemaal betrokken en tegelijkertijd is zo'n gebied afbakening zeg maar dat maakt het nog geen experimentele omgeving ."



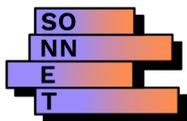
<p>'Topconsortia for knowledge and innovation', or TKIs³⁵</p>	<p><i>"Within a TKI, entrepreneurs and scientists are looking for ways to bring innovative products and services to the market. They do this with fundamental research, industrial research, experimental development or a combination of these. The TKI ensures that the network is formed, that knowledge is shared and that projects are managed."³⁶</i></p>	<p>Tangible network around social learning</p>	<p>Launch Topsector policy (2017: policy event)</p>	<p>The TKIs accompanied the Topsector experiments. The TKIs were financed by the involved businesses and subsidised by the Ministry of Economic Affairs (for every Euro invested by businesses, the Ministry gave 0.30 EUR). The energy sector had five affiliated TKIs: TKI Biobased Economy, Energy and Industry, New Gas, Urban Energy and Wind at Sea. Between 2012 and 2017, more than 2100 R&D pilot projects were realised. These received approximately 1.6 billion EUR of funding, 750 million of which were granted from public sources (i.e. subsidies) (RVO, 2018).</p>
<p>Learning network Testbeds gas Free Neighbourhoods³⁷</p>	<p><i>"As a knowledge and learning program we connect municipalities with each other. Local learning within Living Labs does not automatically contribute to an acceleration of the transition process. That is why we make learning experiences and knowledge accessible to all municipalities. We often do this by organizing meetings for policy officials, but also for administrators and council members. [...] This is how we invent the wheel together, instead of each individually."³⁸</i></p>	<p>Tangible network around social learning</p>	<p>Signing of National Climate Agreement with broad societal support (2019: policy event)</p>	<p>The Climate Agreement was characterised by a large focus on regions, neighbourhoods, cities and civil society. One of the agreements made was the launch of the testbed programme (PAW). The learning programme emerged as a learning network to assist municipalities in their testbeds.</p>

35 NL: Topsector voor kennis en innovatie

36 NL: "Binnen een TKI zoeken ondernemers en wetenschappers naar manieren om vernieuwende producten en diensten naar de markt te brengen. Dat doen ze met fundamenteel onderzoek, industrieel onderzoek, experimentele ontwikkeling of een combinatie hiervan. Het TKI zorgt dat het netwerk wordt gevormd, dat kennis wordt gedeeld en dat er regie op de projecten zit." (Topsectoren.nl, no date)

37 NL: Proeftuin Aardgasvrije Wijken, PAW

38 NL: "Als Kennis- en leerprogramma verbinden we gemeenten met elkaar. Lokaal leren binnen proeftuinen draagt niet automatisch bij aan een versnelling van het transitieproces. Daarom maken we leerervaringen en opgedane kennis toegankelijk voor alle gemeenten. We doen dit veelal door bijeenkomsten te organiseren voor beleidsambtenaren, maar ook voor bestuurders en raadsleden. Hierbij differentiëren we naar de fase waarin gemeentes zich bevinden. Zo vinden we samen het wiel uit, in plaats van ieder apart." (Aardgasvrijewijken.nl, no date)

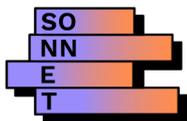


<p>ENOLL</p>	<p>A proposed measure to boost European Competitiveness: „The European Network of Living labs establishes a European platform for collaborative and co-creative innovation, where the users are involved in and contribute to the innovation process.” (ENOLL.org, no date)</p>	<p>Tangible network around social learning</p>	<p>Ongoing trend of Living Labs in Europe (ca.2005-2020: trend)</p>	<p>ENOLL was launched in 2006 as a measure to boost European competitiveness. Only few Dutch Living Labs (currently four, and 11 in Belgium) are connected the European Network of Living labs (ENOLL)³⁹. This network started in 2006. According to interviewee 1, ENOLL represented an “<i>older understanding of the Living Lab concept, because they are coming a bit more from this user integrated innovation and user focused product development.</i>” In its current set-up, it was mainly seen as a ‘networking’ organisation. The Amsterdam Metropolitan Solutions (AMS) institute - established by the municipality of Amsterdam in 2013, with the objective to “<i>help us solve metropolitan questions</i>” (interviewee 2) - did not join because they “<i>do not see what [the AMS institute] can get out of it, besides networking</i>”⁴⁰ (interviewee 2). The AMS itself assembles the expertise from different technical universities across the country and beyond (Delft University of Technology, Wageningen University of Life Sciences and the Massachusetts Institute of Technology).</p>
<p>Group of actors who signed the energy/climate agreement</p>	<p>“<i>[Obstacles] will be removed by the market and government together</i>”⁴¹ (SER, 2013; p.85)</p>	<p>Intangible network of actors who signed the same agreement</p>	<p>Signing of Energy Agreement (2013: policy event) and the National Climate Agreement (2019: policy event)</p>	<p>The Energy Agreement and the Climate Agreement were both nationally deliberated agreements, made in Dutch poldering tradition, between a large number of actors (for more information, see Table 4). The argument could be made that an intangible network is created amongst these actors, as they bound themselves to the same agreement, which holds a shared vision and a shared discourse.</p>

³⁹ See <https://enoll.org/network/living-labs/>, accessed 11/12/20

⁴⁰ NL: “[...] zie niet wat [het AMS-instituut] eruit kan halen, behalve netwerken.”

⁴¹ NL: “Gevonden belemmeringen worden door markt en overheid samen weggenomen.”

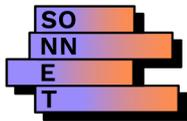


Living labs	<i>“At a certain point those city makers [...] started calling themselves Living Lab Buiksloterham because they also had to institutionalise themselves. But they were also very actively looking for such a Living Lab status. Just say that they could actually give more of a label to everything they did and for a kind of recognisability.” (interviewee 4)</i>	Intangible network of Living Labs	Ongoing trend of Living Labs in Europe (ca.2005-2020: trend)	The Living Lab status forms an intangible network (discourse coalition) between actors working on this field. This discourse coalition has a legitimising power to new entrants (i.e. communities). However, our analysis of SIE-Is Buiksloterham and Aardenhuizen shows that discourse alone is not enough to facilitate these novel actors, see also section 5.1.1.3.
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5.1.2.5 How have the SIE-fields co-evolved with the policy context (if so) (and what was the relative importance of the urban, regional, national and European level)?

As described in Table 5 and Table 6, policy events have a large influence on the SIE-field. These tables also indicate the effect these policy events have had on the SIE-field. Several observations from these tables are:

- Impeding policies/policy making processes can have three forms. Policies may lead to:
 1. Discontinuation of existing SIE policies. For example, SIE-I Stadslab2050 was discontinued because the political climate in the city of Antwerp had changed.
 2. Hijacking of SIE policies by non-SIE actors. For example, the Transition Experiments and IPIN projects were initially to be driven by non-regular actors (mainly citizens and societal actors). However, these projects became dominated by regime actors.
 3. Creation of non-SIE policies. Some policies have never aimed for socially innovative results. For example, the Topsector policy never aspired beyond triple-helix collaborations (which were non-SIE at the time, considering these collaborations being already mainstreamed within the Netherlands at the time).
- **Enabling policies/policy making often legitimises the entry of a novel actor.** They can be important enablers because they provide an opportunity to institutionalise and thereby legitimise new actors. For example, the integration of citizens and financial citizen participation in the Energy Agreement (2013) led to them being more accepted and trusted by incumbent regime actors and helped in mainstreaming citizen engagement in the energy transition.



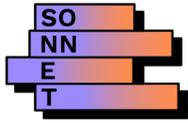
5.1.2.6 How are which power relations (such as inequality, exclusion, oppression, exploitation, injustice) being transformed and/or reproduced by the SIE-phenomenon under study? (And vice versa – how are SIEs enabled and impeded by power relations?)

SONNET studies the power relations that enable or impede the SIE-field and vice versa. SONNET builds on Avelino (2017) in understanding power as the relational and structural (in)capacity of actors to mobilise resources and institutions to achieve a goal. SIEs can refer to the resources being mobilised and/or the goals being aspired (D1.2). SONNET distinguishes between “power to mobilise SIE-related resources and/or to achieve SIE-related goals (incl. (in)equality and in/exclusion), power over others in SIE-related processes (including dependency, oppression and exploitation), and power with other actors to achieve collective (SIE-related) goals” (Wittmayer et al., 2020).

Power to

The primary goal of the experiments discussed in this case study is to **foster innovation, in some form**. This innovation might be technical (i.e. in the Topsector R&D pilots, smart grid IPIN projects, technical Living Labs) or social, such as developing new governance arrangements or legislations (i.e. societal Living Labs, and the regulatory sandboxes). What all these experiments share is a goal to create resources to change the current dominant way of doing, thinking or organising the energy system. While the experiments might aspire for innovation, they might end up reproducing existing structures and institutions. To explain this thought, we delve into the power typology of Avelino on the “*nature of the power exercise in relation to stability and change*” (Avelino, 2017; p.509). Here, Avelino proposes the distinction between **reinforcive, innovative and transformative power**. According to Avelino, “*innovative power is the capacity of actors to create new resources*”, whereas “*transformative power is the capacity of actors to develop new structures and institutions*” and reinforcive power “*is the capacity of actors to reinforce and reproduce existing structures and institutions*” (Avelino, 2017; p. 510). Seen through the lens of this typology, the experiments discussed in this case study aim to exercise innovative or transformative power (that is, the results of their experiment, test bed, or Living Lab are to be new resources, institutions or structures).

Whereas indeed, on the one hand, they possess the power to create new resources (and thus innovative power), **they experience difficulty to realise change in the system and thus their transformative power remains limited**. An example is the SIE-I Aardehuizen. The formal experimental-status gave them the right to take up the role of local electricity exchange. It did not however provide them resources (funding, technology, network, knowledge) to do so, nor did it enforce other actors to collaborate, without whom the experiment would not be able to succeed. In particular, the lack of cooperation of the grid operator was deemed problematic by Aardehuizen. The grid operator did not cooperate in requests for certain approaches towards rerouting their data management, nor did they provide the necessary devices for reading the data quickly enough for local electricity exchange. This eventually resulted in a lack of experimentation. As such, the SIE-I did not fully had the power to experiment.



Power over

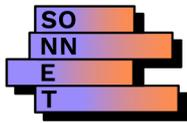
In this SIE-field, 'power over' occurs within experimental formats (i.e. differences in knowledge amongst experimenting actors), or between the experimental format and their context (i.e. dependency on outside funding).

The latter relation, between the experimental format and their wider context, comes back in several instances in the case study. In the words of interviewee 7A, "*these types of projects will always need public funding.*" As experiments often need funding, resources, political will or network from outside, governments often have power over experimental formats. For example, the cabinet of the city of Antwerp has power over SIE-I Stadslab2050, a change in political climate led to the disappearance of Stadslab2050 as a brand in the city of Antwerp. Instead, the brand of the SIE-I Stadslab2050 became absorbed in the wider climate policy of the city (see also the box on SIE-I Stadslab2050). Similarly, the Ministry of Economic Affairs has power over the SIE-I Aardehuizen, because they control the amount of experimental space that is provided within the electricity law. Lastly, public funding agencies like JPI and NWO have power over Living Lab formats, as they provide the funding necessary to carry out the experiment.

These observations relate to the notion of the pilot paradox, where the ingredients that initially allowed the experiment to be successful, eventually lead to their discontinuation (van Buuren et al., 2018). Experiments thrive on the empowering resources granted by external parties, but their dependency on these factors also lead to their discontinuation when funding periods end.

Power with

This SIE-field assumes a certain level of 'power with' from the get-go: multi-actor configurations experiment for a shared goal. Moreover, collaborations are facilitated by top-down induced learning networks. Transition experiments and Topsector R&D pilots have been accompanied by national learning and reflection programs, such as the TKIs of the Topsector R&D pilots making space for experiments to learn, reflect and network. Similarly, the Testbeds Gas-free Neighbourhood are accompanied with learning and reflection networks that allow exchanges between testbeds. An open question of this study remains the extent to which these programmes and networks are considered helpful and for which end. Also, not every Living Lab sees the benefit of networking for the sake of networking (i.e. AMS institute not seeing the relevance of international networks such as ENOLL, interviewee 3) – we currently see some attempts towards more bottom-up organisation of lessons and learnings (e.g. the Amsterdam Living Lab Summit).



5.1.3 What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the ‘outside’ institutional environment?

5.1.3.1 Who is involved in conducting institutional work (and who is not)? Which actors benefit from this work (or not)? How does this shape the SIE-field?

SONNET studies the institutional work of actors, defined as the activities of SIE-field actors and other field actors that aim to create, maintain and transform regulative, normative and/or cultural-cognitive institutions (Hielscher *et al.*, 2020; Wittmayer *et al.*, 2020). This builds on the definition of institutional work by Lawrence and Suddaby: “*the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions*” (Lawrence and Suddaby, 2006; p.215).

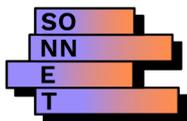
Table 8 Types of institutional work, copied from Fuenfschilling and Truffer, 2015, as adapted by Lawrence and Suddaby, 2006.

Forms of institutional work	Definition
Advocacy	The mobilization of political and regulatory support through direct and deliberate techniques of social suasion
Defining	The construction of rule systems that confer status or identity, define boundaries of membership or create status hierarchies within a field
Vesting	The creation of rule structures that confer property rights
Constructing identities	Defining the relationship between an actor and the field in which that actor operates
Changing normative associations	Re-making the connections between sets of practices and the moral and cultural foundations for those practices
Constructing normative networks	Construction of interorganizational connections through which practices become normatively sanctioned and which form the relevant peer group with respect to compliance, monitoring and evaluation
Mimicry	Associating new practices with existing sets of taken-for-granted practices, technologies and rules in order to ease adoption
Theorizing	The development and specification of abstract categories and the elaboration of chains of cause and effect
Educating	The educating of actors in skills and knowledge necessary to support the new institution

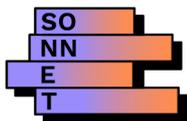
To analyse which actors do which types of institutional work, we will use the typology of institutional work by Funfschilling and Truffer (2016), who distinguish between various forms of institutional work (see Table 8). Table 9 shows the types of institutional work of SIE-field actors in this case study.

The institutional work has shaped the SIE-field Participatory Incubation and Experimentation in multiple ways. The institutional work by academia led to the stance within policy to **consider other modes of innovation within their policies**, leading to i.e the Transition Experiments of the 2000s. The advocacy by JPI Urban Europe for Living Labs led to the **emergence of the Living Lab collaborative format** in the Netherlands. Lastly, the advocacy of citizens for their consideration in the energy transition was part of the cause of the emergence of **collaborative formats where citizen-engagement were centralised** (i.e. sandbox experiments and societal Living Labs).

Table 9 Types of institutional work of SIE-field actors.

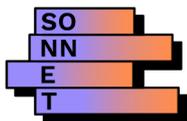


Who is doing institutional work?	Type of institutional work	Description of institutional work
Research institutes	Theorising	<p><u>Theorising new ways of knowledge production.</u> Increasing focus on producing relevant knowledge to society (Hessels, van Lente and Smits, 2009), mode-2 knowledge production (Gibbons <i>et al.</i>, 1994; Nowotny, Scott and Gibbons, 2001), post-normal science (Funtowicz and Ravetz, 1994; Wesselink and Hoppe, 2011), increasing acknowledgement of the complexity, uncertainty and interrelatedness of what has been termed as wicked or persistent problems (Rittel and Webber, 1973; Grin, Rotmans and Schot, 2010; Schuitmaker, 2012). A publication in science marks ‘Sustainability Science’ as a new research field (Kates <i>et al.</i>, 2001). Fundamental societal change started to make use of the concepts of transition and transformation (O’Riordan and Voisey, 1998; O’Riordan, 2001; Rotmans and <i>et al.</i>, 2001; Grin, Rotmans and Schot, 2011).</p> <p><u>Theorising new ways of innovation,</u> letting go of linear models of innovation by including consumers in product development (Ballon, Pierson, and Delaere, 2005; Kaulio, 1998) and triple-helix collaborations between state, market, and science (Etzkowitz and Leydesdorff, 1995; Ranga and Etzkowitz, 2013).</p>
	Changing normative associations	<p><u>Criticising the normative associations between the practice of transition management in the government’s transition platforms, and the foundations of transition management.</u> Researchers criticised that “transitions policy perpetuates technocratic routines in energy policy” (Smith and Kern, 2009) and that it fell short on democratic grounds with no broad civic dialogue about desirability and future directions in sight (Hendriks, 2009). Due to the high involvement and representation of business and industry, next to government and the occasional scientist and only low involvement of intermediary organisations and NGOs (Loorbach, 2007), it has been referred to as “highly corporatist approach” (Hendriks (2008), p.196 chapter 9 of Kemp, 2012).</p>
	Constructing normative networks	<p>Living lab researchers constructed an actor network of municipalities, researchers and other actors working with Living Lab formats around Living Labs, informally, as well as formally (i.e. AMS institute Living Lab Summit).</p> <p><u>The construction of a network of stakeholders around system innovation: ‘Dutch Knowledge Network on System Innovation and Transition’ (KSI).</u> It contained eleven knowledge institutes.</p>
	Theorising / educating	<p><u>Rathenau institute theorising on the impact and scalability of Living Labs in the Netherlands and educating the wider audience (state, market) about their findings through two research reports.</u></p>
National Government	Constructing normative networks	<p><u>Construction of interorganisational networks through implementing transition platforms.</u> The Dutch Ministry of Economic Affairs created seven energy transition platforms, each comprising 10 to 15 individuals from the private and the public sector, academia and civil society. They came together to develop goals for 2020 and pathways towards those goals (Kern and Smith, 2008; Kemp and Rotmans, 2009; Smith and Kern, 2009; Kemp, 2012). In the following years, transition experiments were to practically explore those pathways. The government funded transition</p>



		experiments through the ‘Unique Chance Scheme’ (NE: Unieke Kansen Regeling), granting 118.3 million EUR of subsidy between 2004 and 2007 (Kemp, 2012). Besides government funding, a remaining 957.8 million EUR investment was sourced from market parties in this time period (Kemp, 2012). Twelve actors from state, 36 from business, nine from NGOs, and 16 from science participated across all energy-related transition platforms (from Table 2 in Smith and Kern, 2009).
Multi-actor (initiated by ministries)	Defining / constructing identities	<u>Defining that citizens and decentral governments were to be pillars of the energy transition in an Energy Agreement</u> , which was signed by a broad coalition of actors from diverse societal spheres.
Citizens	Advocacy	<u>Advocating at the municipality for a citizen-led approach in the Buiksloterham area in Amsterdam.</u>
		<u>Advocating at the municipality for an official Living Lab status.</u> “At a certain point those city makers [...] started calling themselves Living Lab Buiksloterham because they also had to institutionalise themselves. But they were also very actively looking for such a living lab status. Just say that they could actually give more of a label to everything they did and for a kind of recognisability.” (interviewee 4)
		<u>Advocating for regulatory support from grid operators to conduct experiments and educating the Ministry of Economic Affairs on the outcomes of their experiments.</u>
	Theorising / educating / changing normative associations	<u>Experimenting with the energy transition locally and educating the wider system about their findings.</u>
Local governments	Vesting ⁴²	<u>City of Amsterdam vesting citizens of Buiksloterham with the right to develop their own area.</u> The financial crisis and the governmental budget-cuts that followed created space for SIE-Is to develop and institutionalise where other projects had fallen through. “I think the municipality was more than happy that there were a couple of enthusiasts who wanted to do something there themselves. So, in that sense, [...] they were happily supporting them because [they thought that] at least there was happening something, and maybe we can get something out of it.” (interviewee 3)
		<u>City of Antwerp vesting a city lab within the Antwerp city administration in 2013</u> , as part of their sustainability vision. The goal was to aid in making Antwerp CO ₂ neutral by 2050. The initiative is funded by the Flemish government and the city of Antwerp. Incidental funding is acquired

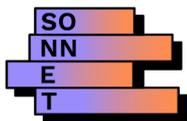
⁴² Following the table by Fuenfschilling on various types of institutional work, In this analysis, ‘vesting’ is understood as regulatory changes with tangible effects on rights or economic support (i.e. a fund made available, or a specific right which is altered). Defining, on the other hand, is understood as institutional changes that relate to intangible effects on identity, status or hierarchies.



		<p>through EU-funded (research) projects. According to the Flemish government:</p> <p><i>“Working on a sustainable city requires a different approach, in which experimentation and innovation are key words. Moreover, it is not a task for the city government alone. It requires a unique partnership between government, companies, residents and organisations in the city. Stadslab2050 is a platform for everyone who is involved in sustainable processes in the city.”⁴³</i></p> <p>The city administration stops Stadslab2050 as a brand. Due to a shift in political climate, “there is too little support” on a political level for the brand Stadslab2050 (interviewee 7B). The Stadslab2050 will be integrated in the overarching climate policy of the city, and the brand Stadslab2050 will disappear. In the words of interviewee 7B, such continuity issues due to shifting political climates are more common throughout Europe: “The Danish ‘Mindlab’ has dropped a year or a year and a half ago. They had a fantastic lab to which everybody looked up to, and due to a shift in politics it has been changed to a technical lab. [...] [Labs have] an end date.”⁴⁴</p> <p><u>In 2021, the city of Antwerp vested the notion of social innovation within a thematic call for projects on social innovation in the energy transition.</u> In total, 60.000 EUR has been budgeted for social innovation in energy projects.</p>
	Defining	<p><u>Defining the Buiksloterham neighbourhood as a Living Lab.</u> However, this label did not formally offer anything, but was merely an “empty shell” (interviewee 4). The formalisation also led to the fact that “a lot of the initiators from the very beginning [...] find it difficult to continue to recognise themselves [...], or they think it is there now and then we can do something else” (interviewee 4). In the view of interviewee 4, this often occurs with initiatives: “A kind of maturity that you can achieve of which it is difficult to take that step at a given moment and then also continue to have meaning. (...) In the end, they got there, so indeed the city council said: ‘Okay then you are now a Living Lab.’ But otherwise, it was actually an empty shell. So then they could call themselves that, but then there was nothing attached to it, no budget attached to it, no authority attached to it.”</p>
	Educating / changing normative beliefs / constructing normative networks	<p><u>SIE-I Stadslab2050 educating the city of Antwerp on diverse topics and constructing new networks, as well as changing normative associations around energy.</u> For example, in 2014, the city lab collaborated with a policy maker from the municipality to launch the programme ‘Energy for the Heart of Antwerp’ (NL: Energie voor het Antwerpse Hart), which focused on energy savings in the tertiary sector. The goal of the programme was, amongst others to “[/]et [citizens] know through campaigns in our city that</p>

⁴³ NL: “Werken aan een duurzame stad vraagt een andere aanpak, waarin **experimenteren** en **innoveren** sleutelwoorden zijn. Het is bovendien geen taak voor de stedelijke overheid alleen. Het vraagt een uniek samenwerkingsverband tussen overheid, bedrijven, bewoners en organisaties in de stad. Stadslab2050 is een platform voor iedereen die met duurzame trajecten in de stad bezig is.” <https://www.antwerpenmorgen.be/nl/projecten/stadslab-2050/over>, accessed 11/12/20

⁴⁴ NL: “Het ‘Mindlab’ van de Denen is een jaar of anderhalf jaar geleden opgeheven. Ze hadden een fantastisch lab waar iedereen naar opkeek, en met een verschuiving in de politiek is die veranderd in een technisch lab. [...] Het heeft een houdbaarheidsdatum.”

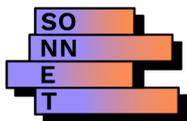


		<p>sustainability is not a goat's wool sock story, but a harsh economic reality that we all benefit from."⁴⁵ The main actors involved in the project were the city of Antwerp, the grid operator Eandis (now Fluvius) and a triple-helix networking organisation Smart Grid Flanders (now Flux50). Whereas the programme did not lead to any immediate changes in the behaviour of actors involved, interviewee 7B notes that "a few years later you see that when there is a renovation plan, then suddenly you hear: oh we should really do something about these store doors. So, agenda-setting, that we do a lot, but causally solve something one on one, I have never seen that before."⁴⁶ One of the conclusions of the city lab programme was that structural change was facilitated by new ways of organising, thinking and financing:</p> <p><i>"The fragmentary realisations along the way are good, are beautiful and are important because they prove the steps forward in demonstrable results, but the big changes are taking place in the way we organise ourselves, how we think about energy, provide subsidies [...]. We already experienced that during this Stadslab2050 process."⁴⁷</i></p>
	Educating / changing normative associations / constructing normative networks	<p><u>Stadslab2050 is educating the city of Antwerp on energy poverty in Antwerp through experiments.</u> These experiments include finding new collaborations to facilitate consumption of cooperatively generated PV electricity for social housing tenants (Stalinsstraat, and Collectief Goed/ZuidtrAnt), finding new business models to lease energy-saving refrigerators to low-income households (Papillon) and integrating multiple energy services of the municipality (Ecohuis). These experiments all focus on developing new collaborations and business models for energy production, consumption, savings and distribution for low-income households to address energy poverty.</p>
	Advocating	<p><u>The project leads of Gelijkstroom suggested a thematic call on social innovation in the energy transition in the climate fund of the municipality of Antwerp (NL: klimaatfonds).</u> This fund had existed for a while before Gelijkstroom started. Due to a restructuring of the fund, there was space for a new theme.</p>
Ministry of Economic Affairs	Defining / vesting	<p><u>Defining 27 citizen-led (housing) associations as official experiments, through an official experimental status.</u> These rising concerns about legal barriers around smart-grid developments seem to have influenced the development and implementation of the 'Electricity Law Experimentation Decree' (NL: Experimenten Electriciteitswet 2015-2018). This experimental status made "individual exemptions to Article 16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators" (Lammers and Diestelmeier, 2017b;</p>

⁴⁵ NL: "Laat [burgers] via campagnes in onze stad weten dat duurzaamheid geen verhaal van geitenwollen sokken is, maar een harde economische realiteit waar we allemaal van profiteren." <https://stadslab2050.be/energie/wie-plaatst-mee-een-versnelling> accessed 17/8/20

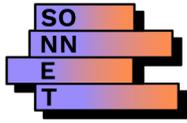
⁴⁶ NL: "Een paar jaar later zie je dat als er een verbouwingsplan is, dan hoor je ineens: oh we moeten echt iets aan die winkeldeuren doen. Dus agendasetting, dat is iets wat we veel doen, maar causaal iets één op één oplossen, dat heb ik niet eerder gezien."

⁴⁷ NL: "De fragmentarische realisaties onderweg zijn goed, mooi en belangrijk omdat ze de stappen voorwaarts aantoonbaar bewijzen, maar de grote veranderingen vinden plaats in de manier waarop we ons organiseren, hoe we denken over energie, subsidies verstrekken [...]. Dat hebben we al ervaren tijdens dit Stadslab2050-traject." <https://stadslab2050.be/energie/wie-plaatst-mee-een-versnelling> accessed 17/8/20



		<p>p.216). The decree made it possible for the Ministry of Economic Affairs to grant selected (housing) associations a formal experimental-status. This status allowed associations to derogate from the electricity and gas act of 1998, and to take up tasks that are legally reserved to be conducted by the grid operator. In particular, the decree was used by associations to carry out peer-to-peer grid management. The goal of this Experimentation Decree was to reveal which adjustments to the legal framework were needed to facilitate the energy transition. Besides legal innovation, the Experimentation Decree aimed to find new modes of governance. The IPIN projects had shown that the grid operator was a leading actor in all projects, being a potential threat to actually finding these new modes of governance (Lammers and Diestelmeier, 2017). Thus, the experimentation status was only made available for housing associations and energy associations. The requirement was that these associations had to be controlled by their members, impeding grid operators and energy suppliers to control the experiments (decree article 7(1)) as cited in (Lammers and Diestelmeier, 2017)). [...] A total of 27 projects were granted formal experimental status, including the housing association Aardehuizen in Olst.</p>
United Nations	Advocating	<p><u>Advocating and educating EU member states on the importance of sustainability, collaboration of actors from different societal spheres and the important role of the local governments in sustainability, through the Brundtland report on 'our common future' (1987) and Agenda 21.</u> Agenda 21 specifically pointed out the importance of the local governments as "the level closest to the people" and considered their participation and cooperation as "decisive" in addressing the problems outlined since these often originate locally (United Nations Conference on Environment and Development (UNCED), 1992).</p>
EU	Constructing normative associations / networks	<p><u>Constructing normative associations about the narrative of local experimentation through a shared discourse coalition of Living Labs/city labs.</u> Interviewee 7B of Stadslab2050 stated that he found support in the fact that their narrative of local experimentation through city labs is embedded in European policy, and that the EU is "<i>really pulling the cart</i>"⁴⁸.</p>

⁴⁸ NL: "trekt echt de kar"



5.1.3.2 How, why, and where do SIE-field actors and/or other field actors conduct activities linked to creating, maintaining and transforming institutions?

This question has been answered in section 5.1.3.1, the SIE-field actor is covered in the first column (who is conducting institutional work?), how, why and where have been covered in the other columns.

5.1.3.3 What have been the most important activities linked to creating, maintaining and transforming institutions? Outline these activities through describing 2-4 examples.

This section contains two examples of transforming institutions

1. SIE-I Stadslab2050
2. SIE-I Aardehuizen

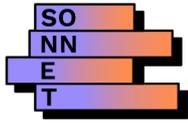
Other examples of institutional work were not researched in the same depth and thus not selected for the analysis in this section. For more information on institutional work, see the institutional work analytical box in chapter 5 of the case study.

As described in section 5.1.3.1, Stadslab2050 and Aardehuizen were both involved in institutional work.

1. Transforming institutions: new norms and transformed cultural-cognitive institutions through SIE-I Stadslab2050

The SIE-I Stadslab2050 mainly engages in transforming norms and cultural-cognitive beliefs. In the words of interviewee 7B, “you always see three things come to exist: there’s knowledge build-up [...], network is built up, and mostly that network stays intact after the projects [...] and one layer, you see a shift in mind-set [...]”⁴⁹. In the SIE-I Stadslab2050 projects, a change in norms, discourse and cultural-cognitive beliefs often emerges in project participants. Regulatory changes often occur at a later stage and as a consequence of these normative changes. An example of institutional work is a water innovation project for the Garden Streets in 2017 (NL: Tuinstraten). The project did not initially lead to regulatory changes. Rather, it led to a change in discourse in the city department: ‘designing with water’ became the norm, through advocacy and knowledge spreading of the SIE-I Stadslab2050. This resulted in an innovation project ‘Antwerp breaks out’ (NL: Antwerpen Breekt Uit) and Climate Resilient Roofs (NL:

⁴⁹ NL: “Je ziet altijd drie dingen ontstaan: er wordt kennis opgebouwd [...], het netwerk wordt opgebouwd, en meestal blijft dat netwerk intact na de projecten [...] en een laag daarboven zie je een verschuiving in mindset [...]” (Interviewee 7b)



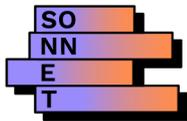
Klimaatrobuuste Daken). In the end, the learning trajectory of the experiments gave incentive to re-evaluate the citizen premiums for roof innovation, thus resulting in regulatory changes. In another project ‘fashion flows’ on textile and the circular economy, the project led to an increase in knowledge amongst associated partners, resulting in an online tool⁵⁰ and a change in discourse: textile is considered an important resource by the partners⁵¹, rather than a waste stream. To realise these changes in institutions, the city lab actively engaged potential partners, provided financial support to experiments, created a network through active communication and events and actively promoted self-reflection amongst associated partners on their role in the transition after the trajectory. Whereas the SIE-I engages in regulative institutional work in the water and material sector, interviewee 7B states that “in energy this is much harder, maybe also because it is less at a local level.” Only recently, Stadslab2050 became involved with the city lab trajectory around energy poverty in 2020, *Gelijkstroom*, which is financed by the European Union’s research and innovation programme Horizon 2020 through the SONNET project and the municipality of Antwerp. While the experiments are still running, initial results show that the project resulted in a thematic call on social innovation in the energy transition as part of the project fund of the municipality of Antwerp (NL: *projectenfonds*). This fund had existed for a while before *Gelijkstroom* started. Due to a reformation of the fund, the project leads of the *Gelijkstroom* trajectory saw the opportunity to suggest a thematic call on social innovation in the energy transition in the project fund. The cabinet thought this to be a good idea. As such, the city of Antwerp will launch a thematic call for projects on social innovation in the energy transition in 2021 (interviewee 7A).

Transforming institutions: new norms and transformed cultural-cognitive institutions through SIE-I Aardehuizen

The SIE-I Aardehuizen were part of a regulatory sandbox experiment provided by the national government. The regulatory sandbox experiments provided a space for associations to do institutional work, this is, to transform regulatory institutions around the governance of grid operation. The SIE-I struggled to realise their experiment and thereby transform these regulatory institutions. This was partly because they could not construct interorganisational networks and were confronted with a lack of access to resources. Aardehuizen attempted to involve the grid operator in the project to link the local experiment to the wider grid, but this did not materialise in practice (see also box on SIE-I Aardehuizen). Moreover, they lacked the resources (i.e. monetary, knowledge, network) to fully execute the work necessary for regulatory change (see also box on SIE-I Aardehuizen). However, the Experimentation Decree allowed Aardehuizen to engage in advocacy institutional work (i.e. news coverage, blogs and project websites) and to spread their beliefs around peak-shaving and grid management.

⁵⁰ www.close-the-loop.be/nl accessed 25/1/2021.

⁵¹ See also <https://www.ovam.be/circulaire-mode-en-textiel-0> accessed 25/1/2021.



Concluding remarks

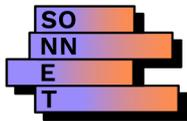
In sum, institutional work by bottom-up and local SIE-field actors mainly occurs on a normative or cultural-cognitive level. Whereas national policy plans and initiatives might broadcast ambitious plans to transform regulatory institutions through integrating local civil society, societal and municipal actors, the latter actors are often not empowered through resources, network or authorisation to put in the required effort to do this transformational work (i.e. SIE-I Stadslab2050, Buiksloterham and Aardehuizen). A more general point that warrants further research is to which extent certain experimental formats such as Living Labs or regulatory sandboxes are actively mimicking existing triple-helix formats such as transition experiments or Topsector R&D pilots. One possible question then would be about the extent to which experimental formats strategically combine new practices (the inclusion of users or citizens) with existing ones (a focus on technology, and on business, state and academic actors in the lead) to ease their adoption and thus the creation of new institutions. Or the question could focus on whether this mimicking is more a process that could be understood following the ideas of ‘institutional isomorphism’, that new formats in a certain system tend to assimilate over time; or whether it is optimisation of existing formats. With the exception of the last phase, the relative lack of concerted action by experiments including educational efforts, which might also be due to their temporary character, does stand in the way of broader influences and on embedding such new ways of doing, thinking and organising.

5.1.3.4 What forms do these activities linked to maintaining, creating and transforming institutions take (i.e. emotion work, boundary work, strategy work, practice work and/or values work)? Link back to the 2-4 examples

The previous sections have illustrated this in more detail. Table 10 gives a summary of these sections for the two examples Aardehuizen and Stadslab2050.

Table 10 The most important activities linked to creating, maintaining and transforming institutions in two examples from the case study.

Example	End result: created, maintained or transformed institution?	Description of institutional work
Aardehuizen	Transformed institutions (to a limited degree): cultural cognitive and regulatory institutions around role division around peak shaving and grid operation (limited)	Aardehuizen received a formal experimental-status. This was a legal derogation of the Electricity and Gas Act, which meant they were allowed to manage the grid instead of the grid operator. The transformation of the beliefs and regulation around role divisions in grid management was limited, because 1) the experimental status was temporary, 2) the experimental environment was not fruitful and therefore transformation was impeded. See also the following sections.
Stadslab2050	Transformed institutions: discourse, and, at a later stage, regulation.	The SIE-I Stadslab2050 mainly engages in shifting norms and cultural-cognitive beliefs, i.e. knowledge, network or a shift in mind-set (interviewee 7A). Regulatory changes often occur at a later stage. An example of institutional work is a water innovation



		<p>project for the Garden Streets in 2017 (NL: Tuinstraten). The project did not initially lead to regulatory changes. Rather, it led to a change in discourse in the city department: ‘designing with water’ became the norm. This resulted in an innovation project ‘Antwerp breaks out’ (NL: Antwerpen Breekt Uit) and Climate Resilient Roofs (NL: Klimaatrobuuste Daken). In the end, the learning trajectory of the experiments gave incentives to re-evaluate the citizen premiums for roof innovation, thus resulting in regulatory changes.</p> <p>The brand Stadslab2050 was discontinued in 2020 and absorbed into the wider climate policy of Antwerp.</p>
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5.1.3.5 What factors have enabled and/or impeded institutional work? E.g. Resources, learnt lessons and competences connected to actors/ alliances/ networks/ collaborations. Link back to the 2-4 examples

The factors that have enabled or impeded SIE-field actors to conduct institutional work through harnessing these forms of power are discussed in the table below (Table 11).

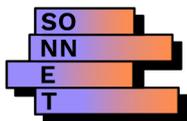
Summarising the table for each example:

- **Aardehuizen** has mainly been enabled by the Ministry of Economic Affairs through the legal derogation they were granted. A major impeding factor was the lack of other forms of resources (i.e. knowledge, funding, network) that they needed to conduct their experiments.
- **Stadslab2050** was mainly enabled by JPI Europe advocating for their way of working (Living Lab format). A central impeding factor has been the changing local political climate with regards to their activities, which has resulted in the discontinuation of the Living Lab.

Table 11 Factors that have enabled or impeded institutional work through power ‘with’ and power ‘to’, based on the example of Aardehuizen, Buiksloterham and Stadslab2050.

Factor	Enabling or impeding?	Empirical example	Empirical effect (page number in case study)
Formalisation of experimental status	Initially enabling (legitimation), later impeding	Aardehuizen	<i>In 2017, Aardehuizen became part of the regulatory sandbox agreement from the Netherlands Enterprise Agency (NL: Rijksinstituut voor Ondernemend Nederland, RVO). Consequently, Aardehuizen was legally allowed to operate local electricity grids. The formal experimental-status gave them the right to take up the role of the grid operator to exchange electricity locally. It did not, however, provide them resources (funding, network, knowledge) to do so, nor did it enforce other actors to collaborate, without whom the experiment would not be able to succeed. P31</i>
		Buiksloterham	<i>Whereas the Buiksloterham Living Lab is often considered one of the leading Living Labs of the Netherlands, the SIE-I was not framed as a Living Lab from its inception. In the words of interviewee 4: “At a certain point those city makers [...] started</i>

			<p>calling themselves <i>Living Lab Buiksloterham</i> because they also had to institutionalise themselves. But they were also very actively looking for such a living lab status. Just say that they could actually give more of a label to everything they did and for a kind of recognisability” (interviewee 4). However, this label did not formally offer anything, but was merely an “empty shell” (interviewee 4). “In the end they got there, so indeed the city council said: ‘Okay then you are now a Living Lab.’ But otherwise it was actually an empty shell. So then they could call themselves that, but then there was nothing attached to it, no budget attached to it, no authority attached to it.” (Interviewee 4) P29</p>
		Buiksloterham	<p>The formalisation also led to the fact that “a lot of the initiators from the very beginning [...] find it difficult to continue to recognise themselves [...], or they think it is there now and then we can do something else” (interviewee 4). In the view of interviewee 4, this often occurs with initiatives: “A kind of maturity that you can achieve of which it is difficult to take that step at a given moment and then also continue to have meaning.” P29</p>
Agreement signed with broad societal support	Enabling	Diverse	<p>The Energy Agreement was signed by 47 organisations from diverse societal spheres. It legitimised citizen and local government involvement in energy, as these actors were listed in the agreement as pillars of the energy transition. P22</p>
Learning networks	Enabling	Stadslab2050 and Buiksloterham (Living Labs)	<p><i>Living labs</i> also started to address issues around the continuity of their experiments. Whereas the <i>Living Labs</i> of the start of the decade had focused primarily on learning within their project, the end of the decade was characterised by increasing attention on learning between projects. In the words of interviewee 4, “we [<i>Living Lab</i> researchers] are currently also busy by just seeing each other in between and just exchange and develop knowledge together”. However, as stated by interviewee 4, funding for these informal learning meetings was lacking and proved a barrier to realise such exchanges. As more formal learning opportunity between <i>Living Labs</i>, the <i>Urban Living Lab Summit</i> was organised by the <i>AMS Institute</i> - for the first time in 2019 with the intent to provide a yearly learning platform. The idea of the summit was to “explore tools that are used [<i>in Living Labs</i>] and ways to standardise them” (<i>AMS Institute</i>, 2020). Invitees to the summit were actors, who were working in <i>Living Labs</i> and wanted to take part in knowledge sharing: researchers, municipalities, and businesses.</p>
Being opportunistic about destabilising shocks	Enabling	Buiksloterham	<p>In the wake of the financial crisis of 2007/2008, and the resulting cuts in municipal budgets, a housing development project in the North of Amsterdam had been cancelled due to a lack of funds. At the same time, several city makers and civil society actors had started to gain interest in the local area. In the absence of municipal initiatives, these city makers started to develop ideas and plans for activities for that unused territory. For example, the area of <i>De Ceuvel</i> started to experiment with self-sufficiency, by testing whether electricity could be exchanged locally. In the words of interviewee 3: “I think the municipality was more than happy that there were a couple of enthusiasts who wanted to do something there</p>



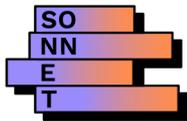
			<p>themselves. So, in that sense, [...] they were happily supporting them because [they thought that] at least there was happening something, and maybe we can get something out of it." (interviewee 3)</p>
Being part of a broader discourse coalition	Enabling	Stadslab2050	<p>JPI Europe was putting 'Living labs' as "co-creative workshops and collaborative formats" on the European research agenda. P26</p> <p>Interviewee 7B of Stadslab2050 stated that he found support in the fact that their narrative of local experimentation through city labs is embedded in European policy, and that the EU is "really pulling the cart"⁵².</p>
Funding	Enabling	Stadslab2050	<p>The JPI Urban Europe funded dozens of living lab projects via national research funding institutions (NWO) starting in 2012. The ambition of JPI Urban Europe is "to address the global urban challenges of today with the ambition to develop a European research and innovation hub on urban matters and create European solutions by means of coordinated research"⁵³. While the first calls were more general, the calls between 2014-2016 and in 2020 focused specifically on the energy transition and also on smart grids in cities or neighbourhoods. To differentiate those Living Labs focusing on technology as parameter for experimentation – which is the majority in the Netherlands – from those focusing on governance arrangements or business models, we refer to the latter as societal Living Lab. An example of a societal Living Lab, which also received funding by JPI Urban Europe (via the URB@Exp⁵⁴) is the SIE-I Stadslab2050 in Antwerp, founded in 2013 (see box Stadslab2050). P24</p>
Lack of political support	Impeding	Stadslab2050	<p>Because of a shift in political climate, "there [was] too little support" on a political level for the brand Stadslab2050 (interviewee 7B). The Stadslab2050 was integrated in the overarching climate policy of the city, and the brand Stadslab2050 disappeared. In the words of interviewee 7B, such continuity issues due to shifting political climates are more common throughout Europe: "The Danish 'Mindlab' has stopped a year or a year and a half ago. They had a fantastic lab to which everybody looked up to, and with a shift in politics that has been changed to a technical lab. [...] It has an end date."⁵⁵</p>

⁵² NL: "trekt echt de kar"

⁵³ <https://jpi-urbaneurope.eu/about/intro/> accessed 2.10.2020

⁵⁴ <https://jpi-urbaneurope.eu/project/urbexp/>, accessed 11/12/2020

⁵⁵ NL: "Het 'Mindlab' van de Denen is een jaar of anderhalf jaar geleden opgeheven. Ze hadden een fantastisch lab waar iedereen naar opkeek, en met een verschuiving in de politiek is die veranderd in een technisch lab. [...] Het heeft een houdbaarheidsdatum."



5.1.3.6 What have been intended and unintended effects (i.e. contributions) derived from conducting institutional work? What influence have they had on the SIE-field and ‘outside’ institutional environment? Link back to the 2-4 examples

Whereas the Aardehuizen project intended for regulatory institutional transformation, **the unintended effect was actually a change of cultural-cognitive institutions** around local experimentation by citizens. Their legal derogation zone to experiment with local grid management did not lead to different regulation regarding local management, but did create a different conversation about grid management amongst several actors surrounding their experiment (from i.e. RVO, Enexis and knowledge institutes).

Stadslab2050 actively **strives for a change in cultural-cognitive institutions**, and unintended regulatory institutions follow further down the line. Table 10 gives an example of this in more detail.

5.2 Case study 2: Financing and Subsidy Mechanisms for Renewable Energy

5.2.1 How have the SIE and SIE-field emerged, developed and institutionalised over time?

5.2.1.1 What are the relevant SIE-field actors and other field actors within the SIE-field and what are their roles within the SIE-field? How have these changed over time?

The most relevant SIE-actors are **financial institutions** (banks, institutional investors, crowdfunding platforms), **citizen initiatives** (energy cooperatives) and **governments** (authorities for financial markets, local, regional, national and European governments). To provide an indication as to which roles these actors have played in the SIE-field over time, we will use the multi-actor perspective of Avelino and Wittmayer (2015) (Figure 3).

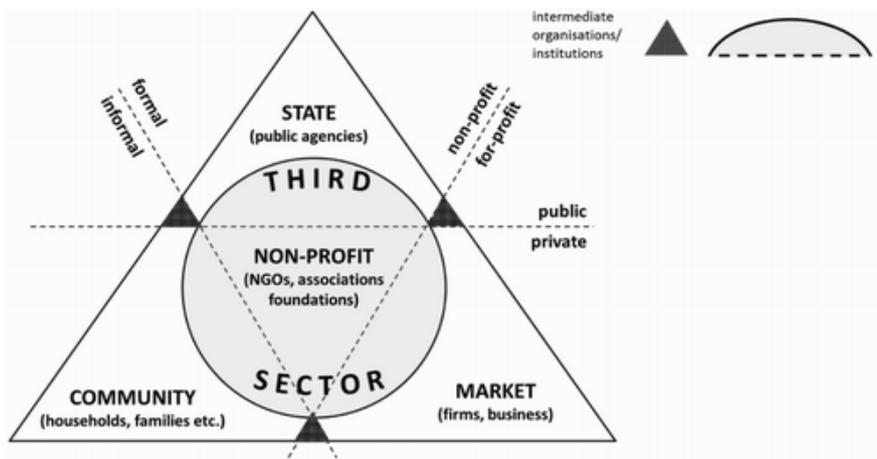
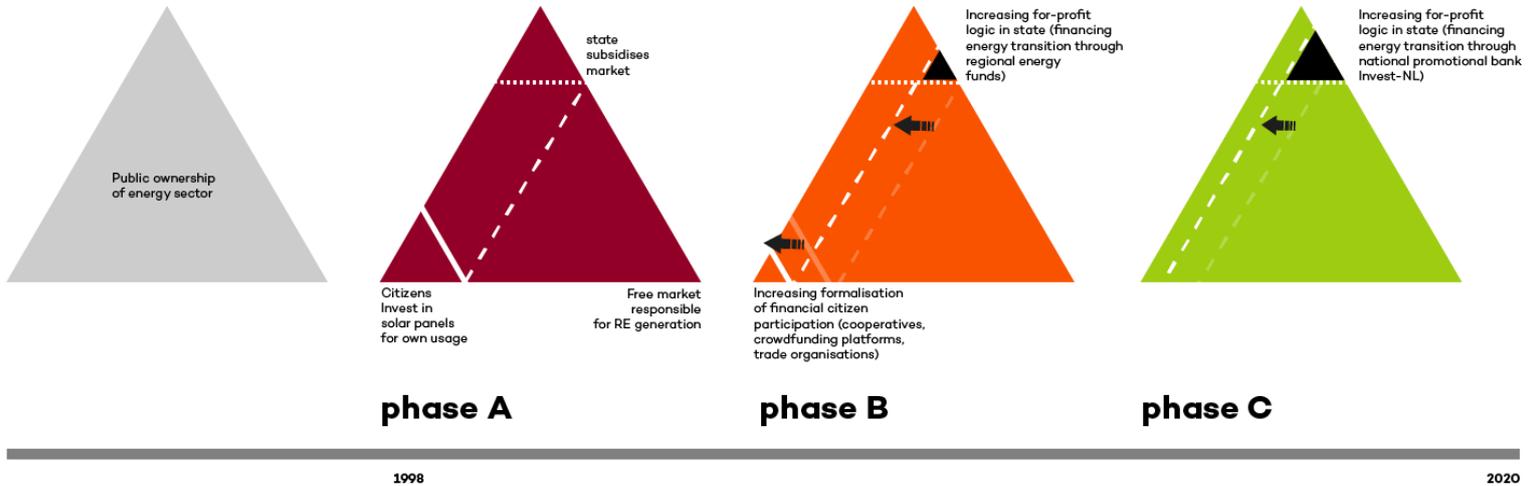
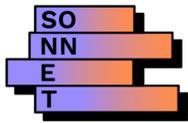


Figure 4 Multi-actor perspective of Avelino and Wittmayer (2015) adopted from Evers and Laville (2004, p.17).

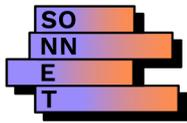
Figure 5 Multi-actor perspective (Avelino and Wittmayer, 2015) as applied to this case study. The figure shows that the SIE-field increasingly formalises and privatises over time. It also shows an increasing for-profit logic within the state.

Three observations are evident when looking at the case study through the multi-actor perspective (Figure 5):

- 1) Increasing **formalisation** within the SIE-field (within the community sphere)
- 2) Increasing **for-profit logic** within the SIE-field (within community as well as state spheres)



3) Increasing **privatisation** of the SIE-field (from state monopoly to free market)



5.2.1.2 What are relevant activities, aims/goals and narratives that have been developed and manifested by SIE-field actors and/or other field actors within the SIE-field over time?

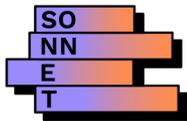
Over time, actors have taken up diverse activities (see Table 12): i.e. lobbying for or against the institutionalisation of crowdfunding, lobbying for or against a national promotional bank or formalising into cooperatives or trade organisations.



Figure 6 Activities of actors in this SIE-field: subsidising or financing (blue), lobbying for (green) or against (red), and formalising (orange).

Table 12 Relevant activities and narratives developed and manifested by SIE-field actors and other field actors over time.

Phase	Actor	Activity	Activities and the associated narrative
A	European Union	Privatise	Privatising the energy sector of member states to increase efficiency and economic growth.
A	National government	Subsidise	Subsidising the newly created free market to make RE projects profitable.
B	Decentral governments	Finance	Sold utility shares and started financing the energy transition with the profits, steadily started to decrease subsidies and start investing instead, in order to be 'smarter with money'.
B	National government (Authority Financial Markets and Ministry of Economic Affairs)	Enforce regulation	Initially, the national government do not enforce financial regulation upon crowdfunding platforms in order to stimulate innovation. Later, the government switches their approach and starts enforcing regulation and takes a more hesitant tone towards crowdfunding.



B	Crowdfunding platforms	Crowdfund	Sourcing the crowd to increase financial citizen participation in the energy transition.
B	Crowdfunding platforms	Lobby for	Further institutionalising crowdfunding within legislation to ensure that banks are forced to refer to crowdfunding platforms if they reject a proposal by an entrepreneur, in order to increase financial citizen participation in the energy transition.
B	Banks	Lobby against	Put a stop to the further institutionalisation of crowdfunding by lobbying against the proposed legislation (see previous row).
C	Jeroen Kremers, LTO, VNO-NCW	Lobby for	Lobbying for a national promotional bank and the centralisation of government financing institutes.
C	BNG, NWB, FMO, VNG	Lobby against	Lobbying against the centralisation of government financing institutes.
C	National Promotional Bank Invest-NL	Finance	Invest-NL was established in 2019 and aimed to allow companies and/or projects that contribute to major societal transitions to get funded by market parties. Another aim was to provide risk capital, which was perceived to be lacking as compared to i.e. Germany or the UK (EZK, 2020; Thole, 2020).

The **motivations behind these activities** are diverse. Several examples will be discussed in this paragraph. In phase A, the government wanted to **privatise and subsidise to stimulate innovation and efficiency in the energy market**. In phase B, governments started financing rather than subsidising, in order to gain profits on their investments and to **stop being “mad-Hank who just spends money”** (see phase B). Another narrative that has been developed is that of **financial citizen participation**, where citizens, formalised into cooperatives or crowdfunding platforms to partake financially in the energy transition (see also phase B). Another interesting narrative that has been developed is that of **centralisation, in order to increase efficiency**. This narrative has been put forward by those behind the institutionalisation of the national promotional bank Invest-NL: Jeroen Kremers, and business trade organisations (see also phase C). The narrative was contested by the institutions that were to be centralised, such as RVO, BNG, VNG and NWB.

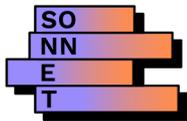
The research focused less on the **creation of narratives**. In order to provide insight into this analytically, more research would be necessary.

5.2.1.3 What types of interactions/ relations exist between SIE-field actors and/or other field actors? What types of informal and formal alliances, networks, collaborations have existed (and possibly still do)?

This section describes the relationship between formalisation, professionalisation and power through two types of networks: tangible and intangible networks.

Tangible networks: Formalisation of citizens increases professionalisation

In this SIE-field, citizens have formalised into networks, associations or cooperatives. Examples of this include energy cooperatives, crowdfunding platforms, and the crowdfunding trade



organisation. According to an interviewee, citizen formalisation coincided with them being increasingly recognised as professional actors within the SIE-field. This relationship between formalisation and professionalisation also emerges from the example of crowdfunding. Here, the crowdfunding trade platform was specifically initiated because the Ministry of Economic Affairs wanted to further professionalise the crowdfunding sector. They feared the lack of professionalisation would potentially harm citizen investors.

Co-financing creates invisible networks

Figure 6 indicates the relationships between actors in this field. It portrays the high level of co-financing (also referred to as 'stack financing') currently evident. RE projects gather their funds from a variety of sources of funding. The argument could be made that this high level of co-financing creates invisible or informal networks between the associated actors: each actor provides a different piece to the puzzle. Governments and crowdfunding provide the high-risk financing in the beginning of the project, and because of that, banks are able to come in later with less risky financing.

5.2.1.4 How can the interactions/ relations between SIE-field actors and/or other field actors be characterised (e.g., cooperation, exchange, competition and conflict)? How have they changed over time?

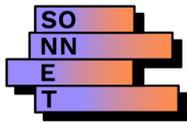
Before this case study (start of 2021), the energy market was in public hands. However, after the **liberalisation** of the energy sector in 1998, the market opened, marking the kick-off of **market competition** in the energy sector.

In this first phase, **the government was cooperative towards the energy sector**: the market was to be supported, stimulated and facilitated by 'bridging the unprofitable top' of innovation through subsidies (MEP, SDE(+/+)) in order to reach the shared goal of increased RE in the Dutch energy sector. In later years, as the market and technology matured, the **government's attitude changed towards exchange**: the government started to expect a return on their investment (Invest-NL and the regional energy funds). At the same time, **emerging niches started to compete with the incumbent actors** of the system through providing an alternative option.

Overall, the case study thus demonstrates how **relations in this field changed from cooperation, towards competition and exchange**.

5.2.1.5 What is 'socially innovative' about the SIE (including SIE-initiatives and/or SIE-field actors)? How and to what extent do which ideas, objects and/or actions demonstrate a change in social relations and new ways of doing, thinking and/or organising energy?

In SONNET, social innovation is defined as combinations of ideas, objects and/or actions that change social relations and involve new ways **of** doing, thinking and/or organising energy



(Avelino *et al.*, 2019; Pel *et al.*, 2020; Wittmayer *et al.*, 2020). This field discusses the social innovation rendered by finance and subsidy mechanisms for solar and wind energy. The socially innovative aspect is the fact that these mechanisms change the social relations amongst actors (i.e. municipalities, national governments, banks, institutional investors, citizens) and change their current way of doing, thinking and/or organising. The extent at which this case study is 'socially innovative' will be analysed through the changing of actor roles in the system.

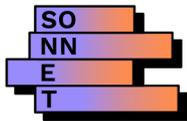
Over the course of a decade, finance and subsidy mechanisms for solar and wind have shifted from subsidy-based, to funding-based. The SIE-field also demonstrate a change in centralised mechanisms (MEP, SDE, SDE+, SDE++ subsidies), towards decentralised mechanisms (crowdfunding, regional energy funds), and an attempt to re-centralise financing mechanisms through a national promotional bank. These changes are mainly driven by ongoing waves of privatisation, and a neoliberal political climate and large market-logic.

Table 13 Main finance and subsidy mechanisms for solar/wind RE in the Netherlands discussed in this case study

Mechanism	Year	Type	Actors involved	Changed roles	Characterising quote
MEP, SDE, SDE+, SDE++	2008	Subsidy	National government, RE project developers	These were the first large-scale subsidy after privatisation, thus marking a new role for the government: stimulating a free market, rather than utility ownership.	<i>"A huge palette of energy innovation subsidies has passed [the department where I work] [...] which make it possible for entrepreneurs to try to bring their innovation to market"⁵⁶</i>
Regional Energy Funds	Ca. 2012	Funding	Local/regional governments and RE project developers and utilities	The sale of utility shares shifted the role of local/regional governments: from being shareholders in a utility, they now had access to funds for energy-labelled loans. It also marked an increasing trend of decentralisation in the energy transition.	<i>"We have become more business-minded. We shouldn't be 'mad Hank' who just spends money. We also want to see revenues."⁵⁷</i>
Crowdfunding	Ca. 2012	Funding	Citizens and RE project developers	The rise of crowdfunding (and energy cooperatives) resulted in increased citizen engagement in financing wind and solar projects.	<i>"Within a timeframe of a few years, there is a very small part of the Netherlands that thinks crowdfunding is a thing. But I think that 80 percent of the Netherlands really or more 85</i>

⁵⁶ NL: "binnen mijn afdeling waar ik dan werk is een enorm palet aan energie innovaties subsidies voor diverse ontwikkelingen gepasseerd, [...] die het voor ondernemers mogelijk maken om met een subsidie op de markt proberen te brengen." (Interviewee 3)

⁵⁷ NL: "We zijn zakelijker geworden. We moeten niet gekke Henkie zijn die maar geld uitgeeft. We willen ook revenuen zien."



				In particular, the increase of financial literacy in energy cooperatives shifted citizens from informal actors, to professionals.	<i>cents for the Netherlands has no clue what crowdfunding is.</i> ⁵⁸
State loans (from promotional bank)	2020	Funding	Government institutions, business lobby organisations, Jeroen Kremers (former top-banker)	The renewed institutionalisation of a national promotional bank (Invest-NL) challenged – but didn't succeed in - the merge of governmental institutions. It did mark a change in tide of government attitude towards RE, away from subsidisation towards financing.	<i>"...the most important was, we have a gap when it comes to co-financing risk-bearing innovative enterprises. Especially in the field of sustainability. So therefore Invest-NL was created. [...] in practice Invest-NL appears to be risk-averse. And to me ..., that is a pity."</i> ⁵⁹

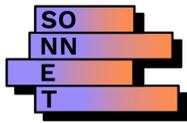
Several actors in this case study took up new roles (Table 13). However, the analysis demonstrates that there are two types of role innovation in this case study (Table 3). The difference is that the first is only innovative to the actor itself and the second is innovative to the SIE-field. Table 14 demonstrates several examples of these various types from the case study. For example, crowdfunding platforms and energy cooperatives changed the role of citizens from consumers, to investors. The *investor* role itself was not new to the SIE-field at the time, as banks were also investing in the energy transition. Therefore, the change in role from consumers to investors was only innovative in respect to the citizens themselves. This illustrates a change in role within the current system of roles, and thus not a dramatic change of the system of roles.

Another example is the change in role of the government from utility owner to the stimulator of the free market around the liberalisation of the energy market. Before liberalisation, there was no *stimulator* (through subsidies) in the SIE-field. Thus, the change in role of the government also marked a new role for the SIE-field.

Lastly, an observation worth noting and which will be further examined in 6.1.H, is that the creation of a new role for a certain actor might come with legitimising power. For example, banks started referring to citizens as 'professional' SIE-actors once citizens became formalised into

⁵⁸ NL: "So but that is within a timeframe of a few years, there is a very small part of the Netherlands that thinks crowdfunding is a thing. But I think that 80 percent of the Netherlands really or more 85 cents for the Netherlands has no bloody clue, which is crowdfunding." (Interviewee 2)

⁵⁹ NL: "het belangrijkste was van joh, we hebben gewoon een gat als het gaat om, zeg maar het meefinancieren risicodragend in echte innovatieve ondernemingen. Juist op het gebied van duurzaamheid. Dus dus invest-NL is daar uitgekomen. En volgens mij is dat dus heb je daarmee 80 procent van het probleem had je kunnen oplossen. De grote vraag is alleen nu wat gaat Invest in NL nou precies doen? En daar hoor ik gewoon niet zulke hele goede verhalen over. Dus dus het idee is dat Invest-NL toch best wel risicomijdend is. En dat is volgens mij echter de de dood in de pot, dat is heel jammer." (Interviewee 4)



energy cooperatives and institutionalised in the Energy Agreement which listed them as a ‘pillar of the energy transition’ (interviewee 4).

Table 14 Type of role innovations in this case study for actors, the SIE-field and the outside institutional environment

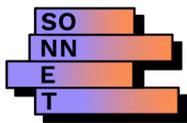
Type of role innovation	Examples from case study (non-definitive)		
	Mechanisms	Actor	Phase <i>old role</i> → <i>new role</i>
New role for a certain actor	Crowdfunding platforms and energy cooperatives	Citizens	B <i>Consumers</i> → <i>investors</i>
New role for the SIE-field	Subsidies (MEP, SDE, SDE+, SDE++)	National government	A <i>Utility owner</i> → <i>stimulator of a free market</i>
	Regional Energy Funds	Decentral governments	B <i>Utility owner</i> → <i>investor</i>
	Investments (Invest-NL)	National government	C <i>Stimulator</i> → <i>investor</i>

5.2.1.6 How has the SIE developed over time (and space)?

The first chapter ‘Bridging the Unprofitable Top’ lays out the rise of a national subsidy system for RE between 1998 and 2016. In the years thereafter, the Netherlands gradually shifts its weight from subsidisation towards financing solar and wind energy.

In the wake of ongoing privatisation of the energy sector, regional energy funds emerged in around 2012. These, as well as the Energy Agreement of 2013, centralised the responsibility and agency of decentral governments in realising the energy transition. Around the same time, citizens started participating in the energy transition through shareholding in crowdfunding platforms and energy cooperatives. Financial participation became synonymous with citizen participation, which was applauded by policy-makers for its potential to solve Not-In-My-Backyard behaviour (NIMBYism). Citizen participation became institutionalised as an important pillar of the Dutch energy transition in the national Energy Agreement of 2013. In the meantime, crowdfunding platforms and banks were experimenting with their roles in respect to each other. Because of cultural, normative and regulative institutional barriers maintained by the national government and the financial sector, the Dutch crowdfunding sector remained small as compared to the UK or the US.

The last chapter demonstrates the institutionalisation of a national promotional bank, Invest-NL. The bank was to solve the lack of a high-risk investor in the Dutch financing landscape. Although the bank was eventually launched in 2019, with a budget of 1.7 billion EUR, it is currently unclear as to whether it will be able to realise its ambitious goals of financing the energy transition. Most funds have been redirected towards the covid-19 pandemic, and it appears that the bank is more risk-averse than initially intended.

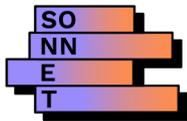


5.2.1.7 How/ to what extent do narratives and activities by SIE-field actors and other field actors refer to power issues and include ambitions to improve them?

As portrayed in Table 12, which shows the narratives SIE-actors use over time, there are roughly three narratives developed in this SIE-field:

1. **Privatisation and liberalisation will lead to increased efficiency of the energy system and heightened economic growth.** It is a way for governments to be 'smarter with money'. This narrative returns in the following instances: the EU's First Energy Directive (1996) and the Dutch Electricity and Gas Act (1998) leading to energy sector liberalisation and the sale of the utility shares leading to the emergence of regional energy funds for local/regional governments (ca. 2010).
2. **Subsidisation is mad, investment is smart.** This narrative manifests in phase B, where regional governments want to 'stop playing mad Hank' by 'just spending money' through subsidisation, and instead want to invest in the energy transition through regional energy funds. Around the same time, citizen investment arises, and the call for a national investment institute (which would later become Invest-NL) emerges. What these trends have in common is that investment is positioned in all of these dynamics as a way to be smarter with money as compared to its predecessor (subsidisation or letting the money rest on bank accounts of individual citizens).
3. **Financial citizen participation is a crucial 'pillar of the energy transition'.** This narrative is represented mainly in phase B, in which financial citizen participation formalises into energy cooperatives, crowdfunding platforms and a crowdfunding trade organisation. It becomes institutionalised within the Energy Agreement (2013) which states that citizens are an 'important pillar for the energy transition'. The institutionalised narrative becomes dominant in the way of thinking and working in other SIE-actors, such as banks. As described by interviewee 4, banks start considering citizens as 'professional actors' rather than individual customers.

In a way, all narratives relate to power issues. The former narrative aims **to increase the power of the market**, by stimulating market-driven innovation. The later narrative emerged out of a need to **increase the power position of citizens** in the energy transition.



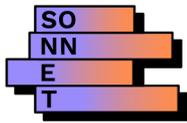
5.2.1.8 What have been (shared) narratives, activities, knowledge, learnt lessons, etc. between alliances/networks/collaborations of SIE-field actors and/or other field actors? How have they been reproduced, adopted and replicated in the SIE-field? To which extent they been legitimised and/or contested by several actors within the SIE-field? Have there been any key changes over time?

This case study examines networks or formalised groups (energy cooperatives, crowdfunding platform trade organisations), and the less tangible networks (see Table 15). In the cases where the network actively lobbied for a change in institution, their activities were contested by the regime SIE-actor which represented the power that needed to be changed according to the network. Key examples are the **trade organisation of crowdfunding platforms**, and the intangible network around the **lobbying for the national promotional bank**. Crowdfunding organisations lobbied for regulatory space within the government that would force banks to forward rejected loan applications to crowdfunding platforms. This was inspired by the UK, where such a practice had been institutionalised. However, banks put a stop to this. The national promotional bank was put forward by Jeroen Kremers and several trade organisations (VNO-NCW and LTO). They opted for a centralisation of government institutions, to decrease the fragmentation and transaction cost of the financing landscape. The government institutions which were to be centralised opposed the merger and put a stop to this.

Lastly, an observation worth noting is that **the creation of a shared narrative or network seems to have a legitimising power**. For example, banks started referring to citizens as ‘professional’ SIE-actors once citizens became formalised into energy cooperatives, and institutionalised in the Energy Agreement which listed them as a ‘pillar of the energy transition’ (interviewee 4).

Table 15 Types of networks in this case study.

Type of network	Examples from the case study
Tangible, formalised networks which self-identify as such	Phase B: Energy cooperatives and crowdfunding platforms (network of citizens), crowdfunding trade organisation (network of crowdfunding platforms) Phase C: VNO-NCW and LTO (networks of businesses)
Intangible networks, formed around a shared activity or shared understanding or co-dependency which might not self-identify as a network	Phase A-C: The invisible networks around co-financing SIE-actors (banks, governments, cooperatives, crowdfunding) that all depend on each other to realise RE projects together financially Phase C: Jeroen Kremers and VNO-NCW and LTO, (shared activity/co-dependency: lobby for a national promotional bank)



5.2.2 How do SIE-field actors and other field actor interact with the ‘outside’ institutional environment and thereby co-shape the SIE-field over time?

5.2.2.1 Which institutions (regulative, normative, cultural-cognitive) within the ‘outside’ institutional environment have shaped (including enabled/ impeded) SIEs and its SIE-fields (and how)?

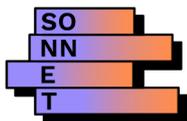
Table 16 portrays an overview of the institutions of the ‘outside’ institutional environment, and how they have been translated into the SIE-field institutional context.

On multiple accounts, the case study illustrates a dominance of a **neoliberalist set of values**, which has influenced the ideas, practices and materialities of the SIE-field. As neoliberal values are highly institutionalised (i.e. through the First Energy Directive and the Gas and Electricity Act 1996-98), it is too rigid and widespread to be effectively transformed by SIE-field actors. Rather, SIE-Is have gradually become more in line with neoliberalism. For example, in the beginning, crowdfunding platforms emerged as a non-neoliberal financing instrument, as it allowed citizens to make donations for projects they valued. There was no return on investment at this stage. As time passed, crowdfunding platforms became increasingly focused on investment and returns, in line with the wider normative belief in neoliberalism.

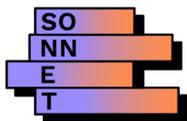
The main impeding factor is the organisational and individual cultural/normative beliefs in pre-existing institutions. These **pre-existing institutions ‘carry on’ to the SIE-field and seem to impede individual actors, or organisations, to break from path dependency**. For example, the organisation SVn focused on the built environment in their financing instruments because that is where their previous work experience lay (see table below for more examples).

Table 16 Overview of which institutions in the ‘outside’ institutional environment have translated to the SIE-field.

Institution in the ‘outside’ institutional environment	The translation of this institution into this SIE-field	Example from SIE-field
Societal cultural institution: neoliberalism	Out of a cultural cognitive fear for overstimulating the market, governments avoid over-subsidisation	The perceived risk of government interference and overstimulating markets through over-subsidisation is mentioned by interviewee 5: <i>“If the market does something, then actually, you should not interfere with that with government money. It’s about realising something that isn’t automatic. [...] You have the regular financiers who act where they can, and it is socially desirable to supplement where it is not done or is not done sufficiently. If you don’t do that well, it will compete with each other. [...] If you look at the heat fund, 9 out of 10 house owners can in principle also go to ABN Amro, ING and Rabobank.”</i> The fear of government intervention portrays how the Dutch government sees itself. Its



		activities are strictly stimulating and facilitating. As such, upon asking about the revenues from government loans at the Netherlands Enterprise Agency (NL: Rijksdienst voor Ondernemend Nederland, RVO), interviewee 3 noted that the amount was not significant and <i>"you shouldn't expect too much from that."</i>
	Out of a cultural belief in market-driven innovation, governments actively promote innovation in the market sphere	The importance of stimulating innovation is evident through the ample space given by the Authority Financial Markets (AFM) to crowdfunding platforms to develop. Citing a conclusion of their report on supervising the budding crowdfunding sector: <i>"We recommend that (the intensity of) legislation and regulations and supervision be considered to grow with the development of the market. This offers the opportunity to make appropriate regulations, which considers the uncertainties of a market that is developing rapidly and stimulates the market to grow in phases towards a sustainable, responsible and mature sector"</i> (AFM, 2014; p.4). Later, in 2016, when crowdfunding was no longer perceived as a new sector, regulation was enforced again. For a lengthier discussion on the relationship of crowdfunding platforms towards existing institutions, see page 22.
	Out of a cultural-cognitive belief in techno-optimism, governments actively support technological innovation	Issues such as climate change are addressed through technological innovation, portraying a dominant belief in techno-optimism. In the words of interviewee 3: <i>"The enormous attention to the problems of the planet, governments have started to look globally: what can we do? In the Netherlands, this led to the Topsector [innovation] policy, and to making much more money available to the nice solutions that will come. [...] Yes, that's high on the political agenda, and has been for years."</i>
Institutions within organisations or individuals before they engaged with investing or subsidising RE	As SVn has previous experience in the built environment, it applies their activities in this SIE-field (financing the energy transition) mainly to the built environment	A final example of how culture can be leading in defining the future focus of an organisation, is that of SVn, the regional energy fund manager. As the company emerged out of the built environment sector, this remains one of their key focus areas in sustainability and the energy transition: <i>"originally, we were very involved with the built environment. [...] Then, sustainability became very dominant. Then we included that. So, if you look where are we active now? That is a bit of building, living and sustainability. That is where we define our boundaries. When there are sustainability operations in the transport sector, for example, that is too far beyond our expertise and we do not interfere with that"</i> (interviewee 5).
	Because institutional investors are used to larger investment opportunities, they do not engage with crowdfunding	Interviewee 6 remarked that, when he posed the question on why institutional investors did not invest in crowdfunding, he always got the reply that <i>"I must be able to put away a hundred million in a year, otherwise it is impossible." And the whole crowdfunding market is 200 million. So yes, I will not do that, because then I will have half of the sector and that is really not justified. So, it is too small. You know, it's normal and it doesn't fit their calculation model, their way of working. And then I always got the answer: "I should be able to invest a hundred million in a year, otherwise it is impossible to</i>



		<i>invest in crowdfunding projects.” At the moment, the whole crowdfunding market is 200 million. [...] So, it is too small. [...] It doesn't fit their calculation model, their way of working.”..”</i>
	Because policy makers have 'imprinted' beliefs and ways of working, their ability to manage the energy transition is limited	Interviewee 8: <i>“They have already had a career for twenty years, in which they have worked their way up in a certain culture and have been given beliefs and working methods. And that is completely imprinted. And with that programming they are in that chair, so you cannot expect them to do it completely differently in one go.”</i> As interviewee 8 explains, the dominant way of working of policy makers in decentral governments (before entering this SIE-field of financing/subsidising RE) affected their way of working within this SIE-field. For a lengthier discussion on the troubles decentral governments faced in realising the energy transition, see section 'giants with feet of clay: the energy agreement' in phase B.

5.2.2.2 What are the key events, external shocks, trends and inter-field interactions that enable/ impede SIEs and its SIE-fields (now and in the past)?

Table 16 demonstrates the largest events, shocks, trends and inter-field interactions that enabled SIEs.

Table 17 The largest events, shocks and trends that enabled this SIE-field.

Time (phase)	What happened?	Characterising quote	Type?	How did it affect SIE?
1996-8 (A)	Liberalisation of the energy sector in the EU kicked off with the EU's First Energy Directive (1996), which was transposed into the Electricity and Gas Act of 1998 in the Netherlands.	<i>“A huge palette of energy innovation subsidies has passed [the department where I work] [...] which make it possible for entrepreneurs to try to bring their innovation to market”⁶⁰</i>	Key policy event	The social relations between actors in the energy sector changed radically (from state monopoly to a free market). It marked a new role for the government: stimulating a free market through subsidies.
2010-2 (B)	The sale of the regional and local authorities' utility shares opened up substantial budgets	<i>“We have become more business-minded. We shouldn't be 'mad Hank' who just spends money. We also want to see revenues.”⁶¹</i>	Key policy event within wider trend	The sale of utility shares opened budgets to radically change the role of local/regional governments: from being shareholders in a utility, focusing mainly on subsidisation,

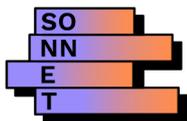
⁶⁰ NL: “binnen mijn afdeling waar ik dan werk is een enorm palet aan energie innovaties subsidies voor diverse ontwikkelingen gepasseerd, [...] die het voor ondernemers mogelijk maken om met een subsidie op de markt proberen te brengen.” (Interviewee 3)

⁶¹ NL: “We zijn zakelijker geworden. We moeten niet gekke Henkie zijn die maar geld uitgeeft. We willen ook revenuen zien.”

	<p>for regional/local governments, which were used for the newly instated regional energy funds.</p> <p>The sale of the utility shares followed a wider trend of liberalisation, which had been kicked-off by the liberalisation of the energy sector.</p>			<p>they now had access to funds for energy-labelled loans.</p> <p>The regional energy funds also marked an increasing trend of decentralisation in the energy transition.</p>
Ca. 2004-2010 (B)	<p>Online payment technology emerged (in the Netherlands: iDeal), and crowdfunding platforms emerged in the US in 2004.</p>	<p><i>"It is a convergence of some very big inevitable trends. [...] the technology (a website and supporting system) is relatively cheap and keeps on getting cheaper, and doing business online as well as paying for things online became more and more commonplace ... [now] you can pay [...] via iDeal."</i>⁶²</p>	<p>Trend in the 'outside' institutional environment</p>	<p>The emergence of crowdfunding in the US was adopted in the Netherlands around 2010.</p> <p>The rise of crowdfunding (and energy cooperatives) resulted in increased citizen engagement in financing wind and solar projects. In particular, it shifted citizens from informal actors, to professionals.</p>
2000-2020	<p>Energy cooperatives become increasingly formalised, professionalised and institutionalised within the Netherlands.</p>	<p>Interviewee 7 states that around 2014-15, banks no longer saw citizens as "private individuals" but as "in fact a collection of private individuals who, together, become so professional that they can take on quite large projects. Well, we are actually seeing a professionalisation step, and [...] with the help of an advisor or with someone else, [they are] ultimately being [treated as] a professional customer"⁶³</p>	<p>Inter-field interaction of a trend</p>	<p>The increasing acknowledgement of citizens as professionals by incumbent actors (such as banks) changes their role from private individuals to 'professionals', thus changing the role between citizens and market parties.</p>
2013 (B)	<p>The Energy Agreement institutionalised the importance of decentral actors in the energy transition.</p>	<p><i>"An important part is the decentralized generation of renewable energy by people themselves, and in the form of cooperative initiatives, the third pillar of the agreement. Citizens will have more options</i></p>	<p>Key policy event</p>	<p>The Energy Agreement gave legitimacy to new actors in the energy transition, such as citizens, thereby contributing to a change in social relations in the energy system.</p>

⁶² "Het is een samenkomst van een aantal hele grote onvermijdelijke trends. [...] En dan is denk ik dat de techniek goedkoop is, en dat je voor een paar tientjes via iDeal af kan rekenen." (Interviewee 2)

⁶³ NL: "in feite een verzameling van particulieren die die die bij elkaar toch dermate professioneel worden dat dat ze best wel grote projecten aan kunnen gaan. Nou we zien eigenlijk een professionaliseringslag, En dat dat nou dan wel met de hulp van een adviseur of met iemand anders erbij, uiteindelijk een professionele klant zijn." (Interviewee 7)



		<i>to generate their own renewable energy and local and regional initiatives are supported where necessary and possible by municipalities, provinces and the national government.</i> ⁶⁴		
2014 (B)	A report ordered by the Authority Financial Market (AFM) advises limited enforcement of existing regulation on crowdfunding platforms, to stimulate innovation (AFM, 2014).	<i>"We think it's important that the crowdfunding sector gets the space to grow in a sustainable and responsible way"</i> ⁶⁵ (AFM, 2014; p.4)	Key policy event	The AFM's leniency towards crowdfunding allowed the crowdfunding sector to develop and professionalise. This allowed citizens to develop into professional investors.
2020 (C)	The launch of SIE-I Invest-NL provided a new financial institution for financing the energy transition: a national promotional bank.	<i>"...the most important was, we have a gap when it comes to co-financing risk-bearing innovative enterprises. Especially in the field of sustainability. So therefore Invest-NL was created. [...] in practice Invest-NL appears to be risk-averse. And to me ..., that is a pity."</i> ⁶⁶	Key event	Invest-NL changed the role of the government in the energy transition, following a wider trend towards financing (loans) rather than subsidisation. It also marked the (failed) institutionalisation of an attempt to centralise government roles.

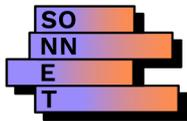
Table 18 The largest events, shocks and trends that impeded SIE.

Time (phase)	What happened?	Characterising quote	Type?	How did it affect SIE?
2016 (B)	The Authority Financial Markets (AFM) stops being lenient towards crowdfunding and starts enforcing regulation more strictly.	<i>"Actually, after 2016 there was no positive message anymore about crowdfunding from the government or financial authorities."</i> (interviewee 2)	Key policy event	The AFM's strict attitude towards crowdfunding makes it difficult for social relations in the energy transition to change: financial citizen participation is now limited in their capacity to take over the role of banks.

⁶⁴ NL: "Een belangrijk onderdeel vormt de decentrale opwekking van hernieuwbare energie door mensen zelf, en in de vorm van coöperatieve initiatieven, de derde pijler van het akkoord. Burgers krijgen meer mogelijkheden om zelf hernieuwbare energie op te wekken en lokale en regionale initiatieven worden waar nodig en mogelijk door gemeenten, provincies en de rijksoverheid ondersteund."

⁶⁵ NL: "Wij vinden het belangrijk dat de crowdfundingsector de ruimte krijgt om op een duurzame en verantwoorde manier te groeien"

⁶⁶ NL: "het belangrijkste was van joh, we hebben gewoon een gat als het gaat om, zeg maar het meefinancieren risicodragend in echte innovatieve ondernemingen. Juist op het gebied van duurzaamheid. Dus dus invest-NL is daar uitgekomen. En volgens mij is dat dus heb je daarmee 80 procent van het probleem had je kunnen oplossen. De grote vraag is alleen nu wat gaat Invest in NL nou precies doen? En daar hoor ik gewoon niet zulke hele goede verhalen over. Dus dus het idee is dat Invest-NL toch best wel risicomijdend is. En dat is volgens mij echter de de dood in de pot, dat is heel jammer." (Interviewee 4)

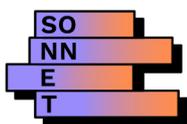


2019 (C)	<p>There is opposition from several government institutions (BNG, VNG, NWB) as a response to Jeroen Kremers' idea to centralise these institutions in a national promotional bank. This leads to a political recoil for support in Kremers' plan. Invest-NL is founded, but does not centralise existing institutions. Rather, it becomes a new institution operating alongside the others.</p>	<p>Interviewee 4 explains the opposition as follows: <i>"basically just because every kingdom had a king and no king wants to give up their kingdom. And nobody wanted to break through that either."</i>⁶⁷</p>	<p>Key policy event</p>	<p>The political recoil in Kremers' plan to centralise institutions impedes the formation of new social relations. Instead, existing incumbent organisations stay fixed in their roles.</p>
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When looking at the tables above, several observations might be made:

- **We have distinguished more enabling, than impeding factors.** Yet we assess the level of social innovation to be relatively low. Likely, this is because we have not extensively researched the impeding events/shocks/trends of SIE. Another reason might be that whereas most enabling factors seem to be captured in (policy) events (i.e. the Energy Agreement, the First Energy Directive, etc), the impediments often arise from the status-quo. Thus, one might argue that whereas events, shocks and trends might uproot the system and enable SIE to happen, **impediments to SIE often comes from a rigidity in existing norms, beliefs and regulation** (discussed in the previous subsection).
- **Policy events are important enablers** because they institutionalise certain trends within society, which can have two positive effects for SIE:
 1. Institutionalisation can lead to **'social standards' that solve social dilemmas** associated with public good or common pool resource problems, such as climate change mitigation. A social dilemma posits that individual efforts are useless unless others participate (Kollock, 1998). The EU's Treaty of Amsterdam (1997), the Dutch Energy Agreement (2013), the international Paris Climate Agreement (2015) and the Dutch Climate Agreement (2019) seemed particularly influential in bridging this social dilemma for market regime actors such as banks. It offered trust that competitors were tackling the same problems, and lowered their

⁶⁷ NL: "Ik denk in de kern gewoon omdat elke elk koninkrijkje had een koning en geen koning wil ze koninkrijken afgeven. En daar had ook niemand had zin om daar doorheen te gaan gaan breken." (Interviewee 4)



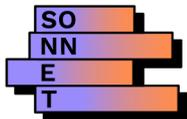
perception of investment risk.

2. Secondly, **institutionalisation allows for legitimisation of new actors**. For example, the integration of citizens and financial citizen participation in the Energy Agreement (2013) led to them being more accepted and trusted by incumbent regime actors and helped in mainstreaming financial citizen engagement in the energy transition.

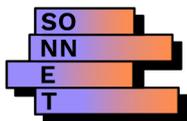
5.2.2.3 How (if so) have the SIEs and their SIE-fields and ‘outside’ institutional environment been shaped by these events, external shocks, trends and inter-field interactions (now and in the past)?

This question has been integrated in the columns ‘what happened?’ and ‘how did it affect SIE’ in Table 18.

Time (phase)	What happened?	Characterising quote	Type?	How did it enable SIE? <i>Empirical background from case study. (page number in case study in which original content can be found)</i>
+/- 2000 (pre-A)	Increasingly letting go of linear models of innovation	<i>“If you look back 30 years, this word [innovation] was hardly used, the focus was on research and development or the like, or research. Gradually, more attention was given to ensuring that you would work more in practice instead of in a factory or in a laboratory” (interviewee 2)</i>	Trend	State market and community spheres adopted the role of the researcher, whereas the researcher adopted more the role of practioners. <i>Traditional research and development policy (focusing on subsidies, regulation and intellectual property rights) was increasingly supplemented by innovation policy focused towards bringing actors together and stimulating private-public partnerships (Schot and Steinmueller, 2018). This included an increasing focus on including consumers and users in product</i>

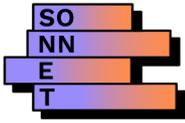


				<p>development (Ballon, Pierson, and Delaere, 2005; Kaulio, 1998) but also the rise of triple-helix collaborations between universities, governments and industries which focused on situated knowledge and innovation generation, diffusion and use (Etzkowitz and Leydesdorff, 1995; Ranga and Etzkowitz, 2013). In the Netherlands, this change of thinking was influenced by a number of programmes and networks in policy, technological innovation and sustainable development- an example of the latter was the Dutch National Initiative for Sustainable Development (NIDO) that focused on pushing sustainable development of different sectors through bottom-up processes (Loorbach, 2007), P9</p>
+/- 1987-1992 (pre-A)	Brundtland report and Agenda 21	n/a	Policy events	<p>Increasing emphasis on the role of local actors (i.e. local governments) and transdisciplinary collaboration.</p> <p>The Brundtland report on 'our common future' (1987) and Agenda 21 emphasised the need for collaboration of actors from different societal spheres. Agenda 21 specifically pointed out the importance of the</p>

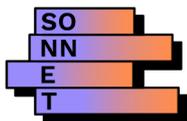


				local governments as “the level closest to the people” and considered their participation and cooperation as “decisive” in addressing the problems outlined since these often originate locally (United Nations Conference on Environment and Development (UNCED), 1992). P8
2008	Financial crisis	<i>“I think the municipality was more than happy that there were a couple of enthusiasts who wanted to do something there themselves. So, in that sense, [...] they were happily supporting them because [they thought that] at least there was something happening, and maybe we can get something out of it.” (interviewee 3)</i>	Outside institutional environment: shock	Increasing role for citizens and bottom-up movements as experimenters. Governments take a backseat. The financial crisis and the governmental budget-cuts that followed created space for SIE-Is to develop and institutionalise where other projects had fallen through. See also previous section on the outside institutional environment.
B	Energy Agreement signed by 47 organisations	<i>Any obstacles found in the experiments “will be removed by the market and government together”</i>	Policy event	The Energy Agreement institutionalised a new and more active role for citizens in the energy transition. In this sense, it contributed to the formalisation and professionalisation of citizen engagement. It included actors from societal spheres, civil society, and decentralised energy suppliers. This was different from the more

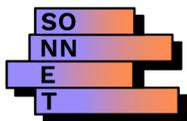
				<p>traditional helix configurations. triple-helix configurations.</p> <p><i>In 2012, the Social and Economic Council (SER) of the Netherlands evaluated Dutch energy policy on request of the Ministry of Economic Affairs. It concluded that there was a lack of continuity, cohesion and predictability in energy policy leading to investment insecurity, and a lack of innovation and investment in large energy transition projects (Smelt and Bolhuis, 2018). As a remedy, the SER facilitated a dialogue: more than 100 people from diverse organisations joined the deliberation tables at the beginning of 2013, including societal organisations, financial actors, state actors and market players from small businesses and energy companies (Smelt and Bolhuis, 2018). The proposed long-term solutions and ambitions were being calculated by an external party to understand their effects – this increased trust in the achievability of the agreement (Smelt and Bolhuis, 2018). In September 2013, the Energy Agreement was signed by 47 organisations. [...] The Energy Agreement</i></p>
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				<p>prescribed several experimental formats: energy suppliers experimenting with variable energy tariffs in 2014, grid operators experimenting with variable transport tariffs and energy cooperatives experimenting with legal barriers for crowdfunding as a financial basis for financing their cooperatives. The Energy Agreement envisioned that any obstacles found in the experiments “will be removed by the market and government together” (Energieakkoord, 2013; p.85). P22</p>
B	<p>National and European (scientific) funding institutes JPI Europe and NWO fund Living Lab programmes throughout Europe</p>	<p>“Working on a sustainable city requires a different approach, in which experimentation and innovation are key words. Moreover, it is not a task for the city government alone. It requires a unique partnership between government, companies, residents and organisations in the city. Stadslab2050 is a platform for everyone who is involved in sustainable processes in the city.”</p>	<p>Policy event</p>	<p>Increasing empowerment of local governments and citizens as active participants in experimental formats through Living Lab funding.</p> <p>The Joint Programming Initiative (JPI) Urban Europe funded dozens of living lab projects via national research funding institutions (The Nederlandse Organisatie voor Wetenschappelijk Onderzoek, or NWO in the Netherlands and Fonds Wetenschappelijk Onderzoek, or FWO, in Flanders) starting in 2012. The ambition of JPI Urban Europe is “to address the global</p>

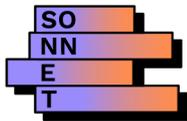


				<p>urban challenges of today with the ambition to develop a European research and innovation hub on urban matters and create European solutions by means of coordinated research". While the first calls were more general, the calls between 2014-2016 and in 2020 focused specifically on the energy transition and also on smart grids in cities or neighbourhoods. To differentiate those Living labs focusing on technology as parameter for experimentation – which is the majority in the Netherlands, from those focusing on governance arrangements or business models, we refer to the latter as societal Living Lab. An example of the latter, which also received funding by JPI Urban Europe (via the URB@Exp) is the SIE-I Stadslab2050 in Antwerp, found in 2013 (see box Stadslab2050). P24</p>
2015-2018 (B)	<p>'Electricity Experimentation Decree' (NL: Experimenten Electriciteitswet)</p>	<p>Law (NL: 16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators" (Lammers and Diestelmeier, 2017b; p.216).</p>	<p>Policy event</p>	<p>Formalisation of citizen participation within experimental formats of the energy transition. It shifted citizens from the 'community' sphere, towards the third sector.</p> <p>This experimental status made "individual exemptions to Article</p>



				<p>16, third paragraph of the Dutch Electricity Act, which exclusively assigns the task of grid operation to the designated system operators" (Lammers and Diestelmeier, 2017b; p.216). The decree made it possible for the Ministry of Economic Affairs to grant selected (housing) associations a formal experimental-status. This status allowed associations to derogate from the Electricity and Gas Act of 1998, and to take up tasks that are legally reserved to be conducted by the grid operator. In particular, the decree was used by associations to carry out peer-to-peer grid management (i.e. in the SIE-I Vve Aardehuizen, see also box below on the Aardehuizen). The goal of this Experimentation Decree was to reveal which adjustments to the legal framework were needed to facilitate the energy transition. P30</p>
2015 (C)	Paris Climate Agreement	Climate	n/a	<p>Outside institutional environment: policy event</p> <p>Increasing attention on climate change issues by SIE-field actors. It did not necessarily result in a change in social relations directly, but it did legitimise a national response (next row in this table) which had an</p>

				<p>effect on social relations.</p> <p><i>The signed Paris Climate agreement and the environmental pressures it stands for, also put Dutch innovation policy and the different multi-actor collaborative formats it promoted under pressure. From 2017, the SIE-field went into a phase of taking stock and reorientation. P36</i></p>
2019	National Climate Agreement	n/a	Policy event	<p>Increasing emphasis on regions, neighbourhoods, cities and civil societies.</p> <p><i>The agreement stressed the importance of residents' active involvement: "the cabinet supports the possibility for residents to participate in local energy projects." (Klimaatakkoord, 2019, p.16). P43</i></p> <p><i>The climate agreement was characterised by a large focus on regions, neighbourhoods, cities and civil society, and an exemplary innovation programme is 'Program Testbeds Gas Free Neighbourhoods' (NL: Proeftuin Aardgasvrije Wijken, PAW), in which 27 testbeds experiment with gas-free heating solutions. The partners involved are</i></p>



				<p>31 municipalities, societal actors, knowledge institutes and energy actors. This programme emphasizes the importance of upscaling and rolling-out the knowledge acquired after the project ends (Klimaataakkoord, 2019; p.19). It is planned to receive 435 million EUR of funding during its running time between 2019-2028 (van Elburg et al., 2018). P42</p>
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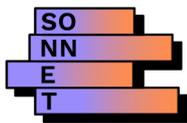
5.2.2.4 What have been the most important alliances/networks/collaborations SIE-field actors and/or other field actors that emerged from these events, shocks, trends, and inter-field interactions (when, how and for what reasons)?

As described in section 5.2.1.3, networks were not based on particular events, shocks or trends, rather around shared ideas (energy cooperatives, crowdfunding). As this question is thus less relevant to this case study it will not be discussed further.

5.2.2.5 How have the SIE-fields co-evolved with the policy context (if so) (and what was the relative importance of the urban, regional, national and European level)?

As described in Table 18, policy events have a large influence on the SIE-field. These tables also indicate the effect these policy events have had on the SIE-field.

In several instances, **the SIE-field led to changes within policy, and thereby co-evolved with the policy context.** For example, the Authority Financial Markets (AFM) first did not enforce regulation on crowdfunding platforms (2014) but later became more strict (2016). There was a close relationship between SIE-field actors (crowdfunding platforms) and policy around 2012, when governments were learning from crowdfunding platforms. This notion is discussed in phase B in the section ‘digitalisation of an age-old tradition’.



5.2.2.6 How are which power relations (such as inequality, exclusion, oppression, exploitation, injustice) being transformed and/or reproduced by the SIE-phenomenon under study? (and vice versa – how are SIEs enabled and impeded by power relations?)

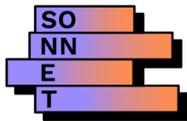
SONNET studies the power relations that enable or impede the SIE-field and vice versa. SONNET builds on Avelino (2017) in understanding power as the relational and structural (in)capacity of actors to mobilise resources and institutions to achieve a goal. SIEs can refer to the resources being mobilised and/or the goals being aspired to (D1.2). SONNET distinguishes between 'power to' mobilise SIE-related resources and/or to achieve SIE-related goals (incl. (in)equality and in/exclusion), 'power over' others in SIE-related processes (including dependency, oppression and exploitation), and 'power with' other actors to achieve collective (SIE-related) goals' (Wittmayer et al., 2020). This section will describe 5 ways in which power relations are being transformed or reproduced in this case study, through this lens of power to/power over/power with:

1. Power to: without resources, existing power relations are reproduced
2. Power to: regional energy funds empower decentral governments
3. Power to: the financial sector does not use their power to drive societal change
4. Power over: knowledge creates power over learning actors
5. Power with: lobbying in collectives for a shared goal

Power to: without resources, existing power relations are reproduced

In SONNET, we understand 'power to' as the power to mobilise resources to achieve goals. An example of 'power to' can be found in the regional energy funds. This section will describe how the lack of resources reproduces, rather than transforms existing power relations.

An often-discussed topic around power relations and financing in the energy transition, is that of **energy poverty**. This concept has been defined by Reddy (2000) as follows: “the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development” (Reddy, 2017, p.44). According to some authors, the silver bullet to solve energy poverty is **financial inclusion** (Kelly and Rhyne, 2015). The World Bank defines this concept as follows: “Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable wayM” (World Bank, no date). **Emerging financial instruments such as crowdfunding have recently been thought of as means to achieve financial inclusion**, because “crowdfunding is [...] democratization and disintermediation made possible by the use of internet and social networks which allow people and potential investors to directly browse and investigate investment options. As such it is a powerful empowerment tool, which positions people at the centre of economic and financial processes with a participatory ambition” (Candelise, 2015; p.4).



However, while crowdfunding is indeed a powerful ‘empowerment tool’ as the former author argues, **this case study shows that without sufficient resources (network, knowledge and money) crowdfunding reproduces, rather than transforms, existing power relations around energy poverty.** This is because only a wealthy and knowledgeable part of the population can invest. In the words of interviewee 2: “Within a timeframe of a few years, there is a very small part of the Netherlands that thinks crowdfunding is a thing. But I think that 80% or 85% of the Netherlands has no clue what crowdfunding is.”⁶⁸

Power to: regional energy funds empowered decentral governments

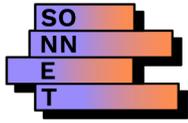
Another example of power ‘to’ can be found with regards to the regional energy funds. The sale of utility shares gave local and regional authorities power to direct energy-labelled funds in whichever project they deemed fitting. In the words of interviewee 5: “It starts with social developments, the social necessity, the Climate Agreement. Municipalities and provinces are always putting these topics higher on the agenda. And if financial resources become available, it speeds up the process”⁶⁹. However, this power was prone to external lobbying, and led to frustrations within municipalities and regional authorities.

Power to: financial sector does not use their power to drive societal change

Moreover, **the financial sector has power to support the energy transition.** According to a report by researchers from TNO on the role of institutional investors in the energy transition: “pension funds are in a strong position to support the energy transition, both directly through capital provision, and indirectly by using their wide geographical reach to drive societal change” (Donker, Gavrilova and Halstead, 2020; p.3). However, **the sector is currently not making use of their power to drive societal change.** As claimed by McKinsey (2018), institutional investors (i.e. pension funds) invest mainly in listed financial funds and companies representing vested interests, such as Shell, British Petroleum (BP), Exxon Mobile and Gazprom, whereas they hardly invest in unlisted small project developers (McKinsey, 2018) (McKinsey, 2018). This has been prescribed to the fragmentation of the energy market and the lack of scale, liquidity and attractive risk-return profile of small RE project developers. As posed by Steffen (2017), the balance sheets of small project developers and individuals are not big enough to match the investment needed for large-scale RE projects (Steffen, 2017) (Steffen, 2017). That is why, according to Steffen (2017), RE projects have been largely financed through project financing. This contrasts to fossil fuel energy, which has large enough balance sheets to be financed by large corporate players.

68 NL: “So but that is within a timeframe of a few years, there is a very small part of the Netherlands that thinks crowdfunding is a thing. But I think that 80 percent of the Netherlands really or more 85 cents for the Netherlands has no bloody clue, which is crowdfunding.” (Interviewee 2)

69 NL: “Het begint met maatschappelijke ontwikkelingen, de maatschappelijke noodzaak, het Klimaatakkoord. Gemeenten en provincies plaatsen deze onderwerpen aldoor hoger op de agenda. En als er dan ook financiële middelen beschikbaar komen, dan versnelt dat het proces.” (Interviewee 5)



When interviewee 2 asked an institutional investor why they did not invest in crowd-funded projects, the investor replied that they “must be able to put away fifty to a hundred million in a year, otherwise it is not feasible. And the whole crowdfunding market is somewhere between 200 to 400 million. [...] So, it is too small. [...] It doesn't fit their calculation model, their scale of working.”

Power over: knowledge creates power over learning actors

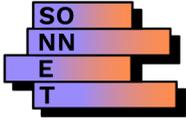
'Power over' is understood as the power over others in SIE-related processes (Wittmayer *et al.*, 2020). Crowdfunding platforms, in the beginning of their development, had power over the government because of their knowledge on the topic: “So those first types [...] had to [...] go to the Netherlands AFM to explain yes, what is crowdfunding? And how should we regulate you? [...] In a manner of speaking, we had to give a lecture to the AFM to tell what it was.”⁷⁰The AFM exercised their power over the crowdfunding platform by first providing space to experiment and later enforcing stricter regulations. The financial sector has 'power over' crowdfunding platforms. This will be discussed in more detail in the next paragraph ('power with'), as it is closely related to the lobby efforts of the respective sectors.

Power with: lobbying in collectives for a shared goal

SONNET defines 'power with' as the power to achieve collective (SIE-related) goals with other actors. This is especially abundant in the multiple lobbies that have been involved in this SIE-field.

In 2016, the Ministry of Economic Affairs wanted to professionalize the crowdfunding sector. They gave interviewee 6 and a colleague the assignment to set-up a trade organisation. The trade organization gave the sector collective power to lobby for their needs and work towards achieving their goals. However, crowdfunding was to date not able to lead to institutionalised changes in the ways of doing, thinking or organising in the financial sector. This is mainly because of the sheer size of the financial sector in the Netherlands. Interviewee 4: “That is always the difficulty of the discussions about financing innovation in the Netherlands. The Netherlands simply have an insanely large banking sector. Also, from an international perspective [...] the size of our banks in relation to the economy is simply insanely large. Historically, this has never happened before, but internationally it is nowhere nearly as large as it was in the Netherlands in 2008. It has declined

⁷⁰ NL: “So those first types [...] had to [...] go to the Netherlands Authority for the Financial Market [AFM] to explain yes, what is crowdfunding? And how should we regulate you? [...] In a manner of speaking, we had to give a lecture to the AFM to tell what it was.” (Interviewee 6)



somewhat since then. But that's why we always talk about banks in the Netherlands.”⁷¹ The crowdfunding trade organisation tried to lobby for a change within the way of working at the Independent Bank on Finance. However, this attempt was stopped by the banking sector: “And then we thought with that trade association, wow, we're going to lobby for that too. You know. But of course, the banks saw that coming, so they put a stop to it”⁷².

As the trade organisation was struggling to fight the power of financial institutions, it was tempted to start fighting new entrants in the crowdfunding sector through quality requirements: “In the beginning you can nip it a bit in the bud, but at some point a trade association can become a bastion for the established players in the market to [...] make the entry of new parties difficult... And that's how it was a bit, too. The affiliated members do not only have the interest to advance the sector, but also the interest, above all, to advance themselves and each other. To [goal was that to] not make the parties that are not yet affiliated [in the crowdfunding trade organisation] any wiser than necessary [...] You had those quality requirements [for new entrants]. These requirements were then tested on new entrants [by the trade organisation]” (Interviewee 6).

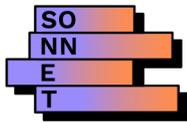
Another example of power is the power of the individual (Jeroen Kremers) versus the power of multiple government institutions. Kremers' vision was to merge several governmental institutions to form a central national promotional bank. This bank would be able to provide the high-risk upfront investments and thereby lead to economic growth. However, due to vested interests, incumbents did not want to merge their institutions, as ‘no king wants to give up their kingdom’⁷³ (interviewee 4). In the words of Rick Bosman in an article on the journalism platform Follow the Money: “They are actually very separate worlds, which are viewed in different ways. Incumbent parties have an interest in keeping it that way.”⁷⁴

71 NL: “Dat is altijd het ingewikkelde aan de discussies over het financieren van innovatie in Nederland. Nederland heeft gewoon een waanzinnig grote bankensector. Ook in internationaal perspectief is [...] de omvang van onze banken ten opzichte van de economie gewoon waanzinnig groot. Historisch gezien is dat nooit eerder voorgekomen, maar ook internationaal is het nergens bijna zo groot als als dat in Nederland was in 2008. Het is sindsdien wel wat afgenomen. Maar daarom hebben we het altijd over banken in Nederland.” (Interviewee 4)

72 NL: “En toen dachten we met die branchevereniging dachten we wow, daar gaan we ook voor lobbyen. Weet je wel. Maar de banken zagen dat natuurlijk ook wel aankomen, dus die hebben daar een stokje voor gestoken.” (interviewee 6)

73 NL: “Geen koning wil zijn koninkrijk opgeven.” (interviewee 4)

74 NL: “Het zijn eigenlijk hele gescheiden werelden, waar op verschillende manieren naar gekeken wordt. Door de gevestigde partijen wordt er belang aan gehecht dat ook zo te houden.” (Crezee, 2016)



5.2.3 What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the ‘outside’ institutional environment?

5.2.3.1 Who is involved in conducting institutional work (and who is not)? Which actors benefit from this work (or not)?

In this analysis, we will use the typology of institutional work by Funfschilling and Truffer (2016), which distinguish between various forms of institutional work.

Table 19 Types of institutional work, copied from Fuenfschilling and Truffer, 2015, as adapted by Lawrence and Suddaby, 2006.

Forms of institutional work	Definition
Advocacy	The mobilization of political and regulatory support through direct and deliberate techniques of social suasion
Defining	The construction of rule systems that confer status or identity, define boundaries of membership or create status hierarchies within a field
Vesting	The creation of rule structures that confer property rights
Constructing identities	Defining the relationship between an actor and the field in which that actor operates
Changing normative associations	Re-making the connections between sets of practices and the moral and cultural foundations for those practices
Constructing normative networks	Construction of interorganizational connections through which practices become normatively sanctioned and which form the relevant peer group with respect to compliance, monitoring and evaluation
Mimicry	Associating new practices with existing sets of taken-for-granted practices, technologies and rules in order to ease adoption
Theorizing	The development and specification of abstract categories and the elaboration of chains of cause and effect
Educating	The educating of actors in skills and knowledge necessary to support the new institution

Table 20 demonstrates the multiple accounts of institutional work in this case study. The table allows for several observations:

- The case demonstrates **institutional work in multiple societal spheres** (state, market, community, third sector).
- The **state is mainly vesting and defining**, whereas markets are educating and advocating.
- The **community sphere is underrepresented**. Communities are formalised into energy cooperatives or crowdfunding platforms, and thereby adhere to the third sector / market logic rather than the community sphere.
- ‘Advocacy for’ is always countered by ‘advocacy against’ by incumbent actors (i.e. crowdfunding VS banks, or Kremers VS BNG, VNG, etc).
- The institutional work of ‘constructing identities’ might be associated with the most radical change in social relations between actors. For example, as indicated in the table below:
 - Privatisation of the energy sector: The relations between market and state changed radically
 - Energy Agreement: The legitimacy of citizens increased and allowed for the increase of financial citizen participation, which changed the relations between citizens, market and state. Also, it institutionalised the importance of decentral governments, changing their role towards citizens, market and state.

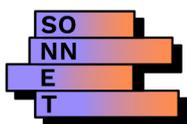
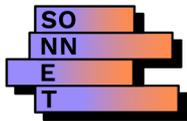


Table 20 Types of institutional work of SIE-field actors.

Phase	Actor	Societal sphere ⁷⁵	Type of institutional work	Description
A	European Union	State	Vesting / constructing identities	Privatising the energy sector of member states to increase efficiency and economic growth through the First Energy Directive. This was transposed by the Netherlands into the Electricity and Gas Act of 1998.
A	National government	State	Vesting	Subsidising the newly created free market to make RE projects profitable.
B	Decentral governments	State	Vesting	Sold utility shares and started financing the energy transition with the profits, moving away from subsidies, in order to be 'smarter with money'.
B	Multi-actor (initiated by ministries)	Diverse	Defining / constructing identities	Stating that citizens and decentral governments are pillars of the energy transition in the Energy Agreement, which was signed by a broad coalition of actors from diverse societal spheres.
B	National government (Authority Financial Markets and Ministry of Economics)	State	Vesting	Initially, the national government takes a passive role towards crowdfunding: they do not enforce crowdfunding platforms in order to stimulate innovation. Later, the government switches their approach and starts enforcing limiting regulation and takes a more apprehensive and stricter tone towards crowdfunding.
B	National government (Authority Financial Markets and Ministry of Economics)	State	Defining	Assigning the crowdfunding sector the task to professionalise by instigating a crowdfunding trade organisation.
B	Crowdfunding platforms	Market	Educating / constructing identities	Educating the AFM and the Ministry of Economic Affairs about crowdfunding.
B	Banks	Market	Constructing identities	Exploring their role towards crowdfunding in multiple experiments (which did not institutionalise or mainstream in the end).
B	Crowdfunding platforms	Market	Advocacy for	Lobbying for the further institutionalisation of crowdfunding within legislation to ensure that banks are forced to refer to crowdfunding platforms if they reject a proposal by an entrepreneur, in order to increase financial citizen participation in the energy transition.
B	Banks	Market	Advocacy against	Put a stop to the further institutionalisation of crowdfunding by lobbying against the proposed legislation (see previous row).
C	Jeroen Kremers, LTO, VNO-NCW	State	Educating / Advocacy for / Constructing identities	Educating the Ministry of Economic Affairs and the political cabinet about the German national promotional bank, and lobbying for a national promotional bank and the centralisation of government financing institutes.
C	BNG, NWB, FMO, VNG	State	Educating / Advocacy against	Lobbying against the centralisation of government financing institutes by posing counterarguments to Kremers, LTO and VNO-NCW.

⁷⁵ Based on the multi-actor perspective by Avelino & Wittmayer (2015)



C	National Promotional Bank Invest-NL	State	Vesting	Invest-NL funds energy transition projects.
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5.2.3.2 How, why, and where do SIE-field actors and/or other field actors conduct activities linked to creating, maintaining and transforming institutions?

SONNET studies the institutional work of actors, defined as the activities of SIE-field actors and other field actors that aim to create, maintain and transform regulative, normative and/or cultural-cognitive institutions (Hielscher *et al.*, 2020; Wittmayer *et al.*, 2020). This builds on the definition of institutional work by Lawrence and Suddaby: "the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions" (Lawrence and Suddaby, 2006, p.215). This section contains the three most dominant examples of institutional work that were found within this case study:

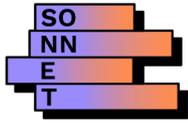
- Creating institutions: Invest-NL
- Maintaining institutions: banks and crowdfunding platforms
- Transforming institutions: financial citizen participation

Other examples of institutional work were not researched in the same depth and thus not selected for the analysis in this section.

Creating institutions: Invest-NL

The most prominent institutional work of this case study is the **quest for a high-risk national investor**. This investor was to solve the lack of high-risk investment capital in the Netherlands, provide financing to SMEs and take up after the German KfW in financing the ambitious goals of the energy transition. The institutional work included advocacy, theorising and educating by former top-banker Jeroen Kremers, who had close ties with the Ministry of Economic Affairs and Finance. Kremers was joined by business trade organisations VNO-NCW and Netherlands Agricultural and Horticultural Association (NL: Land- en Tuinbouw Organisatie Nederland, LTO), which started to advocate and educate for the same goal, publishing their positive reflections in reports (König, 2017; Weissink and Zeemeijer, 2017).

Kremers goals were bifold: 1) to create a national promotional bank to stimulate economic development in the Netherlands, and 2) to transform existing government institutions by merging them into a central financing institute. According to Kremers, the latter would lead to substantial government savings and decreased fragmentation of the financing landscape. However, his ambitious plans did not go down well with the parties concerned. The Bank of Dutch Governments (NL: Bank Nederlandse Gemeenten, BNG), the Dutch Waterboard Bank (NL: Nederlandse Waterschapsbank, NWB) and the Dutch Entrepreneurial Development Bank (NL:



Nederlandse Financierings-maatschappij voor Ontwikkelingslanden, FMO) were informed of the plans and reacted critically (Weissink and Zeemeijer, 2017). For example, Menno Snel, director of NWB, stated that he did not believe that “you get a good sausage if you put three institutions in a meat grinder” (Weissink and Zeemeijer, 2017). According to interviewee 4, these parties opposed the merger “*basically just because every kingdom had a king and no king wants to give up their kingdom. And nobody wanted to break through that either.*”⁷⁶ All this criticism made political support for Kremers’ plans recoil (Weissink and Zeemeijer, 2017). However, his plan was not abolished completely. His primary goal for creating a national promotional banking institution became adopted by the Senate and the House of Representatives in 2019. Consequently, on January 16, 2020, a national promotional bank came into being: Invest-NL (EZK, 2020).

In conclusion, while Kremers was thus successful in creating a new regulatory institution (Invest-NL), he was not able to replace existing regulatory institutions, as those in power (BNG, RVO, NWB, FMO) were actively maintaining their institutions, eventually leading to political recoil.

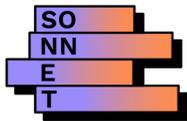
The story around the institutionalisation of a national promotional bank is an example of sociologist’s DiMaggio’s ‘institutional entrepreneurship’, where “new institutions arise when organized actors with sufficient resources [institutional entrepreneurs] see in them an opportunity to realize interests that they value highly” (DiMaggio, 1988, p.14). As described in Lawrence, Suddaby, and Leca (2009), institutional entrepreneurs are often presented as ‘heroic’, making large-scale, visible and dramatic changes to existing institutions.

Maintaining institutions: banks and crowdfunding platforms

An example of institutional work through which institutions are ‘maintained’ is the work invested by the financial sector to stop the lobbying of crowdfunding platforms (in itself also institutional work aimed at transforming the sector). In 2016, the Ministry of Economic Affairs stimulated the crowdfunding sector to further professionalise. They gave interviewee 6 and a colleague the assignment to set-up a trade organisation. The trade organization gave the sector collective power to lobby for their needs and work towards achieving their goals. However, crowdfunding platforms did not lead to institutionalised changes in the ways of doing, thinking and organising within the financial sector: the financial sector maintained their previous way of doing, thinking and organising, despite their investigations towards a new role and attitude towards the novel financial instrument.

This is mainly because of the sheer size of the financial sector in the Netherlands. Interviewee 4: “That is always the difficulty of the discussions about financing innovation in the Netherlands. The Netherlands simply has a large banking sector. Also, from an international perspective [...] the size

⁷⁶ NL: “Ik denk in de kern gewoon omdat elke elk koninkrijkje had een koning en geen koning wil ze koninkrijken afgeven. En daar had ook niemand had zin om daar doorheen te gaan gaan breken.” (Interviewee 4)



of our banks in relation to the economy is simply very large. Historically, this has never happened before, but internationally it is nowhere nearly as large as it was in the Netherlands in 2008. It has declined somewhat since then. But that's why we always talk about banks in the Netherlands.”⁷⁷

When the crowdfunding trade organisation tried to lobby for a change within the way of working of financing (RE) projects, the banking sector intervened: *“And then we thought with that trade association, wow, we're going to lobby for that too. You know. But of course, the banks saw that coming, so they put a stop to it”*⁷⁸.

Transforming institutions: financial citizen participation

Lastly, an example of institutional work that ‘transformed’ institutions can be found in the case of financial citizen participation. The professionalisation of the crowdfunding sector and energy cooperatives transformed the cultural-cognitive beliefs and norms that incumbent parties had towards citizen engagement. For example, as explained by interviewee 7, there was an ongoing trend according to which banks started to see cooperatives and crowdfunders no longer as “private individuals” but as “in fact a collection of private individuals who, together, become so professional that they can take on quite large projects. Well, we are actually seeing a professionalisation step, and that now, with the help of an advisor or with someone else, [they are] ultimately being [treated as] a professional customer.”⁷⁹ (Interviewee 7).

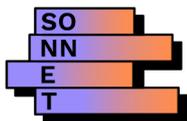
Financial citizen participation institutionalised and became mainstream in a series of ongoing trends and policy events:

- **Retreating governments and decentralising state (around 2010):** The move towards citizen participation in energy policy fits the broader trend of retreating governments and dismantling government engagement in i.e. the welfare state.
- **Inter-field interaction (ongoing trend):** An increasing amount of energy cooperatives had been emerging. Over time, these grew in number, size and gained knowledge. After the liberalisation of the energy sector, energy cooperatives were able to attract more members, further increasing the amount of citizen participation in the Netherlands.
- **Energy Agreement (policy event in 2013):** The Energy Agreement was the result of a national deliberation process involving actors from many societal spheres (i.e. banks, NGOs, governments, grid operators, utilities, energy cooperatives). The Energy Agreement

77 NL: “Dat is altijd het ingewikkelde aan de discussies over het financieren van innovatie in Nederland. Nederland heeft gewoon een waanzinnig grote bankensector. Ook in internationaal perspectief is [...] de omvang van onze banken ten opzichte van de economie gewoon waanzinnig groot. Historisch gezien is dat nooit eerder voorgekomen, maar ook internationaal is het nergens bijna zo groot als als dat in Nederland was in 2008. Het is sindsdien wel wat afgenomen. Maar daarom hebben we het altijd over banken in Nederland.” (Interviewee 4)

78 NL: “En toen dachten we met die branchevereniging dachten we wow, daar gaan we ook voor lobbyen. Weet je wel. Maar de banken zagen dat natuurlijk ook wel aankomen, dus die hebben daar een stokje voor gestoken.” (interviewee 6)

79 NL: “in feite een verzameling van particulieren die die die bij elkaar toch dermate professioneel worden dat dat ze best wel grote projecten aan kunnen gaan. Nou we zien eigenlijk een professionaliseringslag, En dat dat nou dan wel met de hulp van een adviseur of met iemand anders erbij, uiteindelijk een professionele klant zijn.” (Interviewee 7)



institutionalised, for the first time, the important role of local or regional governments as well as participation by citizens and energy cooperatives in the energy transition. It stated that: “An important part is the decentralized generation of renewable energy by people themselves, and in the form of cooperative initiatives, the third pillar of the agreement. Citizens will have more options to generate their own renewable energy and local and regional initiatives are supported where necessary and possible by municipalities, provinces and the national government”⁸⁰ (SER, 2013, p.8). The energy agreement created a sense amongst regional and local policy makers that they needed to incorporate citizen participation in their policy, mainly to limit NIMBYism associated with wind energy on land. Crowdfunding platforms helped steer their sense making by showing them the feasibility of financial citizen participation. Interviewee 2 explained that municipalities expressed a sense of relief that crowdfunding platforms showed them that citizen participation was equal to financial participation: “municipalities and project developers look for examples of how to define and organise citizen participation. Crowdfunding platforms such as ours give them practical examples they can easily copy and use for themselves.”⁸¹

5.2.3.3 What have been the most important activities linked to creating, maintaining and transforming institutions? Outline these activities through describing 2-4 examples.

Three examples of institutional work have been described in the first subsection of this chapter. The first two will be described further in the following paragraphs. A short summary of the previous sections is included in the table below.

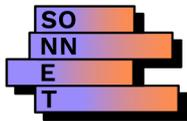
Table 21 The most important activities linked to creating, maintaining and transforming institutions in two examples from the case study.

Example	Involved SIE-field actors	End result: created, maintained or transformed institution?	Societal sphere ⁸²	Description

⁸⁰ NL: “An important part is the decentralized generation of renewable energy by people themselves, and in the form of cooperative initiatives, the third pillar of the agreement. Citizens will have more options to generate their own renewable energy and local and regional initiatives are supported where necessary and possible by municipalities, provinces and the national government.”

⁸¹ NL: “En de kers op de taart is de wettelijke verplichting. En hoe werkt het, dat Energieakkoord, dat vergunningverlenende autoriteiten dwingt om, eh, euh, euh, als onderdeel van de vergunning de projecteigenaar, [...] want de projecteigenaar heeft geld nodig, om een deel van het geld te dwingen te verzamelen van burgers. Of om burgers de kans te geven om mee te doen aan dat project. ” (Interviewee 2)

⁸² Based on the multi-actor perspective by Avelino & Wittmayer (2015)



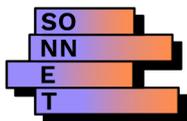
Invest-NL	Jeroen Kremers, VNO-NCW, LTO, VNG, NWB, BNG	Created institutions: Invest-NL as an organisation (regulatory), but also the preference for a high-risk investor (normative).	State	Jeroen Kremers, VNO-NCW, LTO advocated for a national promotional bank and the centralization of government institutions. VNG, NWB, BNG opposed the merger of institutions. Instead of a merged institution (one, central national promotional bank), a new bank was created alongside VNG, NWB, BNG. This bank was called Invest-NL.
Crowdfunding	Crowdfunding platforms, crowdfunding trade organization, banks (financial sector)	Maintained institution: no legislation that force financial institutes to forward rejected loan applicants to crowdfunding (regulatory institution)	Market	In 2016, the Ministry of Economic Affairs stimulated to further professionalize the crowdfunding sector by instigating a trade organisation. The trade organization gave the sector collective power to lobby for their needs and work towards achieving their goals. However, crowdfunding was to date not able to lead to institutionalised changes in the ways of doing, thinking or organising in the financial sector. When the crowdfunding trade organisation saw that the British Business Bank (BBB) were legally forced by the government to send rejected loan applicants to crowdfunding platforms, the Dutch crowdfunding trade organisation started lobbying for the same. However, the financial sector impeded their efforts: "And then we thought with that trade association, wow, we're going to lobby for that too. You know. But of course, the banks saw that coming, so they put a stop to it" ⁸³ .

5.2.3.4 What forms do these activities linked to maintaining, creating and transforming institutions take (.e. emotion work, boundary work, strategy work, practice work and/or values work)? Link back to the 2-4 examples

The categorisation of the types of institutional work in this section are based on Funfschilling and Truffer (2016)), which have been shown in previous sections in this chapter.

From Table 22 and Table 23 it can be concluded that ‘novel’ SIE-field actors often start with mimicking other institutions, after which they start educating the status-quo and aid in constructing identities, mainly about which role this SIE-field actor has in the existing system, and what the attitude of the status-quo towards them ought to be. After this initial phase of

83 NL: "En toen dachten we met die branchevereniging dachten we wow, daar gaan we ook voor lobbyen. Weet je wel. Maar de banken zagen dat natuurlijk ook wel aankomen, dus die hebben daar een stokje voor gestoken." (interviewee 6)

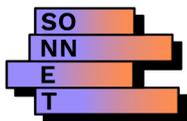


relative freedom for the SIE-field actor, the status quo starts vesting, defining and further constructing identities, thereby formalising the SIE-field actor into the system. This is also a moment where the status-quo starts limiting the SIE-field actor, and institutional transformation becomes more difficult. In this more ‘rigid’ institutional context, the SIE-field actor might advocate for their benefit, which might be stopped by the status-quo who have vested interests in keeping the system as it is. As a result, instead of institutional transformation, the SIE-field actors might create an institution alongside the existing institutions instead. An empirical narrative of this summary might be found in the tables below.

Table 22 The types of institutional work around the institutionalisation of crowdfunding platforms in chronological order.

Actor	Type of institutional work	Description of institutional work
Crowdfunding platforms	Mimicry	Copying the concept of crowdfunding through an online platform from the US
Crowdfunding platforms	Educating / constructing identities	Educating AFM and the Ministry of Economic Affairs about crowdfunding.
National government (AFM and Ministry of Economic Affairs)	Vesting	Initially, the national government takes a passive role towards crowdfunding: they do not enforce crowdfunding platforms in order to stimulate innovation. Later, the government switches their approach and starts enforcing regulation and takes a more hesitant tone towards crowdfunding.
National government (AFM and Ministry of Economic Affairs)	Defining	Assigning the crowdfunding sector the task to professionalise by instigating a crowdfunding trade organisation.
Crowdfunding trade organisation	Defining	The crowdfunding organisation starts defining quality requirements for new entrants into the trade organisation. This limits new entrants into the sector.
Banks	Constructing identities	Exploring their role towards crowdfunding in multiple experiments (which did not institutionalise and mainstream in the end).
Crowdfunding platforms	Advocacy for / mimicry	Inspired by the crowdfunding sector and its widespread institutionalisation, the Dutch crowdfunding sector starts lobbying for the further institutionalisation of crowdfunding within legislation to ensure that banks are forced to refer to crowdfunding platforms if they reject a proposal by an entrepreneur, in order to increase financial citizen participation in the energy transition.
Banks	Advocacy against	Put a stop to the further institutionalisation of crowdfunding by lobbying against the proposed legislation (see previous row).

Table 23 The types of institutional work around the institutionalisation of Invest-NL in chronological order.



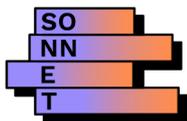
Actor	Type of institutional work	Description of institutional work
Jeroen Kremers, LTO, VNO-NCW	Educating / Mimicry	Educating the Ministry of Economic Affairs and the political cabinet about the German KfW and national promotional banks
Jeroen Kremers, LTO, VNO-NCW	Advocacy for / Constructing identities	Lobbying for a national promotional bank and the centralisation of government financing institutes.
BNG, NWB, FMO, VNG	Advocacy against	Lobbying against the centralisation of government financing institutes by posing counterarguments to Kremers, LTO and VNO-NCW.
National Promotional Bank Invest-NL	Vesting	Invest-NL funds energy transition projects.

5.2.3.5 What factors have enabled and/or impeded institutional work? E.g. resources, learnt lessons and competences connected to actors/ alliances/ networks/ collaborations. Link back to the 2-4 examples

The enabling factors of institutional work seem to be captured in their capacity to access the varieties of power we have studied in SONNET: power ‘with’, ‘to’ and ‘over’. The factors that have enabled or impeded SIE-field actors to conduct institutional work through harnessing these forms of power are discussed in the table below.

Table 24 Factors that have enabled institutional work through power ‘with’ and power ‘to’, based on the example of crowdfunding and Invest-NL.

Factor	Type of power harnessed	Empirical example	Empirical effect
Formalisation into a trade organisation	Power ‘with’	Crowdfunding	The trade organisation gave the crowdfunding sector collective power to lobby for their needs and work towards achieving their goals.
		Crowdfunding	As the trade organisation was struggling to fight the power of financial institutions, it was tempted to start fighting new entrants in the crowdfunding sector through quality requirements: “[...] at some point a trade association can become a bastion for the established players in the market to [...] make the entry of new parties difficult... And that’s how it was a bit too. The affiliated members do not only have the interest to advance the sector, but also the interest, above all, to advance themselves and each other. To not make the parties that are not yet affiliated any wiser than necessary. [...] There were quality requirements [for new entrants] (interviewee 6).
Expert knowledge	Power ‘to’ (resource: knowledge)	Crowdfunding	Crowdfunding platforms, in the beginning of their development, had power over the government because of their knowledge on the topic: “So those first types [...] had to [...] go to the Netherlands Authority for the Financial Market [AFM] to explain yes, what is crowdfunding? And how should we regulate you? [...] In a



			<i>manner of speaking, we had to give a lecture to the AFM to tell what it was.</i> ⁸⁴
		Invest-NL	Jeroen Kremers was a former top-banker and had expert knowledge, enabling him to advocate for the institutional change he aspired.
Close connections to those in power	Power 'to' (resource: knowledge)	Invest-NL	Jeroen Kremers had close connections to high-level policy workers and members of the cabinet. This enabled him to advocate and for his goals.

5.2.3.6 What have been intended and unintended effects (i.e. contributions) derived from conducting institutional work? What influence have they had on SIE-field and 'outside' institutional environments? Link back to the 2-4 examples

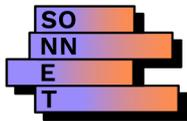
In this paragraph, we will consider contributions in the positive sense of the word. The table below indicates several activities of institutional work that have led to contributions to the SIE-field. It might be observed from the table that:

- Contributions stem from mimicking, defining, educating and advocating work.
- Contributions stem mainly from SIE-field actors that wish to create or transform institutions.
- There is **no unintended contribution** affiliated with institutional work, as it appears from these examples.

Table 25 The contributions of institutional work of SIE-field actors to the SIE-field (incomplete list).

Institutional work conducted	SIE-field actors	Contribution to the SIE-field and 'outside' institutional environment
Mimicry of technological innovation from the US	The first crowdfunding platforms	Increased citizen engagement in the energy transition through crowdfunding platforms.
Defining energy agreements	Diverse actors (50+) from state, market and community spheres	Actors start to take citizens more seriously as professional financial agents within the energy system after the institutionalisation of the Energy Agreement of 2013.
Educating the Ministry of	Jeroen Kremers, LTO, VNO-NCW	Increased knowledge within the Ministry of Economic Affairs and the political cabinet about national promotional banks.

84 NL: "So those first types [...] had to [...] go to the Netherlands Authority for the Financial Market [AFM] to explain yes, what is crowdfunding? And how should we regulate you? [...] In a manner of speaking, we had to give a lecture to the AFM to tell what it was." (Interviewee 6)



Economic Affairs	Crowdfunding platforms	Increased knowledge within the Ministry of Economic Affairs and the Authority Financial Markets (AFM) about crowdfunding platforms.
Advocacy for a national promotional bank	Jeroen Kremers, LTO, VNO-NCW	The launch of national promotional bank Invest-NL.
Advocacy against a national promotional bank	BNG, NWB, FMO, VNG	Stopping the proposed centralisation of government institutions BNG, NWB, FMO, VNG.

5.3 Case study 3: Framings against Fossil Fuel Energy Pathways

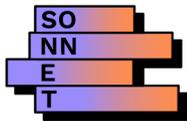
5.3.1 How have the SIE and SIE-field emerged, developed and institutionalised over time?

5.3.1.1 What is ‘socially innovative’ about the SIE (including SIE-initiatives and/or SIE-field actors)? How and to what extent do which ideas, objects and/or actions demonstrate a change in social relations and new ways of doing, thinking and/or organising energy?

‘Framings against Fossil Fuel Energy Pathways’ has been identified as a type of SIE where ‘conflicts’ (rather than cooperation, exchange and competition) is a defining feature of social interactions. This SIE refers to configurations of novel ideas against fossil fuel energy pathways combined with actions such as protesting, campaigning, deliberating, lobbying and creative interventions using both established means (banners, bodies, sites) as well as more novel digital infrastructures (websites, social media, etc), which aim to change dominant (societal) discourses about existing energy pathways, influence policymaking and/or ‘stop’ local fossil fuel production.

In general, there is nothing completely original about activism and protesting – including framings against fossil fuel-based pathways – especially the kind of activities engaged in. What can be considered socially innovative is the imaginary of new social relations that these framings are including and that the SIE-field actors are working towards. Take the divestment framing, this includes the imaginary of an energy system and a world without a fossil fuel industry; or the anti-Groningen gas framing, which includes the imaginary of a region without gas extraction and actors related to that.

To underline the innovativeness of such an imaginary, take the following example. Phasing out gas extraction in Groningen was even unimaginable for GBB and Milieudefensie at the start of their activities – so their demands were oriented towards their assessment of what would



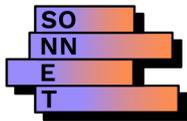
constitute a high demand (e.g. a production cap of 30bcm/year). Overall, the anti-fossil fuel framings changed social relations at different levels – between individuals, between organisations and between the state and the community in question. For example, in the anti-Groningen gas framing, the government took on the responsibility for damage handling and thus intervened in the relation between citizens and the NAM (a private company) and turned it into a relation between citizens and their government.

5.3.1.2 How has the SIE developed over time (and space)?

The following outlines the development of the SIE and the SIE-field over the three periods detailed in the historical account.

Phase 1 (2009-2013), Emergence of new anti-fossil fuel framings and initiatives: a period where framings against fossil fuels surged in the Netherlands. There were newly emerging protests and framings against the fracking of shale gas in several locations in the Netherlands (2010), increased protests against gas extraction in the province of Groningen (after a severe earthquake in 2012) as well as newly emerging framings around fossil fuel divestment (in 2013). During this first phase, actor constellations emerged locally at sites where shale gas resources were to be explored along with a frame focusing on safety and environmental damage. An alternative frame on safety emerged, next to the focus on damage of houses in actor constellations around anti-gas extraction from the Groningen field. Both these frames started in the localities where gas extraction was going to be or already took place. Finally, a frame combining climate change and financial investment was brought to the Netherlands and picked up by individuals and a leading NGO.

Phase 2 (2012-2017), National frames on energy transition and growth of movements: a period that started when the actor constellations consolidated and grew and when activities and frames of all three framings went beyond specific localities to reach a broader nation-wide public. This took place around 2012 for anti-fracking, when the campaign by Milieudefensie (a national NGO) took off, ShaleGasFree Netherlands was founded, activists in a different location (Noordoostpolder) started to organise and many municipalities and provinces declared themselves shale gas free. In 2014, for anti-Groningen gas, when a new governmental decision on gas extraction was taken, Milieudefensie got involved and the problems with gas extraction were more present across the Netherlands. The same year also for divestment, with the start of a national campaign targeting the ABP pension fund which acted nationwide. The nationalising of the activities and frames meant linking local frames such as environmental or physical damage or safety of the population with national frames such the security of supply, the economic efficiency of gas extraction as well as the role of gas in the overall energy mix and in the transition to renewable energy. It thus pulled the claims out of the 'private' into a public sphere. The anti-Groningen gas frames started to move towards stopping rather than only reducing gas extraction and to include alternative regional development perspectives putting forth renewable energy as a topic. For the divestment movement it was about making the investment decisions of ABP matters of public interest by linking it with climate change – this



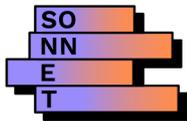
was also part of a broader reorientation to focus next to financial also on non-financial ties between society and the fossil fuel industry.

Phase 3 (2015-2020), Regulatory successes and reoriented frames: a period when many of the initial and adapted claims of the SIE-initiatives became institutionalised and they reoriented their frames. For anti-fracking, regulatory success started in 2015, with the strategic environment assessment and an amendment that was filed by MPs to allow refusal of permits on environmental grounds. This quickly led to a change in the Mining Law that banned shale gas extraction in the Netherlands and to a dispersion of the field. For anti-Groningen gas, 2018 marked regulatory success when the Minister of Economic Affairs announced to reduce gas extraction in 2022 and to stop it by 2030 (later this was moved to 2022). This meant that GBB, one of the main SIE-initiatives started re-orienting towards diligent implementation of these new regulations while Milieudéfensie started to campaign for stopping gas extraction also in other onshore smaller gas fields in the Netherlands. For divestment, successes had been booked with the campaign against pension fund ABP. They reoriented this campaign, on the one hand focusing on other pension funds and other kinds of investors, and on the other hand to implement their focus on financial and non-financial relations between the fossil fuel industry and society, by e.g. focusing on culture or research institutes.

5.3.1.3 What are the relevant SIE-field actors and other field actors within the SIE-field and what are their roles within the SIE-field? How have these changed over time?

There are numerous actors who work on framings against fossil fuel energy pathways (i.e. SIE-field actors) including NGOs, informal groups, local initiatives and residents that work locally, regionally, nationally but also internationally and aim to change societal debates about fossil fuel-based energy pathways. Also, local and regional governments play an important role.

Opponents to Groningen gas include local associations (e.g. Groninger Bodem Beweging), foundations (e.g. Stichting WAG), informal groups (e.g. Schokkend Groningen) as well as active individuals (e.g. upholding websites to inform) – all these are protesting against the damage and unsafety resulting from gas extraction induced earthquakes and eventually against gas extraction. They are supported by a national environmental NGO (Milieudéfensie) that aims to reduce and end gas extraction from the Groningen field. These actors take up the roles of actively pushing for damage handling, safety measures, reduction and phasing out of gas extraction by engaging in different activities. Also, policy actors such as the Province of Groningen as well as the seven municipalities within the earthquake area are engaging in those frames and are thus opposing gas extraction. The roles of these actors did not change too much throughout the development of the SIE-field. However, after reaching their goals of stopping gas extraction and a public handling of damage claims, several actors are currently reorienting. This includes for example Milieudéfensie, which now focuses on stopping also gas extraction from other gas fields in the Netherlands, or from GBB who indicated that with all the successes of the last years, their work is now changing towards monitoring the implementation of the



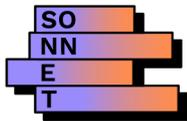
new regulations for handling claims for damage compensation and the reinforcement of houses.

For **framings against fracking**, the situation is similar. SIE-field actors included local groups, either informal action groups (e.g. Schaliegasvrij Boxtel) or formalised foundations (e.g. Schaliegasvrij Haaren). Other actors were a national foundation (Schaliegasvrij Nederland), regional environmental NGOs such as the Brabantse Milieufederatie and the national environmental NGO Milieudefensie. Importantly, SIE-field actors here also included other stakeholders, who feared detrimental consequences for their activities from shale gas exploration and extraction, these include a bank (Rabobank) or a water company (e.g. Brabant Water). The local press as well as national MPs, mainly a green-left politician also were relevant SIE-field actors.

Other field actors that mobilized the anti-Groningen gas framing and the anti-fracking framing included:

- The Ministry of Economic Affairs and Climate took in an ambivalent role: supervising continued gas extraction and aiming to secure energy supply and adherence to international contracts on the one hand and setting climate targets, reducing and eventually stopping gas extraction from shale gas and from the Groningen field on the other hand;
- Mining or exploration companies (such as NAM, Cuadrilla) impeded the development of the field by working against the framings since their main interest lies in the exploration and exploitation of (shale) gas fields;
- Policy advisory bodies or semi-public institutes (e.g. SodM, KNMI, NCEA, Dutch Safety Board) which were enabling the development of the field to a certain extent especially through providing specialised knowledge and help broaden the government's framing;
- Judges and courts (e.g. Council of State, local courts) mainly enabled the further development of the field through their rulings;
- The Dutch parliament also enabled the discussions around the different frames;
- The broader climate movement (e.g. CodeRood) as well as individuals enabled the development of the field on the local and national level through taking part in protests, signing petitions, knitting for Groningen, etc.

SIE-field actors actively using the divestment framing are 'Fossilvrij NL' (as coordinating actor) and many informal local or national groups focusing on specific domains or target groups (e.g. Fossilvrij EUR, Fossilvrij Culture). Fossilvrij NL has always been in close connection with the international organisation 350.org. At the start of the movement, environmental organisations had played an initiating role and they have been supportive throughout (e.g. Urgenda, BothEnds, CodeRood, Stichting Morgen, Greenpeace). Other field actors include pension funds (such as the ABP), local councils, actors from the cultural sector such as museums, or universities – all profiting one way or the other from financial, sponsorship or other kind of relations with the fossil fuel industry – many of these are having an ambivalent role: on the one



hand supporting climate change measures while on the other investing in or being influenced in different ways by the fossil fuel industry.

5.3.1.4 What are relevant activities, aims/goals and narratives that have been developed and manifested by SIE-field actors and/or other field actors within the SIE-field over time?

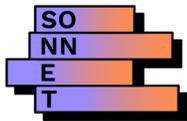
In order to reach their aims, SIE-field actors have made use of different activities and practices over time while continuing to develop their narratives. The **aims** of SIE-field actors were the following:

- Anti-fracking framing: to stop the exploration of shale gas
- Anti-Groningen gas framing: to receive compensation for damage by earthquakes and to have houses reinforced to live safer in an earthquake area with eventually a reduction and stop of the extraction of natural gas from the Groningen field,
- Divestment: to stop investments in the fossil fuel industry.

These aims are closely linked to the **narratives** of the SIE-field actors, and thus to the frames they used. The framings against gas extraction in Groningen and exploration of shale gas, both start from local concerns. Especially the frames around anti-fracking have been studied intensively by scholars (Metze, 2013a, 2013b, 2017, 2018a, 2018b; Dignum *et al.*, 2016; Cuppen *et al.*, 2019). The frames used at the start of the anti-fracking campaigns focused on safety and environment and changed towards utility and necessity in the broader debate about the Dutch energy mix. Framings around anti-Groningen gas and divestment have not been studied in-depth by the existing literature.

Based on this case study, we can identify a number of changes in both framings. The frames used around 2009 against gas extraction in Groningen focused on damages on houses and the need to receive compensations for repair costs. After the Earthquake in Huizinge in 2012, the frame became broader and included a concern for the people's safety and thus the need for reinforcement of houses. In parallel with the start of the engagement by Milieudefensie in 2014 (and strengthened by that), calls for reducing gas extraction and subsequently the to stop gas extraction became more widely shared. The latter came with calls to find narratives of what the region could look like without gas extraction. The divestment framing shifted in terms of target group and in terms of target 'object'. While university groups were established modelling the US and UK movement, individuals simultaneously started addressing the biggest pension fund of the Netherlands. Next to targeting such quantitative financial relations, they also reframed towards including more qualitative social ties such as through sponsoring, education or advertising and started employing more activities towards addressing those ties.

SIE-actors engaged in a whole range of activities, such as: 1) demonstrations, torchlight processions, action camps, petitions; 2) deliberating and thinking along with policy actors, also lobbying; 3) ongoing media work including websites, own newspapers, social media as well as 4) creative interventions including art, theatre, knitting.



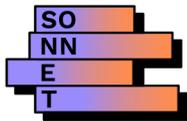
5.3.1.5 What types of interactions/ relations exist between SIE-field actors and/or other field actors? What types of informal and formal alliances, networks, collaborations have existed (and possibly still do)?

Informal networking between different individuals (e.g. through the activities of the loosely organised Dutch climate movement), with politicians, and other stakeholders (e.g. environmental organisations, municipalities or water companies) is an important part of the work of SIE-initiatives. There are however not many signs of formal networking between SIE-field actors and/or other field actors. Importantly, with the focus on framings, one could consider discourse coalitions as an important form of alliance – one that is not formalized, often not explicit and people do not necessarily know each other. Some observations on interactions and relations are shared below.

In both anti-gas extraction framings, local SIE-initiatives do team up with national SIE-field actors (e.g. GBB and Milieudefensie) in informal and fruitful collaborations. The **anti-Groningen gas framing** shows different kinds of interaction between SIE-initiatives. For example, collaboration between Milieudefensie and GBB in organising torchlight processions and in filing court cases against the state. Another example is the conflicting interaction between GBB and Schokkend Groningen in terms of the kind of activities being engaged in. Interesting to mention here is that they had different overall goals (energy transition and lowering emissions vs. safety and reducing damage) which could both be reached through the same means - by stopping gas extraction. In Groningen, more formalised consultative bodies were established that brought together all stakeholders from the region to discuss issues of damage handling, reinforcement of houses, gas extraction and the future of Groningen – e.g. the dialogue platform or the societal steering committee.

The **anti-fracking framing** also shows competition about resources between different initiatives, especially when activities just started, based on an example of two action groups in Boxtel. However, interviewees indicated that networking, especially in the starting days of Schaliegasvrij Haaren was a very important activity that the SIE-field actor engaged in. This included reaching out to the local press, to national environmental organisations as well as to politicians and all those that could have a stake in not exploring shale gas in the specific localities and in the Netherlands more broadly. Regarding anti-fracking, at least some 220 municipalities and 9 provinces declared themselves 'shale gas free', thereby publicly becoming part of a broader alliance. The organisation Schaliegasvrij Nederland is a formalisation of the collaborations between a number of actors, including Schaliegasvrij Haaren, and the action group Schaliegasvrij Boxtel, Milieudefensie as well as the anti-coal gas fracking action group in Gelderland. The latter link also shows that informal collaboration between different locations as well as across different types of fracking (coal gas vs. shale gas) happened.

The individuals and also the SIE-initiatives active in the **divestment framing** are organised in a decentral way, with different groups being connected through a similar name and a website but rather autonomous in their activities. FossilVrij NL is a coordinating organisation and is broadly



networked as part of the broader Dutch climate movement that connects individuals across different organisations and activity foci – often because individuals who are active within this movement are also active in other climate activities.

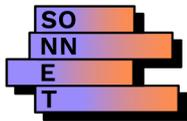
The relations with other field actors, especially those opposing the suggested frames, are characterised by conflict – such as between Schaliegas Haaren or GBB and the Ministry of Economic Affairs; or between ABP FossielVrij and ABP. However, this does not mean that they only engage in conflictual activities, rather and as outlined by GBB it is about balancing more activist and more deliberative activities in relating to other SIE-field actors.

5.3.1.6 How can the interactions/ relations between SIE-field actors and/or other field actors be characterised (e.g., cooperation, exchange, competition and conflict)? How have they changed over time?

See answer to question 5.3.1.5.

5.3.1.7 How/ to what extent do narratives and activities by SIE-field actors and other field actors refer to power issues and include ambitions to improve them?

The SIE-field actors aim at challenging existing power relations (see also 6.3.6) – they are born out of the idea of not wanting to have certain actors exert power over their immediate living circumstances – be that the NAM as gas extraction company, Cuadrilla exploring shale gas or the fossil fuel industry infiltrating everyday lives through pensions, advertising or educational activities. These actors certainly claim the power of being ‘morally right’. Their activities are focused on showcasing their power through demonstrating the mass of people that is supporting them; e.g. through petitions, demonstrations or through choosing the legal form of association that is based on membership. They are also focused on reducing the power of the ‘other’ on their lives, e.g. through court cases or lobbying, or on undermining the societal status of the fossil fuel industry and the power that comes with it, e.g. through gaining societal support for their ideas or revoking the social licence to operate as outlined by the divestment narrative. References are made to power issues specifically in terms of the power of companies, such as the NAM, who stretch time or play on time using the massive financial resources that they have.

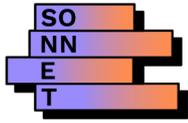


5.3.1.8 What have been (shared) narratives, activities, knowledge, learnt lessons, etc. between alliances/networks/collaborations of SIE-field actors and/or other field actors? How have they been reproduced, adopted and replicated in the SIE-field? To which extent have they been legitimised and/or contested by several actors within the SIE-field? Have there been any key changes over time?

The shared narrative of the different groups (e.g. Fossil Free Education, Fossil Free Euro) engaged in the **divestment framing** concerns the idea that investment in the fossil fuel industry is morally wrong and financially untenable. A proposed alternative is to invest in renewable energy. They have extended this framing towards encompassing not only financial but all other ties that the fossil fuel industry has with Dutch society. The framing is being reproduced through the different activities that the groups are engaging in and which put it recurrently on the societal agenda. These framings are contested by the fossil fuel industry but also by the institutional investors and those organisations targeted by the campaigns. While the divestment narrative gained ground in terms of the moral claim regarding climate change, it struggles with the financial claims, which are much more contested. Counter arguments are that firstly, investment portfolios will not so much suffer from investing but from divesting since risks can be less spread, and secondly, by divesting, the investors would lose their influence on those companies and thus miss out on the opportunity to help them act in a morally right way.

The **anti-Groningen gas framing** shows that SIE-field actors do not necessarily need to share all elements of their narratives – while Milieudefensie focused on gas reduction and eventually stopping gas extraction, GBB focused in first instance on damage repair and safety and only in second instance on gas reduction. Those frames were legitimised over time through court rulings by the Council of State, but also through advisory reports of several governmental advisory bodies (such as the SodM, KNMI, Dutch Safety Board). Other SIE-field actors such as municipalities and the Province of Groningen also put forth a frame that focused on creating a future perspective for Groningen that was independent from gas extraction and emphasizes the possibilities of renewable energies. These frames were countered by other field actors pointing to issues of security of energy supply and the need to use natural gas as a transition fuel during the transition towards a renewables-based energy system. Eventually, research into substitution for natural gas from the Groningen field showed that indeed security of supply could be sustained without gas from the Groningen field.

The frames around **anti-fracking** in the Netherlands have been studied intensively by scholars (Metze, 2013a, 2013b, 2017, 2018a, 2018b; Dignum *et al.*, 2016; Cuppen *et al.*, 2019). The frames used at the start of the anti-fracking campaigns focused on the unclear safety and environment issues in relation to shale gas exploration and extraction. In the end, this frame was picked up by the government to the extent that it led to the commissioning of research into possible consequences and to a letting go of their initial frame considering shale gas extraction as 'business as usual'. Frames that emerged from there focused on economic efficiency, the role of shale gas in the Dutch energy mix (considered as 'game changer' or as 'drop in the ocean') and



the role in the transition to renewable energy (gas as ‘transition fuel’ or as ‘transition delayer’) (Metze, 2018b).

5.3.1.9 Reflections on the main research question (based on answering the minor ones)

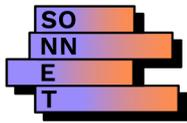
What might have become clear through the way that these minor research questions have been answered is that it is difficult to set boundaries for this empirical SIE-field. Rather than one field including different framings against the fossil fuel industry, it seems that each of the three framings could rather be studied as fields on their own. Especially the divestment framing differs a lot from the other two, not only in terms of dynamics but also in terms of not being rooted in a certain locale. In addition, while Groningen has a long history of gas extraction, shale-gas fracking never went beyond the exploration stage – thus in terms of physical changes in the system, there is a crucial difference also between these two framings that might be more fruitfully be researched as separate fields.

5.3.2 How do SIE-field actors and other field actor interact with the ‘outside’ institutional environment and thereby co-shape the SIE-field over time?

5.3.2.1 Which institutions (regulative, normative, cultural-cognitive) within the ‘outside’ institutional environment have shaped (including enabled/ impeded) SIEs and its SIE-fields (and how)?

Without doubt, government and gas extraction industry have had a great influence on the development of this field: its actors, their activities and frames. Extracting gas to secure Dutch energy supply was business as usual and as such has actors with vested interests in keeping the status quo. Laws and policies, societal expectations and common beliefs were tied to keeping this system in place. The increasingly stronger acknowledgement of climate change and its consequences in public discourse but also in policy agreements, such as for example the Paris Climate Conference and its national equivalent have been supporting framings against fossil fuel energy pathways. However, powerful companies such as Shell, co-owner of NAM, have been going far to delay responses or more to not being held accountable for the societal and environmental consequences of their commercial activities.

The SONNET team is interested in building an understanding of how dominant institutions within the ‘outside’ institutional environment influence the emergence and development of social innovation in energy – framings against anti-fossil fuel energy pathways. Institutions are made up of regulative, normative and cultural-cognitive elements. They are tacitly or explicitly agreed upon rules constraining or enabling activities of actors that provide stability and meaning to social life. These can be: 1) Regulative institutions: laws, rules, standards, policies, 2) Normative



institutions: norms and value systems, and 3) Cultural-cognitive institutions: shared conceptions of reality, binding expectations, and common beliefs.

Regulative institutions, including laws, rules, standards, or policies have influenced the emergence of at least the framings against gas extraction discussed here – since these were directed against specific regulative institutions. Anti-fracking frames were directed against ‘handling’ of shale gas extraction like any other type of gas extraction and thus as falling under the current Mining Law and the ‘Small-field policy’. Anti-Groningen gas frames in the beginning were directed against standard practice of having to handle damage claims with a private party (NAM) rather than dealing with damage and value reduction as a public cause.

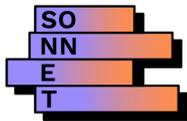
Two more generally embedded ways of the Dutch government to deal with the framings and protests are firstly, the reflex to set up consultative bodies in case there are societal disagreements – often however, such bodies do not have special power or responsibilities; and secondly, the reflex to have more studies and research being done – both of which have surely slowed down the developments. Throughout the years, also the rulings of the Council of State for example have shaped the anti-Groningen gas extraction field in that it accelerated the developments towards not only reducing gas extraction but also bringing it to a halt.

Normative institutions, including norms and value systems have also had their influence. These institutions are key for actors of the divestment framing, who have been referred to as ‘norm entrepreneurs’ (Braungardt, van den Bergh and Dunlop, 2019): they question both moral norms and financial norms and try to change them. Their activities and frames are directed against the value system underlying financial investment in the fossil fuel industry. The norm – that goes beyond the SIE-field – was to consider such investments as profitable now and in the future, and as spreading the financial risks within investment portfolios. Policy agreements such as the Paris Climate Agreement and the norms these establish enabled the development, since for example they allow linking climate change policies to decisions on financial investments for the divestment framing.

Cultural-cognitive institutions, including shared conceptions of reality, binding expectations, common beliefs, were for example shaping the development of the anti-Groningen gas extraction. The shared national belief that gas extraction from Groningen cannot be stopped was so strong, that even SIE-field actors did not dare to challenge it at the start. The rapid change of this shared belief in different parts of society helped to accelerate the stop of the gas extraction.

5.3.2.2 What are the key events, external shocks, trends and inter-field interactions that enable/ impede SIEs and its SIE-fields (now and in the past)?

Key enablers of the anti-gas extraction framings were **environmental shocks** in the form of earthquakes. For anti-Groningen gas these were specifically an earthquake in 2006 leading to a group of people organising and later founding the GBB, and one in 2012 in Huizinge drawing public attention to Groningen and putting public safety on the agenda – thus leading to a change



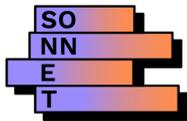
in frame. While these bigger earthquakes were symbolic, they are but two examples of a long history of gas induced ground movement in Groningen. This ongoing insecurity locally did contribute to a strengthening of the anti-Groningen gas framing. For the anti-fracking framing, earthquakes in the UK (Blackpool) fuelled the public debate and were taken as one of the arguments showing that shale gas fracking might not be so much about 'business as usual' as the government pretended. Also, the 2012 Huizinge earthquake did support the Shalegasfree initiatives in their framing of gas extraction being connected to concerns of environment and public safety.

Key policy events for enabling anti-fracking were the first moratorium in 2011 – since it stopped the possibility to continue the exploration for shale gas, and a governmental decision in 2018, which banned the possibility of shale gas exploration in the Netherlands. Key policy events for enabling anti-Groningen gas included the first governmental decision announcing a reduction in gas extraction in 2014 – and thus signposting the possibility for reduction; followed by a first Council of State decision overthrowing the governmental gas extraction plans for the 2015/2016 period asking for further limitation of gas reduction – signposting that the governments plan could indeed be challenged; and then two governmental decision in 2018, firstly to make damage handling a public affair (and thus providing citizens with a public procedure rather than every citizen having to address the NAM as a private company), and secondly, to end gas extraction in 2030. Especially the anti-Groningen gas framing knows a complex institutional field with many layers of policy and the founding and demise of organisations responsible for handling claims regarding damage and/or reinforcement of houses – this field with supposedly overlapping and unclear mandates did impede rapid changes but fuelled the resistance by those concerned.

Key **societal trends** include an increased importance being accorded to alternatives to fossil fuel-based energy production. This is fuelled by an increasing public realisation of the threats from climate change which culminated in 2015 in the Paris Climate Agreement and the Dutch counterpart, the Climate Agreement of 2019. The event in Paris was especially important in linking up Dutch climate activists who are since connected via facebook and through a yearly training camp. One of the resulting groups, Code Rood, then held actions in Groningen in 2018. For the divestment framing another key enabler influencing public opinion was the international documentary 'Gasland' with its vivid imaginaries of burning taps – next to a Dutch documentary on the movement.

5.3.2.3 How (if so) have the SIEs and their SIE-fields and 'outside' institutional environment been shaped by these events, external shocks, trends and inter-field interactions (now and in the past)?

See section 6.2.2 for an overview of the events, shocks, trends and inter-field interactions and the way these have been enabling and/or impeding the SIEs and their SIE-fields.

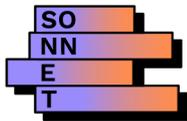


5.3.2.4 What have been the most important alliances/networks/collaborations SIE-field actors and/or other field actors that emerged from these events, shocks, trends, and inter-field interactions (when, how and for what reasons)?

As has partly been outlined under 6.2.2., the following SIE-field actors emerged in relation to key events or shocks:

- The preparations towards and the aftermath of the Paris Climate Conference has led to a surge of climate activism in the Netherlands, and it was also during this time that many individuals met one another marking the start of a more active climate movement
- GBB was officially founded in 2009. It arose from a Sounding Board that was established in 2006 as a reaction to the increasing earthquakes and specifically, the earthquake of Westeremden on the 8th of August. The latter scored 3.5 on the Richter scale and was the heaviest until then. The Sounding Board was an initiative by the Stichting Dorpsbelangen Middelstum (SDM) and was established November 2006 after discussions with the province and municipality of Loppersum to research the consequences of natural gas extraction. After a while, the citizens involved in the Sounding Board became dissatisfied with the advancement and conclusions of the research and decided to unite themselves as what is now the Groninger Bodem Beweging, which is registered as an association.
- When Minister of Economic Affairs Kamp visited the Town hall of Loppersum in Groningen to present this governmental decision, 'Gas extraction in Groningen' from 2014, he was welcomed by a big group of protesters. This arose interest by activists at Milieudefensie and they started their involvement that very day.

Especially in the anti-Groningen gas framing, many governmental plans led to the formation but also demise of different organisations being charged with the handling of damage claims or claims for the reinforcement of houses. The case study in this regard only kept record of those that are relevant for the overall storyline – a more in-depth analysis of this web of actors could be illuminating. To mention one example: a dialogue platform was established in March 2014 with the goal to involve all concerned stakeholders such as the Ministry of Economic Affairs, NAM, the Province as well as societal organisations such as the GBB in working out the government decisions of 2014. Just about a year later, in June 2015 the National Coordinator Groningen was established (under the umbrella of which the institutional actors collaborated) and in January 2016, a societal steering committee involving inhabitants and societal organisations in all matters relating to damage, reinforcement and perspective – leading to a discontinuation of the dialogue platform which had become obsolete by then.



5.3.2.5 How have the SIE-fields co-evolved with the policy context (if so) (and what was the relative importance of the urban, regional, national and European level)?

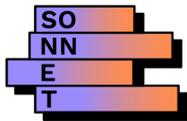
The SONNET team is interested in policies (policy strategies and instruments) that are enabling and impeding the SIE-field and the relative role of the urban, regional, national and European governance level.

The analysis of the divestment framing did not bring to light specific public policy strategies or instruments that would enable or impede its activities. Reversing the analysis, (Braungardt, van den Bergh and Dunlop, 2019) cite a number of studies that show that the divestment movement had positive effects on the development of effective climate policies. There has not been any targeting of a specific public policy by the divestment framing. Interesting in this regard would be whether there have been any changes in the investment policies of local governments – since there are local action groups targeting specifically local governments. Beyond, rather than targeting national policy, FossilVrij NL has targeted the pension fund ABP and its investment policies – thus the internal policies of an organisation.

For both anti gas extraction framings, the policy context has been very significant for their development. Rather than providing a bullet list that would fall short, we refer to the answer to 6.2.2. for an overview of the most important policies, while here we focus on those laws and policies that were targeted by the SIE-field actors: the mining law and to a certain extent the small field policy. In relation to anti-fracking, the mining act was changed to 1) transfer burden of proof by damage to the operator, instead of the victim 2) extend the ground of refusal to protection of the environment, safety or public health, and 3) to have a role for decentral governments in the decision making process related to the mining act. Important in the anti-fracking case were policy instruments such as the structure vision (structuurvisie) as well as strategic environmental assessments. In relation to the anti-Groningen gas case, there have been numerous policies and policy changes – these warrant their own specific policy analysis and are not covered in detail in this report. Important to mention is 1) the multi-level governance aspect – involving the affected municipalities, the province of Groningen as well as the Ministry and 2) the opaque emergence, adaptation and phasing out of governing institutions and organs.

5.3.2.6 How are which power relations (such as inequality, exclusion, oppression, exploitation, injustice) being transformed and/or reproduced by the SIE-phenomenon under study? (and vice versa – how are SIEs enabled and impeded by power relations?)

The main power relations being addressed seemed to be the one between society and fossil fuel industry, where the latter is considered to exploit natural resources (natural gas fields in the Netherlands, but also fossil fuels anywhere) for financial gain at the expense of safe living circumstances for society now (as is the case in Groningen) and in the future (when climate change becomes more visible). The activities of SIE-field actors of the anti-gas extraction framings



are addressing the state as a mediator between the interest of economic actors and its citizenry – and thus in an attempt to address the injustice arising from there. The strong ties between the government and the fossil fuel industry, with the government also being a financial beneficiary of gas extraction did impede the SIE and its chances for success. It seems that it was only when alternatives for the industry had been found (getting engaged in importing gas, converting gas), when the government financially supported the payment of damage claims to a considerable extent and when gas extraction from the Groningen field became less financially attractive due to international gas prices but also due rising costs for the reinforcement of houses that there was more space to react to the demands by citizens for reduction and stop of gas extraction. Some additional observations:

- Incumbent actors have financial resources at their disposal, which buys them time and allows them to delay and to soften potentially painful decisions regarding or consequences for their operational model. Exemplary are the lawsuits of citizens of Groningen against the NAM.
- Knowledge and framing are important sources of authority and power for all actors involved. Exemplary are the negotiations about the boundaries of the research into the effects of shale gas extraction.

In terms of power dynamics, SONNET also distinguishes between ‘power to mobilise SIE-related resources and/or to achieve SIE-related goals (incl. (in)equality and in/exclusion), power over others in SIE-related processes (including dependency, oppression and exploitation), and power with other actors to achieve collective (SIE-related) goals’ (Wittmayer *et al.*, 2020, p. 44). More on these can be found in the textbox on ‘Power and power relations (power to + power over + power with)’ – in the in-depth case study.

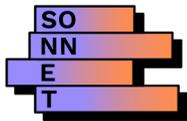
5.3.2.7 Reflections on the main research question (base on answering the minor ones)

No additional reflections.

5.3.3 What are the enabling and impeding factors for the SIE-field actors and other field actors to conduct institutional work and change the ‘outside’ institutional environment?

5.3.3.1 How, why, and where do SIE-field actors and/or other field actors conduct activities linked to creating, maintaining and transforming institutions?

Institutional work refers to the activities of actors that aim to create, maintain and disrupt institutions (i.e.: regulative, normative and/or cultural-cognitive). Such institutional work,

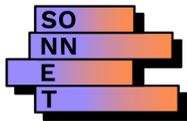


specifically the practices of institutional work is what SONNET is interested in, the why, how, when, by whom and where of these practices, and what influences them. In the following, we outline a number of examples of institutional work within the field of ‘framings against fossil fuel energy pathways’. The practices that the SIE-field actors engaged in to challenge and disrupt existing institutions were manifold:

- organising torchlight processions, demonstrations or action camps, e.g., Milieudefensie organised anti-gas extraction demonstrations in The Hague where the parliament has its seat, or Code Rood organised an action camp in Groningen
- organising (social) media campaigns, creating own media outlets, issuing press releases; e.g. the GBB issued their own quarterly newspaper that was spread in the affected communities; all three SIE-initiatives (GBB, Fossilvrij NL, Shalegasfree Netherlands) had a website that documented all their activities over years
- lobbying with local, provincial and national politicians; e.g. with MPs from the green-left party in the case of shale gas
- issuing research reports; e.g. the four research reports about the investment of pension fund ABP in the fossil fuel industry or the research into the relations between the Erasmus University with that same industry
- launching petitions; e.g. the online petitions asking ABP to stop investing in the fossil industry, and the government to stop gas extraction in Groningen
- lobbying and taking part in official deliberation structures; e.g. GBB and its participation in the societal steering committee or the dialogue platform (to name two out of many), or Shalegasfree Netherlands and its participation in the Sounding Board of the research into the consequences of shale gas extraction
- using art (plays, caricature and others); e.g. the play of Fossil Free Culture in the Van Gogh Museum, the use of caricature in the GBB newspaper and blogs

Through these practices, they tried to challenge and disrupt several institutions.

- Specifically cultural-cognitive institutions, such as general public discourse and existing dominant frames regarding fossil fuels. Examples include the creation of frames against shale gas extraction, the transformation of existing frames against gas extraction as necessary for securing energy supply, towards reducing and stopping gas extraction in the Groningen field, the transformation of frames from seeing gas extraction as business as usual towards seeing it as source for damage and safety concerns including compensation of damage and reinforcement of houses, and the creation of a frame to consider investments as a tool for climate activism.
- These practices were also meant to challenge and disrupt regulative institutions, and the processes towards arriving at these, such as policy making and law amendments. Examples include working towards creating and ‘transforming’ the investment policies of ABP with regards to where they will invest; or transforming laws such as the mining law, which regulates natural gas exploration and extraction.

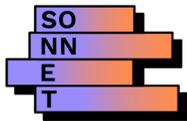


- Finally, also, normative institutions as in norms and value systems are being targeted. This includes challenging existing and creating new norms, such as the divestment framing challenging the perception that investments are neutral and that “*your investments do not have ethical consequences*” (Interviewee 4). The Dutch National Bank, a norm providing organization, started acknowledging the carbon bubble argument as a risk for investments. Anti-Groningen gas challenged the norm that gas extraction (and its consequences) are handled as a private matter and worked on transforming it into a public matter.

Overall, SIE-field actors, including NGO's, foundations, associations, action groups were involved in creating and transforming institutions that were maintained by other field actors. They can be said to specifically focus on cultural-cognitive institutions as well as normative institutions, to arrive at regulatory changes that then inscribe new frames and norms in legal practice. The work is framed in relation to the broader good and to the benefit of a broader group of people; e.g. the citizens of the earthquake area (GBB) and the potential fracking sites (Shalegasfree Netherlands), the world population that will benefit from less CO₂ emissions (Milieudefensie, FossielVrij NL). The clear antagonist of this work are actors who benefit from fossil fuel exploration, extraction and distribution – this includes in first instance companies engaged in these activities (i.e. fossil fuel industry) but also the Dutch government, who directly financially profits from gas extraction and indirectly through taxes. However, also the Dutch citizenry is a stakeholder here, since they are interested in being supplied with energy.

The change of institutions did happen gradually for the anti-Groningen gas framing. As put by Interviewee 5 “*it all went fairly gradually. Yes, they said always ‘it is not possible’, to reduce gas extraction, because we do not have alternatives. Yes, and then it turns out that there are. That were a lot of, often very technical, discussions about the quality of the gas [...]. But it also had a lot to do with exports. The Netherlands had long term contracts with other countries to supply gas [...] and about these contracts, they always said that these ‘cannot be broken open’, but it turned out that they could. It turned out that more gas could be imported [...] Thus, that all went very gradually. Not that there was one specific epiphany. [...] continually there was another insight added: ‘oh we could also do this, oh we could also do that’*”⁸⁵

⁸⁵ Dutch original: “Ja, het is ook redelijk geleidelijk gegaan. Ja, er werd altijd gezegd ‘dat kan niet’, die gaswinning omlaag, want we hebben geen alternatieven. Ja, en het bleek dat die alternatieven dat toch wel waren. Dat waren heel vaak hele technische discussies over de kwaliteit van het gas [...]. Maar dat had ook veel te maken met exports. Nederland had super lange termijn contracten met het buitenland om gas te leveren [...] en van die contracten werd altijd gezegd ‘die kunnen we niet openbreken’, maar dat bleek dan toch te kunnen. Er bleek toch veel meer gas te importeren te zijn [...]. Dus dat is eigenlijk nog heel geleidelijk gegaan. Niet dat er een specifieke ingeving was. [...] steeds een inzicht bijkwam van ‘oh maar we kunnen ook nog dit doen, oh we kunnen ook nog dat doen’.”



5.3.3.2 Who is involved in conducting institutional work (and who is not, and why not)? Which actors benefit from this work (or not)?

This question has been answered under 5.3.3.1.

5.3.3.3 What have been the most important activities linked to creating, maintaining and transforming institutions? Outline these activities through describing 2-4 examples.

In the following, we provide two examples of institutional work.

Example 1: Judicial review of gas extraction plans – transforming regulatory institution

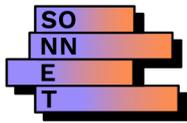
Outline activities: In 2015, 40 parties including GBB and Milieudefensie had objected to the gas extraction plans of the Ministry of Economic Affairs for 2015/2016 and had filed applications for judicial review. The Council of State ruled that gas extraction for said period had to be limited to 27bcm and therewith set aside the initial plans of the government (Raad van State website⁸⁶). It reasoned that the plan of the Minister was integer and based on the studies into seismic threats that were at his availability. However, it also reasoned that considering those studies, which state that lowering gas extraction means lowering seismic risk, the Minister needed to better explain why he still allowed extraction of 33 bcm (the baseline for a very cold year, rather than an average year). The Minister needed to make clearer that he had taken all necessary precautions in weighing security of supply and safety of inhabitants. Through objecting the gas extraction plans and filing a judicial review, and by basing themselves on existing studies and results, the objecting parties transformed the policy plans while reinforcing (or maintaining) those results and the link between gas extraction and seismic activity.

Forms activities take: Taking the overview by (Phillips and Lawrence, 2012), these activities might be closest to 'practice work', understood as 'efforts to affect the recognition and acceptance of sets of routines, rather than their simply engaging in those routines'

Enabling/impeding factors: This institutional work was enabled by the collaboration between different organisations with different access to expertise and financial resources. In addition, the availability of research results that were recognised as legitimate and made the link between gas extraction and seismic activity was supportive. In that sense, also the ongoing actual ground movements and earthquakes worked in favour.

Intended/unintended consequences: This instance of institutional work let to a ruling by the Court of State that overthrew the gas extraction plans for the gas year 2015/2016 of the Minister

⁸⁶ See <https://www.raadvanstate.nl/@8695/gaswinning-groningen/> (accessed March 2021)



of Economic Affairs. It also provided a signal to the SIE-field that the studies of a number of (semi-)public institutions such as the KNMI, SodM and the Dutch Safety Board were taken serious and that the government could be held accountable in relation to the insights from these studies. On the side of the SIE-field actors, this constituted then also the first of a series of objections that were filed against all following draft gas plans that the Ministry of Economic Affairs presented (Interviewee 6). Also the Ministry of Economic Affairs understood the signal and for the gas year 2016/2017 presented a gas extraction plan that would allow only 24bcm/year to be extracted but that would be fixed for five years – this can be understood as trying to pre-empt yearly objections. However, also this plan was overthrown by the Council of State after objections of SIE-field actors in 2017.

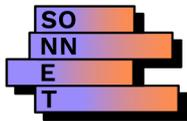
Example 2: Research report into the relations between EUR and the fossil fuel industry - transforming normative institutions

Outline activities: In 2015/16, EUR Fossil Free secured funding and support for a research into the relations of the 2nd biggest EUR faculty (Rotterdam School of Management, RSM) with the fossil fuel industry. The results of the research were published in 2017, clearly indicating that the fossil fuel industry, specifically Shell, BP, ExxonMobil and Gazprom, benefited from interacting with RSM. This included seats on the RSM advisory board, a contractual agreement that allowed Shell to influence curricula and students' profiles, or research sponsoring without disclosing this source of funding (Hüzeir and Fraser, 2017). It is aimed at transforming the norms that are in place regarding whether and to which extent relations with the fossil fuel industry are acceptable.

Forms activities take: Taking the overview by (Phillips and Lawrence, 2012), these activities constitute 'discursive work' since the research activities are done in an attempt to 'influence processes of social construction' and also the closely related 'meaning work' which relates to 'the struggle over the production of mobilizing and countermobilizing ideas and meanings' (Benford and Snow, 2000: 613, in (Phillips and Lawrence, 2012)).

Enabling/impeding factors: This instance of institutional work was made possible by the ongoing work of EUR Fossil Free related to gathering support among students and staff and putting climate change on the universities agenda to the extent that they were invited by the Executive Board of the University, which agreed to research the ties between the EUR and the fossil fuel industry. It might also be enabled by the broadening and increasing societal discourse on climate change and associated actions (also in the aftermath of the Paris Climate Agreement of 2015).

Intended/unintended consequences: This instance of institutional work inspired a number of practices within the broader Fossil Free Movement, to also include non-financial relations next to the focus on divestment, thus practices of groups such as Fossil Free Culture and Fossil Free Education. The EUR established a Commission which looked into the research and identified risks to integrity as well as recommended changes broadly in line with the initial report. A corporate register was installed where RSM staff disclose their ties with the corporate sector and the contract with Shell (allowing it to influence curricula) was stopped in December 2018. The report was also taken by a MP of the Socialist Party to organise a parliamentary debate also leading to a statement by the Minister of Education, Culture and Science. The latter, as well as the reaction by



the Association of Universities in the Netherlands (VSNU) enforced the frame of the self-cleansing properties of academia and existing codes of integrity.

5.3.3.4 What forms do these activities linked to maintaining, creating and transforming institutions take (.e. emotion work, boundary work, strategy work, practice work and/or values work)? Link back to the 2-4 examples

This question has been answered under 5.3.3.3.

5.3.3.5 What factors have enabled and/or impeded institutional work? E.g. Resources, learnt lessons and competences connected to actors/ alliances/ networks/ collaborations. Link back to the 2-4 examples

This question has been answered under 5.3.3.3.

5.3.3.6 What have been intended and unintended effects (i.e. contributions) derived from conducting institutional work? What influence have they had on SIE-field and 'outside' institutional environments? Link back to the 2-4 examples

This question has been answered under 5.3.3.3.

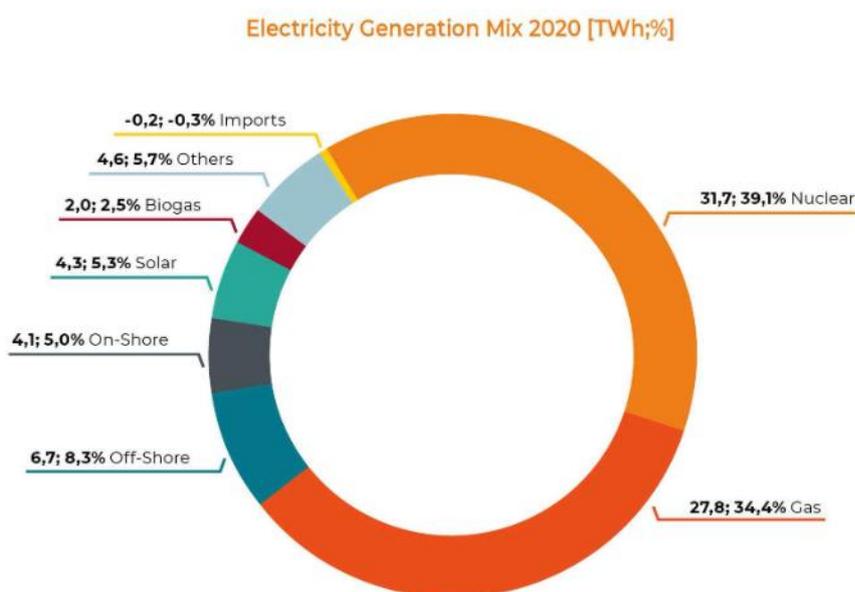
5.3.3.7 Reflections on the main research question (base on answering the minor ones)

This question has been answered under 5.3.3.3.

6 REFLECTIONS FROM A BELGIAN PERSPECTIVE

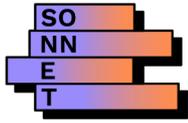
Belgium relies for 70% of its energy consumption on fossil fuels such as gas (ca. 30%) (see Figure 7). These fossils are fully imported. Belgium was the 7th country in the EU to completely banish coal as an energy source. In contrast to the Netherlands, nuclear forms a large share of the Belgian energy mix (ca. 30%). In terms of policies for renewable energy, Belgium aims to decrease its dependence on imported energy and has installed a system of green certificates next to other policy measures aimed at increasing renewable energy production.

Figure 7: Overview of the primary energy sources in Belgium⁸⁷



The Belgian energy market is fully mature and liberalized. It is argued that in a liberalized energy market, SIE, in particular, developed by citizen and social enterprises are provided more opportunities to become new entrants into the energy market, in comparison to other countries where incumbent institutions are still dominant (SI-DRIVE, 2016, 2017). Belgian energy cooperatives are widely considered frontrunners and it is the cradle of the European federation of renewable energy cooperatives (rescoop.eu). For Belgium the role of the strong regions and

⁸⁷ Source: <https://www.energyprice.be/blog/energy-mix-belgium/#evolution> (accessed 18/6/21)



their diverging policies are important factors, especially cities play a key role. SIE-initiatives have begun to develop new approaches for renewable heat (e.g. biomass), reducing energy use (e.g. smart technologies), and purchasing energy and managing demand (e.g. blockchain technology).

In the context of the overall SONNET research project, we focused particularly on the city of Antwerp. Antwerp is the second-largest city in Belgium with a population of 524.501 and the wider metropolitan area having 1.2 million. Antwerp realised overall 14,5% carbon reduction between 2005 and 2015. This means the city is on track to reach its 20% ambition towards 2020. The city's climate plan spells out the ambition to become fully carbon neutral by 2050, which seems ambitious considering the carbon intensive harbour industries. The following reflections on the separate SIE-field analysis in the Netherlands and partly Belgium are done from the perspective of the Antwerp consortium partner of SONNET in collaboration with the DRIFT team, who was responsible for the case studies.

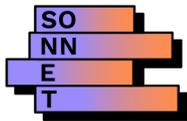
In Belgium, we have studied multiple SIE initiatives. These initiatives are indicated in the table below and will be explained more thoroughly in the next sections.

Table 26: Overview of SIE initiatives studied in Belgium

Case study	Name SIE-I studied
Participatory incubation and experimentation	Think-e
	Stadslab2050
Finance and Subsidy mechanisms	ECCONOVA
	Energie Transitie Fonds
Framings against fossil fuels	Klimaatcoalitie
	Youth for Climate

6.1 Case 1: Participatory incubation and experimentation

There are several SIE-initiatives that experiment with the energy transition in Belgium. Here, the participation of citizen-led energy cooperatives is considered very strong and overall, citizens seem mostly involved in smaller scale projects, whereas larger organizations (i.e. national government, grid operators or the municipality) seem more likely to initiate bigger projects. In terms of normative and cultural differences between Belgium and the Netherlands, that Belgian SIE initiatives might be more passive and expect the government to organise the energy transition. Regulatory institutions are deemed to have a constraining effect on setting up collaborative formats. Moreover, the Flemish government is perceived to struggle to interact with decentral administrations regarding creating more fitting legislation for these initiatives. Potentially, this might be because of the various governmental levels (national, Flemish, Wallonian, provincial and city-level governments). Continuing the reflections from a Belgium



perspective, the main differences between collaborative formats that experiment with the energy transition in Belgium, versus the Netherlands seem to be the strong participation of citizen-led energy cooperatives.

An example of a Belgian SIE-I in this case study is Stadslab2050. The city administration initiated this urban lab Stadslab2050 to work together with a broad range of local stakeholders towards a sustainable Antwerp in 2050. The lab is positioned as a hybrid model that means that the Antwerp Citylab 2050 is neither fully a municipal nor fully a societal project. Because of the hybrid position, the lab works at the interface –or boundary– between government and society. Government, citizens, companies and organisations venture out on joint trajectories to turn ideas into concrete actions. From innovative financial models and technical innovations to complex combinations of social innovation and behaviour experiments. Lowering the threshold by offering a total package from technical to financial solutions. For more information on Stadslab2050, see also the case study report. Another example is the initiative Think-e (see box below).

Introduction to SIE-initiative: Think-e⁸⁸

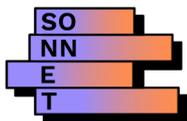
Think-e, a living lab testing and demonstrating zero energy building through renovating an old typical Belgian farmhouse from 1931. The initiative works closely together with the local and regional administration to transform the building into a highly efficient renovated dwelling. According to this initiative, “the Living Lab is a testcase, a case where Th!nk E and the relevant industrial partners jointly leverage components to systems, question current practice and simulate, demonstrate and test to see what can be done differently”.

Aims: Think-e posits that it aims "to achieve a grid-supporting zero energy building starting from an existing representative building".

Organisational history: Think-e was founded in 2020 industrial partners in collaboration with local authorities.

Strategies: The most prominent strategy of Think-e to achieve zero energy buildings, is by actively doing a renovation project of an exemplary Belgian house itself. In this way, the project demonstrates the possibilities of refurbishing the existing housing stock. In

⁸⁸ Description partly based on: Wittmayer, J.M., Fraaije, M., Hielscher, S., Dembek, A., Rogge, K., Schmidt, B., Vernay, A.-L., Blascosok, N., Dankowska, A., Guetlein, M.-C., Leichtweiß, S., Musiolik, J., Ranville, A., Rok, B., Sanchez, I., Stadler, M., Stasik, A., Struminska-Kutra, M. Vaishali, J., 2020. Database of social innovation initiatives in energy across 8 European countries. SONNET: EU Horizon 2020 Grant agreement no: 837498



doing so, it operates through close cooperation with local authorities to find solutions to legislative barriers.

Activities: simulating technical solutions, demonstrating technical solutions, testing how energy systems can be operated more efficiently.

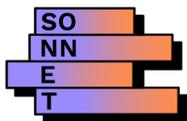
Networks/relations: According to their website, "industrial partners jointly leverage components to systems, question current practice and simulate, demonstrate and test to see what can be done differently." Moreover, the website states they work in 'close cooperation' with the local authority.

6.2 Finance and subsidy mechanisms for RE (wind and solar)

Here the reflections found that in Belgium, this field is mainly represented through subsidies for businesses and individuals through green electricity certificates, premiums or tax advantages. These green electricity certificates were abolished in 2015. From 2021 onwards, the region of Flanders initiated another premium for individuals to install PV-panels. Moreover, PV-panel owners were able to net meter until 2020, when this regulation was cancelled. However, there has been an advice from the Council of State (BE: Raad van State) to reinstate net metering. Furthermore, crowdfunding is an important source of income for energy cooperatives. SIE initiatives apply for funding also through the Flemish Agency Innovation and Entrepreneurship (BE: Vlaams Agentschap Innovatie en Ondernemen, VLAIO), similar to the Dutch RVO. In Flanders, the Flemish Energy Loan (BE: Vlaamse Energielening) allows initiatives to borrow money against the favorable interest rate of 0%.

In terms of institutional differences between Belgium and the Netherlands, the government is considered to have greatly supported RE in Belgium. Especially energy cooperatives have found much support in governmental financing and subsidy schemes, perhaps more so than in the Netherlands. In terms of policy-making, the reflections indicated that the national government seems to send mixed signals: on the one side, they stimulate RE through subsidies and financing schemes, on the other hand, they start or end policies that are damaging to prosumers (i.e. the end of the net metering policy in 2020). Lastly, the lobby of the Belgian nuclear sector forms a barrier to large-scale RE investments. Regardless of a stagnant nuclear exit discussion and lobbying efforts of the nuclear energy industry, there have been large-scale investments in wind parks over the past decade.

Two exemplary SIE-initiatives in this field are ECCONOVA and the Energy Transition Fund (NL: Energie Transitie Fonds). These are described in the boxes below.



Introduction to SIE-initiative: ECCONOVA⁸⁹

ECCONOVA is a crowdfunding platform based in Belgium, Liège, that through crowdfunding – subordinated loan mechanisms- helps project developers to find investors and accelerate energy transition and sustainable development.

Aims: ECCONOVA aims to facilitate energy transition through the development of a crowdfunding platform which makes it easier for project developers to obtain funds to finance their projects.

Organisational history: The organization was founded in 2016 by two Belgian engineers, Quentin Sizaire et Pierre-Yves Pirlot. ECCONOVA represents the first platform of sustainable investment in Belgium.

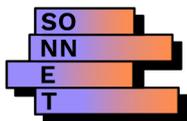
At the beginning, the platform only focused on participative funding of projects related to renewable energy and built asset with high energetic quality. Nowadays, ECCONOVA supports all kind of participatory and environmentally sustainable projects.

Strategies: The strategy adopted by the organization sees a strict financial selection of sustainable projects, developed and carried out by independent project developers. The sustainable projects that are considered more valuable are then presented on the platform. Project developers can then see their projects financed by citizens, through crowdfunding. Therefore, the goal is to select projects which benefit the planet and the people, through the selection and support of the crowdfunding platform.

Activities: Campaigns against NIMBY behaviours through communication and awareness tools; project analysis by experts; crowdfunding; impact studies and risk analysis; the projects financed by ECCONOVA include photovoltaic, co-generation, biogas and wind energy. By now, the platform supported more than 45 different projects with more than 28mln euros funds from 10.000 Belgian and Dutch citizens.

Networks/relations: ECCONOVA bases its action both on the action of investors-citizens- and on independent project developers.

⁸⁹ Description partly based on <https://www.ccimag.be/2021/06/14/ecco-nova-etend-ses-activites-pour-financer-tout-type-de-pme/> (accessed 17/6/21)



Introduction to SIE-initiative: Energie Transitie Fonds⁹⁰

The Energy Transition Fund (NL: Energie Transitie Fonds) is a financing program launched by the Directorate General. The program opens every year calls for the submission of projects and initiatives aimed at energy transition, development and innovation.

Aims: The program aims at financing and encouraging research, development and initiatives fostering energy transition.

Organisational history: The program was launched in 2017 by the Directorate General for Energy and addresses three themes: secure renewable energy production, applications of nuclear energy and the security of the transportation network. The program disposes of a budget equal to €25 millions that could subsidize projects related to energy transition, development and innovation. The grant of subsidies to projects which respect the criteria is decreed by the King together with the Council of Ministers.

Strategies: The strategy for the last open call was based on the prioritization of the first and third thematic axes previously listed. The document of the call includes legal requirement and the thematic areas concerned for the specific call, together with criteria and requirements for participants and projects to be eligible for the grant. The organization of calls is open to every “legal persons governed by Belgian Law and legal persons from other members of the European Union”.

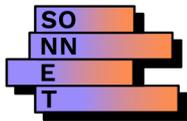
Activities: main activities involve the organization of calls; grant of subsidies.

Networks/relations: The program is mainly dependent on the government and political environment.

6.3 Framings against fossil fuel energy pathways

The reflections found that the discussion around quitting gas as an energy source has been less active in Belgium than in the Netherlands. This seems to be mainly because the physical

⁹⁰ Description partly based on <https://economie.fgov.be/fr/themes/energie/transition-energetique/fonds-de-transition> (accessed 17/6/21)



implications of gas have been less tangible and disturbing in Belgium. Whereas gas extraction in the Dutch Province of Groningen has led to earthquakes and subsequent opposition, Belgium has faced none of these difficulties and henceforth is not as pressured to retract their reliance on gas as the Netherlands. This seems to be because Belgium does not extract their own gas, but rather import it from the Netherlands, the UK and Norway⁹¹. In Flanders, 70% of the houses are heated with natural gas, and 16% with oil, but recently, the Flemish government has decided to ban oil boilers in new housing projects. Despite a lack of discussion around gas, there is a large societal debate around nuclear energy. As described in the country context of Belgium, ca. 30% of Belgium's primary energy use is nuclear.

Like in the Netherlands, framings against fossil fuels have emerged over the past decade. In 2014, a citizen-led NGO was found to collectively force the Belgian government to meet their promises they made to the climate. This initiative, Climate Case (NL: Klimaatzaak) won the case against the Kingdom of Belgium in June 2021. Moreover, recent years marked a rise in calls for divestment, i.e. by NGOs Bond Beter Leefmilieu (BBL) and the Climate Coalition (BE: Klimaatcoalitie). Opposition against fracking has been less prevalent than in the Netherlands, because there is little interest in fracking in Belgium. However, there has been some commotion against fracking when Ineos Manufacturing Group in the port of Antwerp wanted to expand their port to receive materials for fracking. The two SIE initiatives that will be described below are BBL and the Climate Coalition.

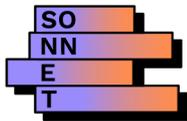
Introduction to SIE-initiative: Klimaat Coalitie [Climate Coalition]⁹²

Klimaat Coalitie [Climate Coalition] is a national non-profit organization based in Belgium, consisting of more than 80 organizations- among which citizens' movements, NGOs such as Greenpeace and Amnesty International Belgique, and health insurance funds - fighting for climate justice. It engages with policy makers and the whole society in shaping a "climate government".

Aims: Klimaat Coalitie aims to mobilize a large audience of climate-friendly and engaged actors from all sectors and put pressure on politicians for stronger actions aimed at contrasting climate change and achieve climate justice.

⁹¹ See <https://www.energids.be/nl/vraag-antwoord/waar-komen-elektriciteit-en-gas-in-belgie-vandaan/4/> (accessed 21/6/21)

⁹² Description partly based on <https://klimaatcoalitie.be/over-klimaatcoalitie> (accessed 17/6/21)



Organisational history: The Coalition was born in 2008 as a non-profit organization and since then hit the press leading striking campaigns such as “Sing for the climate”, “Bankroute” and “Claim the Climate”. The organization consists of two main organs: a board of directors and a general meeting. The former one has 13 directors representing the different actors present within the coalition. The board has the responsibility to set long-term goals and strategies, building the annual plan for the coalition. On the other hand, the General Meeting- or Assembly- is held twice a year and includes all the members of the organization. The Assembly develops a vision for the coalition and the approval of the decisions made by the Board. Moreover, a “political working group prepares positions and recommendations for Belgian policy makers”.

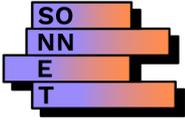
Strategies: The main strategy to fight climate change seems to be bifocal. This means that on the one side the organization engages in a mass mobilization to gain support and increase the level of pressure on policy makers. On the other, Klimaait Coalitie engages with policy makers, in the provision of recommendations and suggestions for a stronger action against climate change.

Activities: Among the actions initiated by Klimaait Coalitie one can find a mass mobilization of the whole society, from youth to scientists. However, the Coalition also engages in the analysis of policy plans and the development of policy recommendations. For instance, in September 2020, Klimaait Coalitie delivered a document at the occasion of the negotiations for the formation of a federal government, where it proposed concrete actions for the achievement of climate justice, recovering after COVID-19 pandemic.

Networks/relations: Klimaait Coalitie mainly interacts with policy makers and institutions at every political level. As a matter of fact, the organization depends on society as a whole, considering that a big part of the strategy entails a mass mobilization. Also, one must remember that the organization is a coalition, therefore extremely dependent on the support and collaboration of the nearly 80 groups composing it.

Introduction to SIE-initiative: Youth for Climate ⁹³

⁹³ Description partly based on <https://youthforclimate.be/> (accessed 17/6/21)



Youth for Climate is an action movement group which militate against current climate policies- at the local, national and international level- considered to be weak and not concrete enough to face the climate crisis.

Aims: Youth for Climate aims at mobilizing as many actors as possible, to make the climate crisis an absolute priority for everyone. Moreover, through the established “Panel for Climate and Sustainability” the organization aims to provide science-based and structural solutions and establish a channel of communication with the policy-making arena (regions, federal authorities, European institutions).

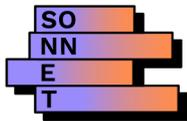
Organisational history: Youth for Climate was founded by Anuna De Wever and Kyra Gantois.

The group consists of activists and whoever wants to participate and actively engage in the fight for a “climate government”. At the end of January 2019, Youth for Climate advanced a request to the architect Vlaams Bouwmeester Leo Van Broeck the set-up of “Climate Panel” to obtain a multi-disciplinary and expert body of more than 120 specialists.

Strategies: In the first place, Youth for Climate understands that it cannot be up to youth and citizens to understand the measures functional to hindering climate change and nurturing climate justice. It is in fact a task that requires strong scientific and academic expertise and knowledge. That is why Youth for Climate engages in a structural action, involving experts and scientists for the development of scientifically based solutions to the climate crisis. In addition to that, relevance is given to the active participation of society, through co-production and deliberation activities but also leaving them the opportunity to actively participate in the organization of initiatives.

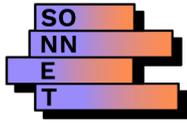
Activities: Weekly marches, citizens’ initiative and opportunities for citizens to organize their own marches and mobilizations through the website; Strong involvement of citizens and youth in the decision making and in shaping policy proposals; Publication and deliberation of science-based recommendations through the Climate Panel, which allows for a holistic and broad perspective;

Networks/relations: One can say that Youth for Climate actions are based on youth and civic participation. Also, the influence of the group is strongly dependent on the “Climate Panel” and therefore on the academic and scientific fields, which shape policy proposals and structural decisions.



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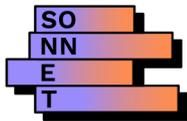
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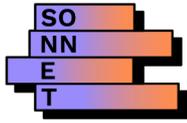
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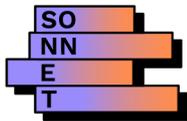
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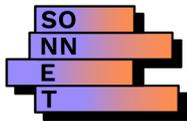
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8 APPENDIX: THREE CASE STUDY REPORTS

Each case study has the following structure:

Key insights

Introduction to the SIE-field

Timeline of the development of the SIE-field

Historical account of the emergence and development of the SIE-field

Conceptual boxes (blue boxes)

SIE-initiatives (other boxes)

Recommendations for our city partners, national and EU policymakers and SIE practitioner

List of references

Description of methodology

More detail SIE-field timeline