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SONNET – SOCIAL INNOVATION IN ENERGY TRANSITIONS

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

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 Poland

Project Coordinator: Fraunhofer ISI

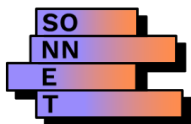
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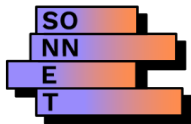
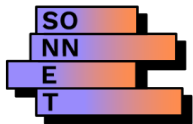


Table of Contents

1	Background	3
1.1	Short introduction into the country report.....	3
1.2	A brief reminder of concepts and research questions.....	3
1.3	Embedded, multiple case study approach.....	8
2	Introduction to SIE-fields and SIE-initiatives studied in Poland ...	10
3	Brief introduction to the Polish energy sector relevant for SIE	14
3.1	Description of national energy system & governance of energy system	14
3.2	Major historical energy policy changes.....	18
3.3	Key cultural and social developments.....	22
4	Methodology	25
4.1	Researcher's relations to the cases.....	25
4.2	Short description of methods.....	25
4.3	Description of analysis.....	26
4.4	Reflections on overall methodology.....	27
5	Summary of each case study report: Three SIE-fields and their SIE- initiatives	28
5.1	Case study 1: Framings against fossil fuel energy pathways.....	28
5.2	Case study 2: Participatory Experimentation and Incubation.....	51
5.3	Case study 3: Financing and subsidies for renewable energy in Poland	67

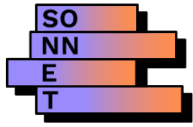


Figures

Figure 1: Summary of overall visual conceptual map.....	8
Figure 2: Illustration of SONNET's embedded, multiple case study applied, including national context.....	9
Figure 3: Electricity production in Poland as of 2019	15
Figure 4. Per capita CO ₂ emissions in Poland	16
Figure 5. Coal production in Poland	17
Figure 6. Responses (in %) to the question: "To what extent is the state of the environment in our country a cause of your concerns and worries?"	23

Tables

Table 1: Overview SIE-field, SIE and SIE-initiative examined in Poland.....	11
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1 BACKGROUND

1.1 Short introduction into the country report

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 Poland. It contains the following sections:

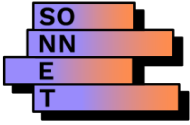
Section 1 provides some reminders of the concepts and research questions. Section 2 introduces the SIE-fields investigated in Poland. Section 3 outlines Poland's energy sector, in particular, the national energy system, the governance of the energy system, major energy policy changes, and social and cultural changes linked to the energy sector. Section 4 details the methodology of the Polish work, including reflections on researchers' relations to the case. Section 5 contains a summary of each SIE-field studied in Poland 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 Poland can be found in the appendix.

The country report builds on 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 D3.1.

1.2 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 questions linked to these foci are:

D3.2. Report on the findings on examining SIE-fields and their SIE-initiatives



- 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.

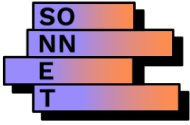
1.2.1 Emergence, development and institutionalisation of SIE and SIE-field over time

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. Below we explain key concepts which will be used:

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.

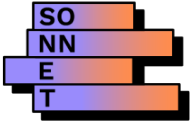
A SIE-field is an arena/space that includes a specific SIE as well as SIE-field-actors working on it and other field-actors enabling and/or impeding it. In this space, these actors take one another and their actions into account and have a shared (but not necessarily consensual) understanding of a SIE 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 regulatively, 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.

1.2.2 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.

Our 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 this '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. Below we explain key concepts which will be used:

Formal and informal institutions constitute the institutional environment. The SIE-field itself constitutes an environment (= SIE-field institutional environment) but is also nested within 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.

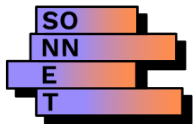
Institutions are made up of regulative, normative and cultural-cognitive elements. They are tacitly or explicitly agreed upon rules constraining or enabling activities of actors that provide stability and meaning to social life. These can be: 1) Regulative institutions: laws, rules, standards, policies, 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 (these 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.



1.2.3 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 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.

Our 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 prevent these activities to be performed. We examine why, how, when and where actors work at creating, maintaining and transforming institutions. This 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 in conducting this work.

Drawing attention to the practices rather than just the accomplishments of institutional work allows 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).

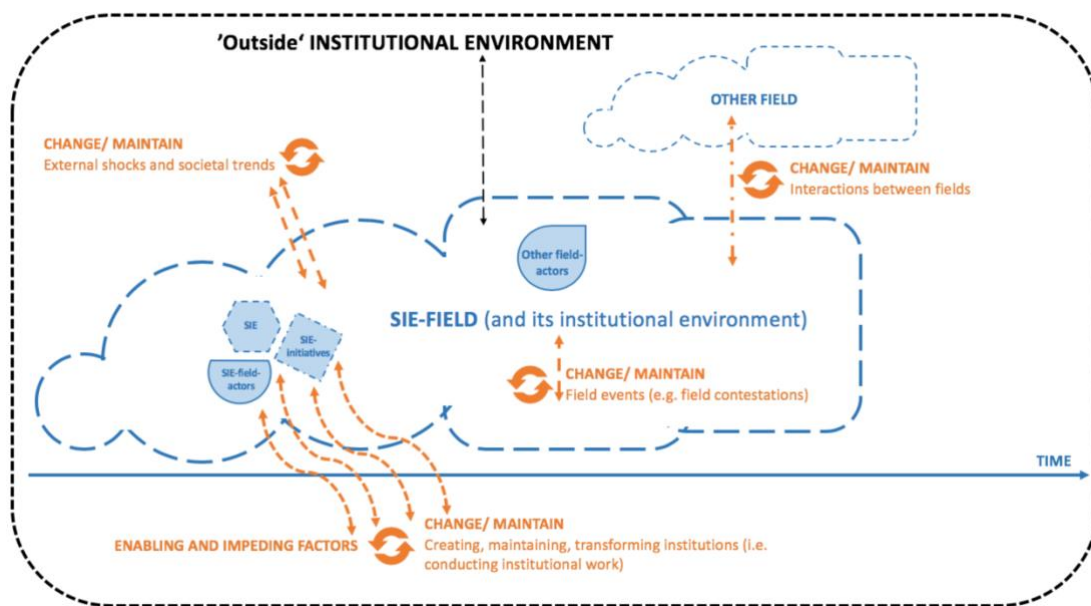
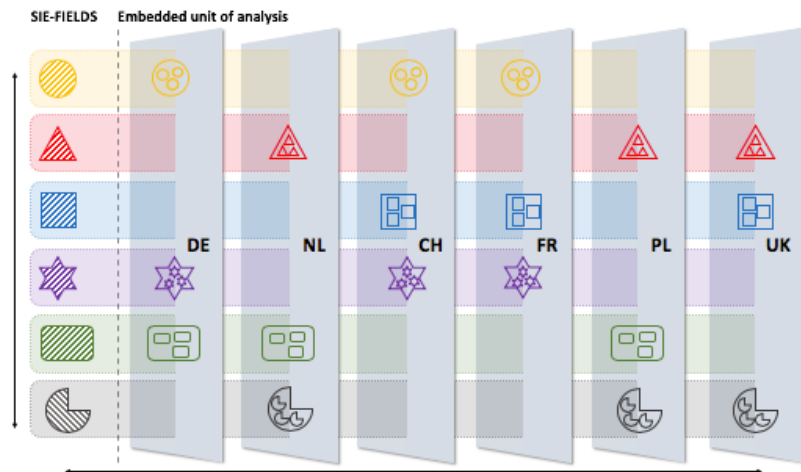


Figure 1: Summary of overall visual conceptual map

1.3 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 important factor in the development and emergence of SIE and have included a diverse mix of country contexts (FR, DE, CH, PL, UK, BE/NL). 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:

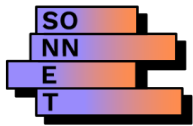


Circle: Cooperative organisation models for renewable energy; Triangle: Framings against fossil fuel energy pathways; Square: Local electricity exchange; Star: City Level competition for sustainable energy; Rectangle: Participatory incubation and experimentation; Half Moon: Financial und subsidy mechanisms for renewable energy.

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

In Poland, we have produced case study reports for the following SIE-fields: 1) Framings against fossil fuel energy pathways, 2) Participatory Experimentation and Incubation and 3) Financial und subsidy mechanisms for renewable energy.

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



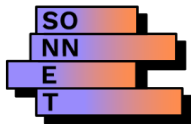
2 INTRODUCTION TO SIE-FIELDS AND SIE-INITIATIVES STUDIED IN POLAND

In this section, we briefly outline how we have defined each SIE-field and its boundaries. In addition, we introduce the SIE-initiatives and SIE linked to the SIE-fields. In Poland, we have examined the following SIE-fields:

The case study of the SIE-field 'Framings against fossil fuel energy pathways', in accordance with the SONNET case studies on this topic in the UK and the Netherlands, refers to the process of creation and development of different framings against energy pathways centred on fossil fuels. The explicit or implicit aim of the SIE-field-actors is to change dominant discourses about existing energy pathways, influence policymaking or block local fossil fuel extraction. The means used by these actors vary and can be connected to peaceful opposition, protest, lobbying or conducting social campaigns, among others.

In the SIE-field 'Framings against fossil fuel energy pathways', SIE-initiatives and other field actors interact with each other to work on, enable or impede the following SIE: pushing a framing of limited extraction of fossil fuels or coal phase-out (ideas) by opposing opening or expanding local fossil fuel extraction sites (objects) and campaigning against political or economic agendas supportive towards fossil fuel energy pathways, or lobbying for renewable energy sources (RES) development (action). The SIE-field encompasses multiple actors engaged in developing different framings against coal or natural gas extraction, such as NGOs, network organisations, protest groupings and various initiatives that work locally, regionally, nationally but also internationally. Most of the initiatives studied in this research act against lignite or hard coal extraction. In addition, protests against fracking are discussed to a lesser extent. This is because the Polish energy system is largely based on the combustion of fossil fuels with a clear dominance of coal.

The case study of the SIE-field 'Participatory experimentation and incubation', in accordance with the SONNET case studies on this topic in Germany and the Netherlands, refers to the multi-actor collaborative formats that aim to experiment with and/or test novel solutions in specific local settings. These solutions are of a socio-technical nature and can be driven by technological (e.g. innovative devices for microgrids' management) and social (e.g. novel business models for prosuming energy) developments. Some of the multi-actor collaborative formats have been referred to as pilot energy clusters, living laboratories, real-life laboratories and regulatory sandboxes. They involve the collaboration of actors from different societal spheres (e.g. state, market, science, community, third sector) at different levels of aggregation (e.g. individuals, collectives and organisations). This collaboration is geared towards experimenting with and/or testing solutions in relation to specific energy pathways (e.g. collective energy prosumerism) and usually contains an implicit or explicit component of learning. They can have a broad focus (e.g. sustainability and climate change) or narrow focus (e.g., energy efficiency and energy savings).



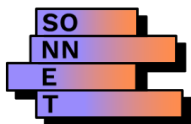
The SIE-field 'Participatory experimentation and incubation' encompasses all kinds of collaborative formats that have so far developed in Poland, aimed at multi-actor experimentation with novel energy-related solutions in real-life settings. SIE-initiatives and other field actors interact with each other to work on, enable or impede the following SIE: collaboratively searching for and testing on local ground (action) novel solutions related to energy production, consumption, storage, and/or distribution (objects) in order to learn about the most effective means of managing energy in a decentralised realm (ideas). In the Polish context, we focus on several experimental formats based on collaboration in real-life settings that have emerged in the Polish energy sector up to date: urban experiments on the topic of energy efficiency or RES development supported by innovative technologies (incl. so far the only living lab on energy in Poland), socio-technical experiments towards energy self-sufficiency led in an eco-village, as well as pilot energy clusters aimed at collective prosumption and local energy balancing.

The case study of the SIE-field 'Financing and subsidies for renewable energy', in accordance with SONNET case studies in this topic in the UK and the Netherlands, refers to the development and/or implementation of financial mechanisms through which funding or investment is made available to facilitate the activities of novel actor constellations related to renewable energy production, distribution and storage. Relevant financial mechanisms require or enable novel combinations of actors or allow actors to assume novel roles in the energy system.

In the SIE-field 'Financing and subsidies for renewable energy' we identified two main types of the SIE-initiatives: (1) traditional financial mechanisms employed for a new goal, that is, enabling newcomers to conduct investment in RES and thus engage in energy transition, and (2) innovative, market-based financial mechanisms. The former type (1), playing a key role in the discussed SIE-field, consists of traditional financial mechanisms, such as subsidies and preferential loans, that are used to develop and support new energy sources, energy efficiency, and to enable new actors to get involved in energy production. Their social innovativeness resides in the effects - creation of a more dispersed and decentralised energy system - rather than in their innovative functioning. Their prevalence in Poland results from a relative underdevelopment of the SIE-field (compared to NL and UK case studies) and, above all, still quite restricted regulatory conditions in the Polish energy sector. The latter type (2), innovative financial and investment mechanisms, is still marginal within the Polish SIE-field, but its emergence is attracting public attention and marks a growing axiological and social change.

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

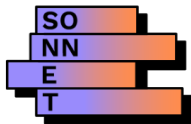
Name of SIE-field	Description of SIE-field and its boundaries	SIE definition linked to SIE-field	SIE-initiatives investigated	Other SONNET countries in which they are studied
Framings against fossil fuel	The creation and development of different framings against energy pathways centered on fossil fuels	Framings against energy pathways centred on fossil fuels	The foundation 'Development YES -	The Netherlands & UK



energy pathways	(in particular coal and natural gas). These framings contain problem descriptions and possibly envisioned alternative futures. Behind these framings can be multiple actors, such as NGOs, network organisations, protest groupings and local initiatives (all of these can be more, or less, formal) that work locally, regionally, nationally but also internationally. Their explicit or implicit aim is to change dominant (societal) discourses about existing energy pathways, influence policymaking and/ or stop local fossil fuel production.	(specifically through problem descriptions and possibly through envisioned alternative futures)	Open-Pit Mines NO' ; energy transition in the eastern part of Wielkopolska Voivodship.	
Participatory experimentation and incubation	The development of multi-actor collaborative formats that aim to experiment with and/or test novel solutions for specific energy pathways (e.g., collective energy prosumption). These solutions can be driven by novel technological (e.g. smart grid installations) and social (e.g. business models for prosuming energy) developments (but are of a socio-technical nature). A key component of these formats is that they provide a collective, physical space for experimentation and that they are time-bound. Some of the multi-actor collaborative formats have been referred to as energy clusters, living laboratories and real-life laboratories (other formats will exist). They can involve different actors from across society (research actors usually play a key role).	Multi-actor, collaborative formats that aim to experiment with and/or try out novel energy solutions in specific local settings.	eEo-village „Osada Twórców” (The Creators' Settlement) ; Zgorzelec Renewable Energy Sources Development and Energy Efficiency Cluster (ZKlaster)	Germany & the Netherlands
Financing and subsidies for RE	The development and/or implementation of financial mechanisms through which funding or investment is made available to facilitate the activities of novel actor constellations related to energy savings and energy efficiency, or the production, distribution and storage of renewable energy. Relevant financial mechanisms require or enable novel combinations of actors (e.g. cooperation between traditional utility and local community) or allow actors to assume novel roles in the energy system.	Financial mechanisms through which funding or investment is made available to facilitate the activities of novel actor constellations related to energy savings and energy efficiency, or to the production, distribution and storage of	“My Electricity” subsidy programme; Krakowska Elektrownia Społeczna (KES; Krakow Social Power Plant)	The Netherlands & UK

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3 BRIEF INTRODUCTION TO THE POLISH ENERGY SECTOR RELEVANT FOR SIE

This section briefly outlines the Polish 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 SIE. It provides a context for reading the three case study reports (see Appendix 1).

3.1 Description of national energy system & governance of energy system

The Polish energy system is largely based on fossil fuels, with a clear dominance of coal. The share of coal in electricity production in 2019 was 73.6% (4.8 percentage points less than in 2018). Yearly, Polish mines extract around 50 million tons of hard coal (as of 2019), and 61 million tons of lignite coal (as of 2017). Additionally, around 13 million tons of hard coal are imported, mainly from Russia¹. The importance of gas is marginal, yet steadily growing, with 8.8% share in the energy mix in 2019, as compared to 7.2% in 2018. In 2018, domestic extraction satisfied only about 20% of the gas demand in Poland². There is also marginal extraction of crude oil in Poland (about 4.5% of annual demand)³. In 2019, the share of RES (mostly onshore wind and, to a lesser extent, biomass) in electricity production was 15.4% (over 25 TWh). The installed RES capacity increased from 2 GW in 2010 to 9.5 GW at the end of 2019. However, this result is still too low to meet international obligations.

¹ <https://wysokienapiecie.pl/31452-gornicze-zwiazki-uslyszaly-ile-wegla-bedzie-potrzebne/> (accessed on 17.08.2020)

² <https://www.polskieradio24.pl/5/1222/Artykul/2338631,Gdzie-w-Polsce-wydobrywamy-gaz-Skad-go-importujemy> (accessed on 17.08.2021)

³ https://pl.wikipedia.org/wiki/Wydobycie_ropy_naftowej_w_Polsce (accessed on 17.08.2020)

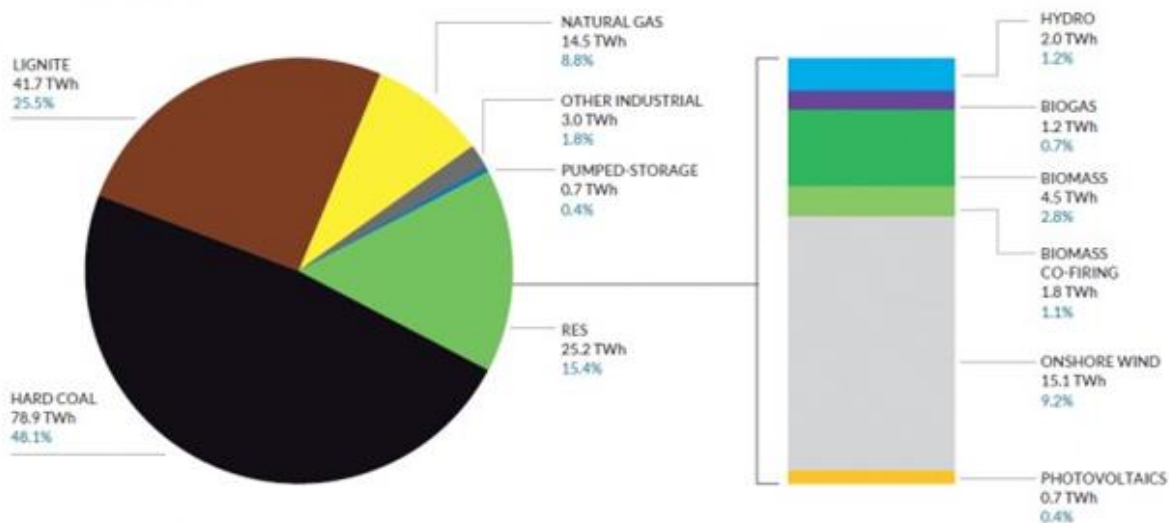


Figure 3: Electricity production in Poland as of 2019

Source: Forum Energii, <https://forum-energii.eu/en/polska-transformacja-energetyczna> (accessed on 18.08.2020)

The mining lobby has traditionally had an immense influence on political decisions, effectively persuading politicians and society of the need to maintain the mines' functioning for ensuring national energy security. Such a stance has its roots in the communist era when the vast expansion of the energy sector was rationalised as necessary to power the energy-intensive and inefficient heavy industry, a flagship of the soviet-style economy. As such, little regard was given to environmental issues and, in any case, there was virtually no space for social dissent. Even with the political and economic turn in 1989, the governmental agendas focused on economic growth, thereby marginalising environmental issues.

The project of building the first Polish nuclear power plant was abandoned in 1989, leaving the coal power plants almost the sole source of electricity. In negotiations that started the process of political and socio-economic transformations in Poland, a dedicated working group focused on ecology was initiated. The group developed recommendations for energy decentralisation and support for small, renewable energy producers. However, due to the challenges of the economic and political crisis of the early 1990s, these recommendations were not implemented. At the same time, in this period, Poland's CO2 emissions dropped significantly: from 464 mln tonnes in 1987, to 376 mln tonnes in 1990, and a record low of 306 mln tonnes in 2003⁴. This decrease was due to the collapse of heavy industry and coal mining, and rise of energy efficiency, rather than explicit energy and climate policies.

⁴ <https://ourworldindata.org/co2-emissions> (accessed on 22.04.2021)

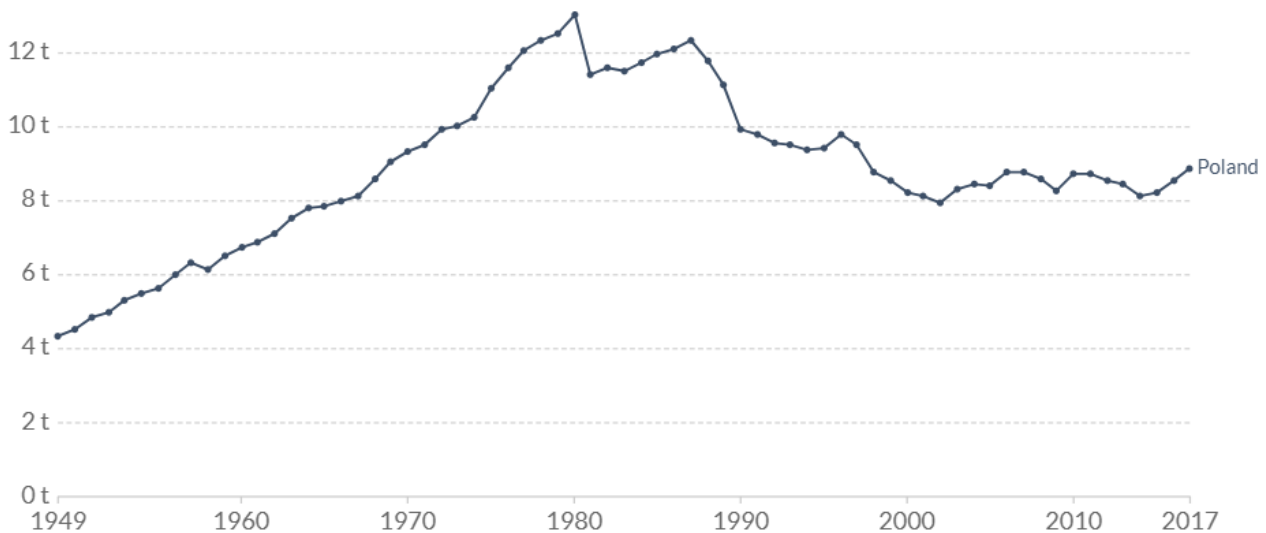
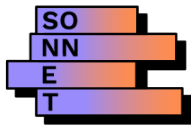


Figure 4. Per capita CO₂ emissions in Poland

Source: <https://ourworldindata.org/co2/country/poland> (accessed on 22.04.2021)

When the communist regime in Poland fell in 1989, there were over 400.000 people working in the Polish mining industry. However, the following years brought a shrinking demand for coal, as due to the economic transition much of the heavy industry shut down, and energy efficiency was steadily growing. Therefore, it was necessary to introduce structural changes in the Polish mining sector. This process progressed in stages, but the most significant changes took place in 1998-2002 when around 100.000 coal miners quit their jobs, receiving large compensation payments. As a consequence, current employment in hard coal mining is 83.300 (as of 2019), while Polish lignite mines employ almost 9.000 (as of 2017)⁵.

Despite the significant reduction in employment, the Polish mining sector remained in a poor financial condition. According to Tomasz Rogala, CEO of PGG SA (a Polish joint-stock company, the largest mining company in Europe and the largest hard coal producer in the EU), the current slump of the industry is mainly due to rising prices of CO₂ emission allowances⁶. Over the last few years, they have increased from EUR 5 per tonne in 2013, to over EUR 40 (as of March 2021). Also, the Covid-19 pandemic and the relatively warm winter have contributed to a reduction in demand for electricity. As a result, there are currently around 20 million tonnes of coal stored on the heaps, for which there is a shortage of buyers.

Besides, the industry also faces serious internal problems. First, the costs of extraction in Polish mines are rising. After a century of intensive hard coal mining, Polish miners are now going down to an average depth of 750 metres. As a result, it is becoming increasingly difficult to ventilate, dehydrate, de-methane and fireproof corridors, as well as to transport extracted coal, workers and

⁵ <https://nettg.pl/news/167418/gornictwo-w-kopalniach-wegla-kamiennego-zatrudnienie-stoi-w-miejscu> (accessed on 17.08.2020)

⁶ <https://www.eecpoland.eu/2020/pl/panel/4050.html#retransmisja> (accessed on 4.09.2020)

equipment⁷. Second, the high labour costs are a significant financial burden for the industry. It is caused by overstaffing, extensive social benefits, relatively high wages and the existence of numerous trade unions. In 2014, the over-employment in three state-owned mining companies exceeded 20.000 jobs. As a consequence, the cost of employees in the hard coal mining industry is three times higher than in other branches of heavy industry in Poland⁸.

As a result, already in the middle of 2020, PGG made a loss of approximately PLN 550 million (EUR 122 million), and its revenue fell by PLN 2.7 billion (EUR 0.6 billion)⁹. The unprofitable mines cover their expenses with loans and subsidies from the state budget. Subsidies allocated to the conventional energy sector in the period 1990–2016 amounted to PLN 230 billion (EUR 52 billion). It is estimated that external costs (e.g. health and environmental costs) reached even ten times this amount¹⁰. Polish hard coal does not stand up to the competition with imported coal, which is not only cheaper, but also has a higher energy density and less contamination. In addition, further decline in demand for coal in the Polish economy is expected. Supposedly, only 15 million tonnes of coal will be required in 2035¹¹.



Figure 5. Coal production in Poland

Source: <https://ourworldindata.org/fossil-fuels> (accessed on 22.04.2021)

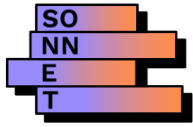
⁷ <https://wysokienapiecie.pl/1984-na-weglu-swiat-sie-nie-konczy-zwlaszcza-na-slasku/> (accessed on 10.07.2020)

⁸ <https://businessinsider.com.pl/firmy/wynagrodzenia-to-polowa-kosztow-kopalni-oto-gdzie-jeszcze-podwyzki-decyduja-o/qvzey46> (accessed on 29.07.2020)

⁹ <https://wysokienapiecie.pl/31038-jest-wreszcie-plan-restrukturyzacji-polskiej-grupy-gorniczej/> (accessed on 29.07.2020)

¹⁰ Webinar with Dr Andrzej Kassenberg, Instytut na rzecz Ekorozwoju, organised by the Workshop for All Beings, 14.05.2020.

¹¹ <https://wysokienapiecie.pl/31452-gornicze-zwiazki-uslyszaly-ile-wegla-bedzie-potrzebne/> (accessed on 17.08.2020)



For around twenty years following the 1989 transformation, official, political and legal actions towards energy transformation and decarbonisation were almost totally absent. For years, energy was publicly and politically perceived as a key national security issue, hence public debate focused mainly on the problem of energy dependence and fuel import (namely, natural gas from Russia). The funds for renewable energy were virtually inaccessible. The RES topic re-emerged in a discourse along with Polish efforts towards access to European Union, alongside regulations focused on the protection of the environment, including air quality. Since joining the EU in 2004, Poland has had to follow the EU policies, which put an increasing pressure to move away from fossil fuels in the national energy mix.

However, subsequent Polish governments have enacted these policies only reluctantly, and have often stalled ambitious EU environmental strategies. The EU climate policy has been presented as a threat to Poland's economic and political interests. The government has been very reluctant to set a coal phase-out date and to present a clearly defined energy transition strategy for the coming decades. Instead, for a remarkably long time, politicians have tried to convince Poles that the Polish mining industry is safe and publicly declared that: *"Coal is Poland's greatest treasure (...) as long as I hold the office, I will not allow anyone to kill the Polish mining industry"* (President Andrzej Duda in 2018¹²), *"Miners! We need more coal!"* (Minister of Energy Krzysztof Tchórzewski in 2018), or *"Polish coal and mining industry has a future. We do not have to say today that it is an industry that is inevitably heading to the end"* (Minister of State Assets Jacek Sasin in 2019)¹³.

Nevertheless, as a result of growing pressure from the EU, financial markets and citizens, the government has recently embarked on a more ambitious path towards decarbonising the Polish economy. According to the updated 'Energy Policy of Poland until 2040', by 2030, the share of RES in gross final energy consumption will be at least 23% (in 2019 it reached 12,18%), and the share of coal in electricity generation will not exceed 56%. Moreover, trade unions reached an agreement with the government, according to which the last coal mine owned by PGG SA will be closed in 2049¹⁴.

3.2 Major historical energy policy changes

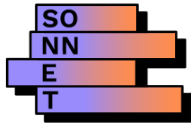
The difficult situation in the Polish coal industry and the current energy policies of European financial and political institutions clearly indicate the direction of further changes in the Polish energy sector. As the 'Poland's National Energy and Climate Plan for the years 2021-2030' indicates, one of the priority strategic goals in Poland is to enable the transition towards the decentralised energy sector based on increased energy production from renewable energy sources¹⁵. The

¹² <https://www.rmfm24.pl/ekonomia/news-andrzej-duda-wegiel-to-najwiekszy-skarb-polski-nie-pozwole-z,nId,2714293> (accessed on 29.07.2020)

¹³ <https://www.green-news.pl/618-jacek-sasin-czas-wegla-nie-minal> (accessed on 29.07.2020)

¹⁴ <https://www.slaskibiznes.pl/wiadomosci,sa-daty-zamkniecia-kopalni-jest-porozumienie-rzadu-i-zwiazkowcow,wia5-1-3677.html> (accessed on 28.09.2020)

¹⁵ <https://www.gov.pl/web/klimat/national-energy-and-climate-plan-for-the-years-2021-2030> (accessed on 15.12.2020)



development of dispersed energy is meant to contribute to increased energy security through greater diversification of energy sources. Distributed sources also provide better possibilities of energy production control. In addition, proximity of production to energy consumers (within 110 kV distribution grids) may in the long term reduce the need for maintenance and construction of cost-intensive high-voltage networks. The development of distributed energy systems using intelligent technologies and low-carbon solutions, however, requires strategic government decisions (Ministry of Energy, 2017).

As already mentioned, to a large extent, changes in the Polish energy system occur under the influence of a changing external context, including the financial sector. Already in 2013, the European Bank for Reconstruction and Development, as well as the European Investment Bank (EIB) introduced some important modifications in their energy policies. Adopting a strict Emissions Performance Standard made the EIB the first international financial institution to effectively end financing for coal and lignite power generation¹⁶. In February 2018, the 'Dirty business' briefing was released that revealed companies insuring both existing infrastructure and new projects aimed at expanding Polish coal mines or coal-fired power plants. The briefing revealed 21 underwriting contracts that revealed the role of non-Polish European insurers in supporting the Polish coal industry. These insurers have operated in countries with high public awareness about the negative environmental impacts of the coal industry. It brought about much controversy and has led to some declarations from the disclosed companies. In 2019, several European banks and insurers introduced new restrictions on financing coal investments or resigned from insuring lignite and hard coal mines in Poland. Ultimately, the two largest Polish banks - PKO BP S.A. and Pekao S.A. - decided to withdraw from the investment in a new power plant unit Ostrołęka C that was supposed to be the last coal power plant construction in Europe. As a result, in establishing energy laws, legislators cannot ignore the increasingly unfavourable financial conditions that make coal projects unfeasible.

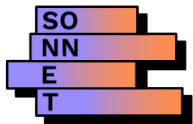
Apart from European financial institutions, the European Union's climate and energy policies have had a very important influence on shaping Poland's national energy strategy. Among the most important EU regulations, a package of measures was adopted in 2009 which set three main objectives by 2020: 20% cut in greenhouse gas emissions (from 1990 levels), 20% of EU energy from renewables, and 20% improvement in energy efficiency (the so-called '3 x 20% package')¹⁷. It committed Poland to increase to 15% share of energy from RES in gross final energy consumption by 2020, among others.

Also, the Paris Agreement adopted in 2016 has been of key importance for the Polish energy policy. The long-term goal of this agreement is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels¹⁸. During the 24th United Nations Climate Change Conference that was held in Poland in December 2018, the so-called 'Katowice Climate Package implementing the Paris

¹⁶ <https://www.eib.org/en/press/all/2019-313-eu-bank-launches-ambitious-new-climate-strategy-and-energy-lending-policy> (accessed on 29.07.2020)

¹⁷ https://ec.europa.eu/clima/policies/strategies/2020_en (accessed on 9.11.2020)

¹⁸ <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (accessed on 9.11.2020)



Agreement' was signed. It emphasised that the transformation resulting from the Paris Agreement must be carried out in a fair and solidarity-based manner (Ministry of Climate and Environment, 2021).

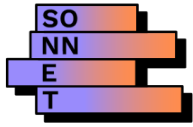
Another important package of directives and regulations is the so-called 'Winter Package', in other words, 'Clean energy for all Europeans, or how to unleash Europe's growth potential'. It was completed in 2019 at the EU forum, setting targets of reducing CO2 emissions by 40% compared with 1990 levels, and reaching a 27% share of energy from renewable sources in final energy consumption in 2030. Importantly, consumers are to play a key role in the energy transition process. The new legislation is intended to give citizens more control over their energy choices and more benefits from participating in energy markets (Ministry of Energy, 2017).

Finally, the European Green Deal strategy presented in 2019 aims to achieve climate neutrality in the EU by 2050. Also, in December 2020, the EU agreed on tougher climate goals of cutting carbon emissions to 55% of 1990 levels within a decade. Poland supported this objective but negotiated special conditions due to the difficult starting point of the Polish transformation, and the high social and economic costs it entails. According to the information provided in the draft 'Energy Policy of Poland until 2040', EUR 45 billions of EU and national funds will be allocated for the national energy and climate change transformation by 2030 (Ministry of Climate and Environment, 2021).

However, despite growing external pressure (as well as internal pressure from anti-fossil fuels social movements), for a long time there had been a lack of appropriate regulations to enable the development of the dispersed energy system based on RES in Poland. Eventually, in February 2015 the government passed the RES Act. It was created to bring Polish law closer to the existing law of other Member States in the field of energy, and to help achieve the climate goals set by the EU. Importantly, the RES Act introduced the definition of a prosumer, and established feed-in tariffs for prosumers. However, the following year, after parliamentary elections had been won by anti-environmental populists, the ruling party replaced the feed-in tariff with a net-metering system. Moreover, in June 2016, the government introduced a law on investments in wind energy, the so-called "Anti-wind turbines Act" that made obtaining permission for setting up a wind farm very difficult.

The government hindered any further RES development until 2018 when electricity prices rose dramatically due to increasing prices for CO2 emissions. In that year, prices increased from EUR 8 to EUR 25 per tonne. As a result, Poland had the highest wholesale electricity prices compared to neighbouring countries. In 2018 alone, the prices rose by around 50%¹⁹. Additionally, there has been a huge problem with polluted air, caused mainly by using coal for heating in many Polish households. Still, according to some estimates, 87% of coal used in households across the European Union is burned in Poland (as of February 2020). As a result, in some Polish towns, the concentration of certain harmful particles may exceed

¹⁹ <https://www.rp.pl/Energetyka/304149927-Rosnacych-cen-pradu--nie-da-sie-zatrzymac.html> (accessed on 29.07.2020)



the norms even by 800%. In this context, in response to the growing need to create mechanisms of subsidies for photovoltaic (PV) installations in households, the government initiated the dedicated program 'My Electricity' in August 2018. It turned out to be a great success: at the end of 2019 the installed PV capacity reached 1.5 GW²⁰, resulting in 3.5 times more PV installations than in the previous year. Since 2014, the capacity of PV installations in Poland has increased by as much as 9000%²¹.

Regarding the dispersed energy system's development, the following EU directives have been of great importance:

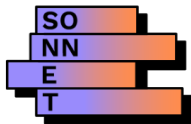
- 1) Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (Renewable Energy Directive II), which sets targets for the consumption of renewable energy sources from 2021 to 2030
- 2) Directive 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity.

These directives introduce concepts such as Renewable Energy Communities and Citizens Energy Communities. Members of these communities cooperate in energy production, consumption, distribution, storage and/or sale of energy from renewable sources. Their main objective is to provide environmental, economic and/or social benefits to the local communities. Accordingly, in the EU, building energy self-sufficiency at local levels is expected to take place on the basis of energy communities (Soeiro & Dias, 2020) that in Poland have so far materialised as pilot energy clusters (Jasiński et al., 2021). The definition of an energy cluster was introduced into the Polish legislation by the Act of 22 June 2016 amending the Act on RES.

The first Polish strategic document that mentioned the need to take action towards a low-carbon economy was the 'Strategy for Responsible Development' adopted in 2017. Energy was identified as one of the key issues - the so-called horizontal thematic areas. Although large-scale energy based on coal and gas was still prioritised in this document, it was also noted that the transition towards a low-carbon economy would require a complete restructuring of the energy system and development of new business models. This was the first strategic national document that pointed to the need for the development of energy clusters, which, in the perspective of 2030, would support ensuring the stability of energy supply and gradually, in accordance with EU objectives, increase the share of RES in the energy mix. The Strategy for Responsible Development formed the basis for the 'Poland's Energy Policy until 2040' (Ministry of Climate and Environment, 2021) - the primary national document that sets the framework for the energy transition. It was adopted in January 2021, 13 years after the previous strategic document on the Polish energy sector had been published. This document already emphasises much more clearly the need to develop a distributed energy system based on energy communities, i.e. energy clusters and energy cooperatives. By 2030, it is expected that 300 energy self-sufficient areas based on the energy cluster model will be

²⁰ <https://forum-energii.eu/en/polska-transformacja-energetyczna> (accessed on 29.07.2020)

²¹ <https://www.teraz-srodowisko.pl/aktualnosci/mamy-jklimat-kampania-ministerstwo-klimatu-nfosigw-8774.html> (accessed on 29.07.2020)



established in Poland, becoming fields for further experimentation and creation of innovative solutions (Ministry of Climate and Environment, 2021).

3.3 Key cultural and social developments

The environmental awareness of Poles has developed unevenly in recent decades. In the late 1980s and early 1990s, many Poles were concerned about the state of the environment, which became highly polluted during the communist era. Moreover, the Chernobyl disaster made more people aware of the potentially dramatic consequences of industry on human health (Szulecka and Szulecki, 2019). According to the Public Opinion Research Centre CBOS, in 1993 as many as 78% of Poles expressed concerns about the state of the natural environment. Over time, however, this percentage declined, as people became more preoccupied with the problems of early capitalism. Consequently, in 2006, only 40% of Poles indicated that they were concerned about ecological problems²².

The situation began to change after about a decade with emerging international climate movements and the much-publicised problem of air pollution by grassroots initiatives known as Smog Alarms. The 2016 CBOS survey found that 68% of respondents perceived the issue of smog as very important. Moreover, nearly three-fourths of respondents estimated that environmental threats related to global warming and carbon dioxide emissions are a very important problem, while 17% of respondents considered them to be a 'medium serious problem'. Only 5% of Poles downplayed this issue, considering it a "minor problem"²³.

According to the 2018 CBOS survey, 69% of Polish largest cities' inhabitants had concerns about the state of the natural environment, but only 20% of rural residents expressed such worries. Those over 65 and under 35 were similarly unconcerned, but this changed just two years later. In 2020, a European Climate Foundation survey showed that as many as 80% of the oldest respondents and 51% of the youngest agreed that climate change could bring disaster. This change in attitudes could be linked to observed disturbing weather and climate phenomena, such as increasingly warm winters and irregular rainfall²⁴.

²² <https://krytykapolityczna.pl/wp-content/uploads/2021/03/raport-nie-nasza-wina.pdf> (accessed on 22.04.2021)

²³ https://www.cbos.pl/SPISKOM.POL/2016/K_032_16.PDF (accessed on 21.04.2021)

²⁴ <https://krytykapolityczna.pl/wp-content/uploads/2021/03/raport-nie-nasza-wina.pdf> (accessed on 22.04.2021)

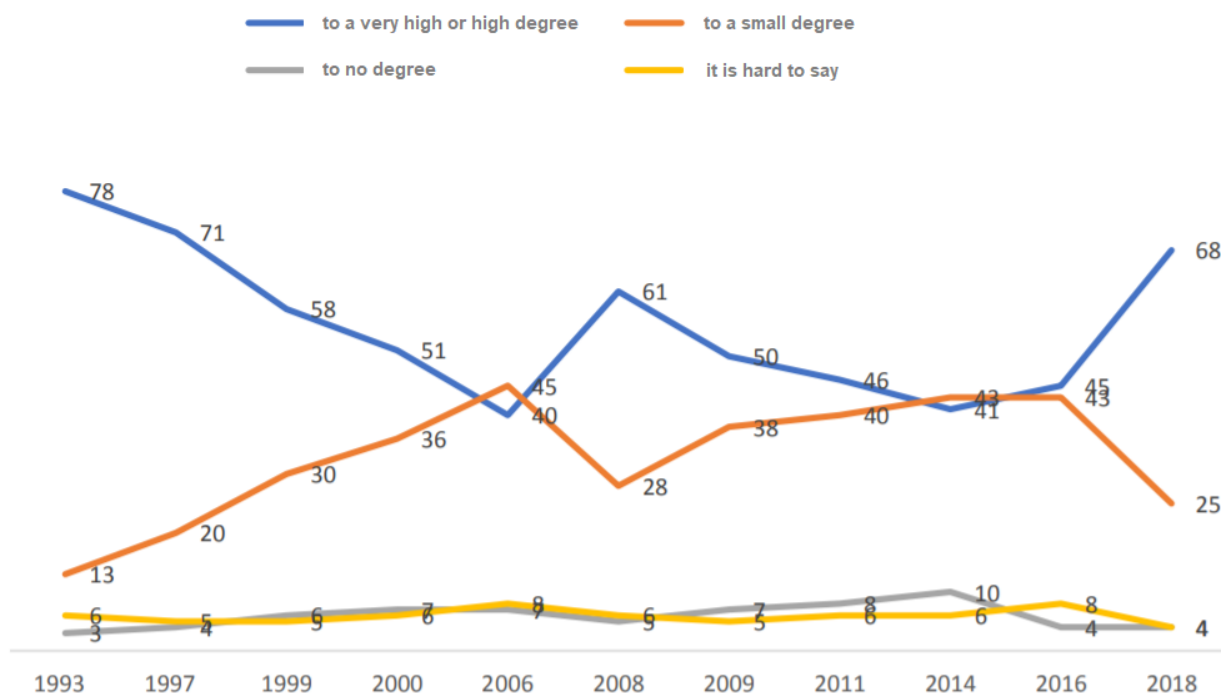
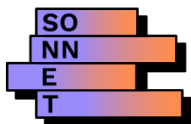


Figure 6. Responses (in %) to the question: "To what extent is the state of the environment in our country a cause of your concerns and worries?"

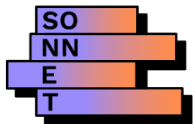
Source: Based on <https://krytykapolityczna.pl/wp-content/uploads/2021/03/raport-nie-nasza-wina.pdf> and CBOS 2018 survey data (accessed on 22.04.2021)

According to the results of the European Social Survey "European Attitudes to Climate Change and Energy"²⁵, in 2017 the vast majority (92.6%) of Polish respondents stated that the world's climate was probably, or definitely, changing. For 89.6% of them, climate change was at least partly caused by human activity, and 70.4% respondents stated that the consequences of climate change would be bad. At the same time, however, Polish respondents expressed relatively little concern about the future: only 13% of them were very/extremely worried about climate change, 9% respondents were very/extremely worried about energy reliability, and 34% respondents very/extremely worried about energy affordability. However, the latter changed just one year later, when electricity prices rose dramatically due to rising CO2 emission allowance prices. This has led to growing social unrest about electricity prices.

In connection with the growing environmental and climate awareness, an increasing support for decarbonisation and the development of RES could be observed. In the 2016 CBOS survey²⁶, the level of public trust in various energy sources was analysed in terms of their safety (understood as the level of risk to people, environment and climate) and prospectiveness (understood as chances for ensuring national energy security). The study showed that 80% of respondents indicated RES as the

²⁵ https://www.europeansocialsurvey.org/docs/findings/ESS8_toplines_issue_9_climatechange.pdf (accessed on 21.04.2021)

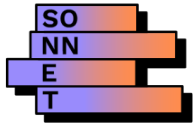
²⁶ <https://www.cbos.pl/PL/publikacje/diagnozy/034.pdf> (accessed on 21.04.2021)



most trustworthy in terms of both factors. At the same time, coal received significantly lower ratings: in terms of safety, around 50%, and in terms of prospectiveness, around 30%. Compared to the 2015 CBOS survey, trust in coal fell in both dimensions by 10 percentage points. In contrast, confidence in RES remained at the same level. However, when it was emphasised in the survey that RES development would make the natural environment less polluted and would increase the citizens' influence on energy-related decisions, RES was positively assessed by 89% of respondents. On the other hand, when it was reminded that Poland had large coal resources, 63% of respondents supported producing energy from coal.

Finally, according to the study from 2018, public support for renewable energy reached even higher levels: 95% of Poles supported the development of RES, as compared to 35% of respondents being supportive for producing energy from coal²⁷.

²⁷ <https://energiaodnowa.wwf.pl/pl/2018/03/26/wiekszosc-polek-i-polakow-popiera-proklimatyczne-dzialania-unii-europejskiej-wyniki-badan> (accessed on 21.04.2021)



4 METHODOLOGY

4.1 Researcher's relations to the cases

The three researchers investigating the three embedded case studies are not formally related to the fields being investigated, i.e. they are not members of any of the SIE-initiatives. However, it is worth acknowledging personal beliefs and attitudes of the researchers involved, who are supportive to the energy transition and decentralisation, as well as to the democratisation of relations within the energy sector. Hence, the normative standpoint of researchers is not neutral. Nevertheless, all three researchers made an effort to maintain emotional and cognitive distance to the investigated fields through keeping an analytical scope and focus on historical narrative reconstruction.

Prior to the study, authors' knowledge of the field was narrow, however Agata Stasik has simultaneously conducted a study on crowdfunding mechanisms in energy, while Alicja Dańkowska participated in two research projects on sustainable energy transition in two coal-dependent regions in Poland. In their private life, they took part in marches organised by, e.g. Earth Strike, signed civic petitions related to the topic of energy democratisation, and have followed Facebook profiles of several SIE-initiatives. They had no prior relations with interviewees and SIE-initiatives under investigation. Regardless of time constraints, we believe that we managed to cover all three SIE-field case studies adequately.

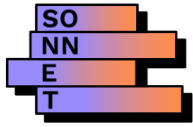
4.2 Short description of methods

Due to Covid-19 related restrictions, the emphasis in research process was put on online/phone interviews, document analysis and participation in events remotely. The exploratory nature of the research conditioned interviewees and documents' sampling. Time constraints impacted the choice of the events researchers participated in.

The case study of the SIE-field 'Framings against fossil fuel energy pathways' was conducted between May and September 2020. The case study of the SIE-field 'Participatory experimentation and incubation' was conducted between November 2020 and February 2021. The case study of the SIE-field 'Financing and subsidies for renewable energy' was conducted between December 2020 and February 2021.

4.2.1 Document review

We reviewed official and grey documents related to the field, i.e. legal acts' commentaries, reports issued by the SIE-field-actors, and examples of press coverage of key field events. We also searched for documents our interviewees had referred to, to build a context for interviews' analysis. Finally, we reviewed



documents, presentations and reports discussed during the field events we remotely participated in.

4.2.2 In-depth interviews

In order to find appropriate persons to conduct the interviews with, we used snowball sampling, asking interviewees for further recommendations. We reached out to SIE-initiatives representatives, who agreed to talk to us, and to SIE-field-actors who had an overreaching view of the given field. We adjusted the choice of interviewees to the specificity of each SIE-field, e.g. in the 'Framings against fossil fuel energy pathways' case study we interviewed activists and various NGOs representatives, whereas in the 'Financing and subsidies for renewable energy' case we talked to independent experts, think-tank members and journalists specialised in the field. In each case, we interviewed relevant public institutions' representatives (e.g. civil servants at ministries), due to the fact that energy sector in Poland is highly regulated, hence governmental and administrative perspectives are key for understanding stories of each SIE-field development.

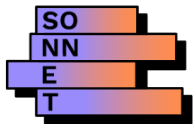
For the case study of the SIE-field 'Framings against fossil fuel energy pathways' 9 interviews were conducted. For the case study of the SIE-field 'Participatory experimentation and incubation' 7 interviews were conducted. For the case study of the SIE-field 'Financing and subsidies for renewable energy' 6 interviews were conducted.

4.2.3 Participant observation

As far as participatory observation is concerned, due to the Covid-19 pandemic, we could only conduct online observation, which has its obvious limitations. The advantage was the possibility to participate in webinars on very different topics, regardless of their location. We managed to participate in several hybrid- and online sector conferences and webinars, which provided rich materials for analysis for each of the case studies. We found presentations at conferences and webinars a valuable source for case studies' overview.

4.3 Description of analysis

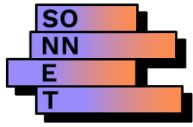
We analysed collected materials in reference to the related research questions and the provided codes. We focused on understanding the given SIE-field 'story' through reconstruction of historical narratives. We made an effort to combine various SIE-field-actors' perspectives, trying to understand their positions and interests. Considering specific definitions of SIE-fields and their boundaries, and the developing stage of RES sector in Poland, we kept referring to key SONNET concepts, in order to avoid overlaps and definitional unclarities. For instance, the analysis of the SIE-field 'Financing and subsidies for renewable energy' was focused on financial mechanisms rather than practices and business models.



4.4 Reflections on overall methodology

Inquiring and writing the three case studies was an exploratory work for the authors. The SIE-fields descriptions and focus led their choices regarding types of sources to study, resulting in mainly documents and reports and interviews. The shape of cases and their insights resulted from a purposefully tailored information gathering. As a consequence, the three cases present a particular SONNET's perspective on the fields under investigation.

The first step in approaching each case study was an extended desk research that led to identification of the political, cultural, institutional and legal boundaries of the fields, as well as of the SIE-initiatives for further study. Desk research also partially informed the choice of interviewees. Furthermore, through snowball sampling, the pool of interviewees was extended. Some of the documents analysed were recommended and/or referred to by interviewees. Triangulation of methods allowed for sufficiently complex depiction of the investigated SIE-fields, including perspectives from official (and legal) documents, press and social media coverage, as well as the experts' and actors' views gathered in interviews.



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 Poland can be found in the 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).

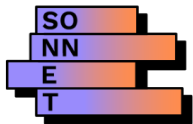
5.1 Case study 1: Framings against fossil fuel energy pathways

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

5.1.1.1 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?

This SIE-field encompasses multiple **SIE-field-actors** (actors who work on SIE) engaged in developing different framings against coal or natural gas extraction, such as NGOs, network organisations, protest groups and various initiatives that work locally, regionally, nationally but also internationally. Their explicit or implicit aim is to change dominant discourses about existing energy pathways, influence policymaking or block local fossil fuel extraction (mainly lignite and hard coal, but also shale gas). The means used by these actors vary and can be connected to peaceful opposition, protest, lobbying or conducting social campaigns, among others. However, throughout the last decades, different actors have been active in the field and their roles have changed over time.

The Polish environmental movement emerged in the socialist 1980s, focusing on two main issues: the alarming state of the environment and social opposition against the Zarnowiec nuclear plant that followed the Chernobyl catastrophe. The first independent environmental organisations in Poland were the **Polish Ecological Club**, and the **Freedom and Peace Movement**. However, with the political transition in 1989, environmental and anti-nuclear protests largely ceased, giving way to a turbulent process of creating new democratic and free-market structures (Szulecka and Szulecki, 2019). As a result, in the 1990s and 2000s the environmental movement in Poland was rather weak, with just a few organisations active in the field. These initiatives could be divided into three main categories: 1) early expert ecological organisations with rather hierarchical structures (such as **Workshop for All Beings** or **EKO-Unia**), 2) formal coalitions of organisations for sustainable development and environmental protection (such as **Climate Coalition** or **Polish Green Network**); 3) Polish offices of international environmental NGOs (such as



WWF or Greenpeace). Overall, these initiatives had little to no success in engaging citizens in their activities.

The core story of the SIE-field's development ranges from 2009, when the first local referendum against expanding a lignite mine took place, to 2020, when growing numbers of people joined mass marches, demanding a coal phase-out date to be decided on by the government to enable a socially just transition of the Polish energy system. This time period has been divided into five main phases which show how the SIE-field-actors' roles have changed over time.

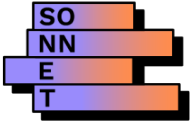
Phase 1 - 'Mobilisation of local communities against opening new open-pit mines and shale gas extraction' covers the years 2009-2014 when local communities mobilised in several locations across Poland, opposing either lignite mines' expansion, or plans of fracking shale gas by multinational companies. In the case of protests against mining lignite, the national **Coalition 'Development YES - Open-Pit Mines NO'** offered critical support to local groups of protesters. In the case of mobilisation against shale gas exploration, the most known anti-fracking protest was held by inhabitants of **Zurawłów**, starting in 2013.

Phase 2 - 'Anti-smog campaigning and lobbying for RES' covers the years 2012-2019 when **Smog Alarms** developed in various Polish towns, creating a bottom-up social movement for improving air quality and moving away from burning solid fuels in households. RES was presented as a cleaner alternative to coal by some other organisations: EKO-Unia or **Poland's Green Party**.

Phase 3 - 'Conducting campaigns against financing and underwriting of the Polish coal industry' covers the years 2013-2020 when the **Foundation 'Development YES - Open-Pit Mines NO'** recognised that in order to become more effective in opposing fossil fuel extraction, more direct pressure must be exerted on banks and insurance companies operating in the energy sector. Later, more initiatives joined these efforts, which led, among others, to the decision by the biggest Polish insurers to withdraw from underwriting and reinsuring the new Ostrołęka C power plant.

Phase 4 - 'Developing a social climate movement demanding to phase out coal' covers the years 2015-2020 when social movements started to emerge. First online and later in various locations across the whole country, strikes were organised that mobilised Polish people against conventional energy pathways on an unprecedented scale. The first attempt to develop mass action to influence political or investment decisions related to the fossil fuel industry was made by the **Action Democracy Foundation**. It prepared the ground for other initiatives that in time engaged growing numbers of supporters: **Camp for Climate**, **Silesian Climate Movement** or **Youth Climate Strike**.

Phase 5 - 'Striving for a just transition of the coal-dependent regions' covers the years 2017-2020, when several Polish coal-dependent regions started to work on their local strategies of a just energy transition. In order to reinforce this process, WWF initiated the **Forum of Mayors** aimed at empowering mayors from towns in coal regions and lobbying for public consultation of Territorial Just Transition Plans. Among the most important regions are **Eastern Wielkopolska** and **Silesia**, where one of the first protests against hard coal mining was initiated by local activists in **Imielin** in 2017.

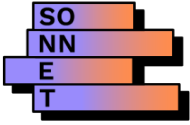


Other SIE-field-actors (who enable and/or impede SIE) are in particular the **Polish government** and **state-owned energy companies** (primarily PGE SA and PGG SA). These actors sought to maintain the status quo of a centralised energy sector based on fossil fuels. This only started to change recently, when the largest energy companies presented their new RES-based development strategies, transferring their coal assets to the planned new state entity, the National Energy Security Agency. In addition, the most significant actors in each phase of the SIE-field's development are as follows: **fracking multinational companies** (e.g. Chevron) and **international allies** (e.g. EU bodies or foreign NGOs) that supported local communities in Phase 1; **government policies** inhibiting RES development and **EU policies** requiring higher standards of clean air in Phase 2; **CEE Bankwatch** - an international organisation that was a leader of a lobbying coalition that enforced green modifications in energy policies of the European Bank for Reconstruction and Development, as well as the European Investment Bank, which has triggered significant changes in the European financial market - as a result, **banks, insurance and reinsurance companies** withdrew from the Polish coal projects in Phase 3; **international climate strike movements** (such as Fridays for Future) which have inspired Polish citizens and activists to develop their own mass resistance in Phase 4; the **EU mechanisms** (such as the Platform on Coal Regions in Transition and the Just Transition Fund) established by the European Commission to support various bottom-up initiatives in coal-dependent regions in Phase 5.

5.1.1.2 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?

The story of the SIE-field's development shows that for years, Polish ecological organisations operated in a very traditional way. They focused primarily on issuing expert reports or monitoring administrative paths of legal acts and decisions facilitating environmentally harmful investments. However, for most people, this level of activity is not available. To fill this gap, broad ecological movements (e.g. Youth Climate Strike, Earth Strike, Silesian Climate Movement) developed to give people a sense of agency. As one of the interviewees observed, from a socio-psychological point of view, going out on the streets and observing that "you know that I know" is often an empowering revelation that motivates to engage even more in pro-ecological activism, especially for young people.

SIE-actors have gradually recognised that the SIE's development depends on their ability to address needs, values and interests of various social groups. This has allowed them to generate **different framings against fossil fuels** depending on their target audience. Hence, on the one hand, the Climate Camp and Smog Alarms are mostly urban initiatives that engage better-situated people who have more resources to spend, for instance on their health or quality of life. On the other hand, the topic of water protection, threats of resettlement or destruction of local infrastructure resonate more strongly in rural areas.

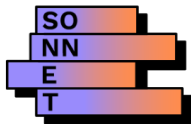


However, the available **framings have also changed in time**. Some of the interviewees observed that since 2018, the topic of climate change has been much more present in mainstream media and, consequently, in public awareness. Even in rural areas, arguments related to the harmful effects of the coal industry on climate have increasingly become considered relevant. This came along with arguably the most significant change in public discourse on energy that has taken place in recent years in Poland, namely recognition of the need to set the coal phase-out date. For many years, environmental organisations had been involved in blocking particular investments in the energy sector, but they had resigned from pushing the framing of moving away from coal, out of fear of fierce social opposition. It was the COP24 (that took place in Katowice in 2018) and the associated international attention paid to the Polish climate policy, as well as the growing importance of the climate movement initiated by Greta Thunberg, that finally made it possible to speak out loud about the need to shift away from fossil fuels in Poland. The suggested phase-out date was first announced by Greenpeace just before the COP24. In February 2019, the political party Spring (Polish social liberal and a pro-European political party led by Robert Biedroń) came out with a demand to move away from coal by 2035. The environmental social movements, such as the Youth Climate Strike and the Silesian Climate Movement, quickly picked it up and put it on their banners. Since then, the topic has been raised most often in connection with the Just Transition Fund and the need to set the phase-out date in order to obtain the full amount of funding from the EU.

5.1.1.3 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)?

Since other field-actors that impede the field's development are mostly powerful state-owned energy companies, SIE-field-actors **support each other** in their efforts to reach their goals. Collaborations take place in both **formal** (e.g. Coalition 'Development YES - Open-Pit Mines NO') and **informal** (e.g. Climate Camp) settings.

A good example of an informal cooperation between different SIE-field-actors is the first Polish Climate Camp that took place in July 2018 in Eastern Wielkopolska, the region endangered by the mining industry expansion. The guiding slogan of the Camp was: "Taking back the power - fighting for climate justice". It was the **'Development YES - Open-Pit Mines NO' Foundation** that made one of its employees responsible for coordinating the first Camp. According to the interviewees, it was meant to be a welcoming space for all people interested in developing alternative scenarios to coal-dependence in Poland. All interested individuals - **from urban activists to local farmers** - were invited to come, exchange ideas, and get to know each other's perspectives. The reason for initiating the Camp was the recognition that previous strategies of fighting against the climate crisis had not been effective. However, since nobody really had the know-how on how to run an ecological social movement in Poland, the idea was to let people decide democratically on the specific goals of the Camp, as well as the methods of expressing opposition that would be used. According to the interviewees, the first Camp was a great success, as 400 people with various backgrounds joined, including



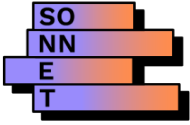
both concerned **citizens and representatives of all major Polish ecological organisations.**

However, in the next two years, the Camp's framing as a space for conducting a democratic dialogue above divisions has gradually shifted towards a focus on developing a method of civil disobedience. As stated on the Camp's official website, currently, its main goal is to act against "*unjust social relations and all forms of exploitation*" through reclaiming agency in the energy sector by means of proactive action. Based on the document review, it became apparent that the Camp supporters aim at changing the dominant discourse and asserting a real impact on Polish energy and climate policies. The Camp still declares the desire to build a broad coalition, but for many, the Camp's actions are too radical. Moreover, the Camp has an openly leftist orientation, declaring support for anti-fascist, anti-racist, anti-capitalistic, and pro-LGBTQ initiatives, which prevents the inclusion of people with different worldviews.

The Coalition 'Development YES - Open-Pit Mines NO' is a good example of a formal cooperation between different SIE-field-actors. It was created when members of the **social Committee 'Stop the Open-pit Mine'**, launched in 2009 by local government officials, residents and activists to support local communities in Brody commune and Legnica subregion in their protests against the opening of new opencast mines, noticed that there are more local communities in Poland that needed their support. Therefore, in 2011 they decided to establish the national Coalition 'Development YES - Open-Pit Mines NO' with the initial support of **Greenpeace** and **EKO-Unia**. Since then, the Coalition has brought together a variety of actors - affected **local communities, representatives of local businesses, local governments, scientists, activists, and social organisations** - and effectively defended the interests of local communities against the coal industry. The Coalition is perceived as a unique initiative in Poland that can mobilise people across political divides. Moreover, as one of the interviewees observed, representing authentic local communities gives legitimacy to the Coalition's members who are engaged in political lobbying or negotiations with financial institutions investing in the coal industry.

5.1.1.4 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?

Since the SIE-field-actors have been **working towards the same goal**, i.e., the decarbonisation of the Polish energy sector and development of RES, their relations are predominantly based on **cooperation**. As the field is relatively small, even when the SIE-actors operate in different contexts and use different tools, they still work in close cooperation, supporting and learning from each other. This cooperation might engage actors on different levels of aggregation (e.g. representatives of local communities, ecological organisations, social movements or coalitions, as well as interested individuals), but also from different societal



spheres (e.g. the process of just transition in Eastern Wielkopolska that engages representatives of various sectors: market, state, community, third sector etc.)

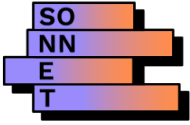
The solidarity in the field is enhanced by the fact that the SIE-field has emerged from the **conflict** between the SIE-field-actors and the powerful fossil fuel industry with its allies. However, as empirical findings suggest, close cooperation, shared aims and interests between local governments, communities and ecological organisations have not always been the case. For example, in a conflict over extending the Turów open-pit mine situated close to the border with the Czech Republic and Germany, activists from the Foundation 'Development YES - Open-Pit Mines NO' have **acted against** the local community and local government. Activists from the three countries formed a cross-border coalition and sent a joint petition to the European Parliament demanding to take away the license for opening the new mine and to extinguish the Turow mining complex within 10 years. In response, 30.000 local supporters of the mine signed their own petition, endorsing the investment of the mining company.

The CEO of the state-owned energy company PGE stated that the ecologists' demands were irrational since there are much larger lignite mines operating in the close neighbourhood in the Czech Republic and Germany. Moreover, PGE would meet all emission standards. Also, according to the CEO, the Turów mining complex plays an important role in Lower Silesia: providing jobs and reliable power supply. The Polish government showed solidarity with PGE and Turow residents by supporting the investment plans. As a consequence, the European Commission rejected the region's application for the Platform on Coal Regions in Transition. The decision was justified by the fact that the region does not intend to decarbonise, but rather plans to extract coal for the next 24 years, i.e. until their license expires. Thus, the region lost the opportunity to access substantial funds that could be invested in dynamic green development.

5.1.1.5 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 the context of the highly centralised Polish power sector with a technocratic approach to policy making, the SIE-field-actors have developed alternative narratives, in which the **energy transition is primarily a social phenomenon**. The way energy is produced and consumed directly affects different social groups - citizens, entrepreneurs, local governments, scientists, youth, activists, etc. - therefore, they should all be involved in the decision-making process. This alternative framing concerns reclaiming agency by actors whose voices have not been previously heard (i.e. the '**thinking**' aspect of the SIE).

However, with regard to the peripheral position occupied by the change agents, which prevented them from speaking out and being heard, the SIE-actors have often engaged in direct actions of physically occupying fossil fuels extraction sites

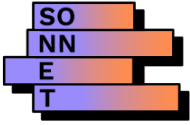


(e.g. Zurawlow inhabitants, Greenpeace activists in Ostroleka, Climate Camp activists in Drzewce), organising marches (e.g. Earth Strike, Youth Climate Strike) or protests and boycotts (e.g. Extinction Rebellion, inhabitants of Gubin and Brody, or Eastern Wielkopolska). Successful realisation of these operations required effective grassroots organisation and close cooperation between the various initiatives (i.e., the **'organising'** aspect of the SIE). Blocking streets, excavators, entrances to banks or passages to the Parliament allowed protesters to become visible and their demands to be heard by the broader public. Therefore, by skilfully introducing practices related to the material realm of the energy system, even a handful of protesters can spark a far-reaching discussion (i.e. the **'doing'** aspect of the SIE).

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

The SIE-field has undergone significant transformation over the last decade. At first, SIE-field-actors limited their actions to blocking particular fossil fuel investments: local communities, supported by allies (e.g. national and international NGOs, interested individuals, EU bodies etc.), protested against the opening of new open pits (e.g. in Brody) or fracking (e.g. in Zurawlow) in their area of residence (usually a rural area). SIE-actors then used arguments related to the decreased quality of life of residents caused by industrial operations, i.e. threatened access to clean water and risk of displacement.

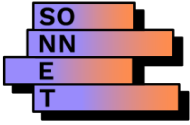
Over time, two major changes could be observed in the SIE-field. First, broader social movements began to develop (e.g. Action Democracy, Youth Climate Strike), involving more diverse groups of people, including those from urban areas. Second, outright opposition to fossil fuels began to emerge due to their negative impact on climate change. This was an important shift in the SIE-field, as for many years there was a fear of criticising the coal industry as a whole, due to a strong belief that social and political support for fossil fuels was too strong in Poland. Moreover, climate issues had long seemed too abstract, and the political will for change too weak, to demand the government to move away from coal on the grounds of the risks associated with global warming. This change was made possible primarily by pro-climate EU policy.



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?

The ultimate goal of the SIE-field-actors has been to decarbonise and decentralise the Polish energy system, that is, to **take away the power** to produce and distribute energy from a few large fossil fuel companies and transfer the agency to a network of RES prosumers (individual and collective). The SIE-field-actors had to confront the dominant discourse of the energy companies and the Polish government (i.e. the **'thinking'** aspect of the SIE). For example, the energy transition towards shale gas extraction was perceived by the SIE-field-actors in terms of keeping the status quo of the centralised, fossil-fuel-powered system. The state partnered with gas companies in shale gas exploration, excluding citizens and NGOs from the decision-making process. The same approach has been evident in plans to expand the lignite or hard coal mining sector. However, in the process of changes taking place in the field, it has been found that although the fossil fuels industry and supporting financial institutions might seem all-powerful, there are ways to exert pressure on them, for instance by applying legal means, using direct pressure through organising marches, strikes, boycotts or methods of civil disobedience (i.e. the **'doing'** aspect of the SIE). Moreover, the underlying principle of the EU's mechanisms of just energy transition in coal-dependent regions is to include in the decision-making process all interested parties: citizens, local governments, NGOs, scientists, business representatives, etc. In accordance with this, several SIE-field-actors (e.g. through the WWF's Forum of Mayors) work towards empowering local officials in the process of developing Territorial Just Transition Plans in a collaborative way, engaging various actors in the energy transition process (i.e. the **'organising'** aspect of the SIE).

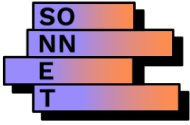
Moreover, empirical findings indicate that while at the beginning most of the SIE-initiatives had hierarchical structures (e.g. Workshop for All Beings, WWF Poland, Action Democracy Foundation), over time more flat and decentralised organisations emerged, which developed effective **collective decision-making** mechanisms. For example, in the Silesian Climate Movement, initially, there were some elements of hierarchy introduced with a group of people leading the initiative. However, later the Movement shifted to **democratic coordination** based on the method of 'social organising'. The method supports members in the process of **self-organising**, with one person functioning as a caretaker of the initiative who is made responsible for contacting people and facilitating meetings or decision-making processes. The working groups do not have sharp boundaries, with some members moving between them. It is also made easy to join the Movement. Similarly, the Youth Climate Strike's priority is **inclusiveness** and creating space for everyone to feel welcome. The Strike has an almost perfectly **flat organisational structure**, and anyone can easily join the coordinating group.



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 they been legitimised and/ or contested by several actors within the SIE-field? Have there been any key changes over time?

A good example of how new shared narratives and activities have developed collaboratively over time is the case of **campaigns against financing and underwriting of the coal industry**. In just a few years, so-called 'financial campaigns' have become one of the key ways in which SIE-field-actors influence the decisions of other-field-actors impeding the development of this SIE, namely the government and state-owned energy companies.

CEE Bankwatch is a global network which operates in central and eastern Europe and aims to influence decisions of international financial institutions to protect human rights and the environment., In 2013, in cooperation with a broad lobbying coalition, CEE Bankwatch succeeded in enforcing modifications in energy policies of the European Bank for Reconstruction and Development, as well as the European Investment Bank (EIB), ruling out new coal power plants' financing. By adopting a strict Emissions Performance Standard, the EIB became the first big international financial institution to effectively end financing of coal and lignite power generation. According to one of the interviewees, it was an important step in the process of moving away from coal in European countries, which has shown that the most important decisions concerning energy might be made in the financial markets, not at a political level.

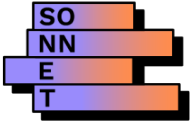


Inspired by these events, the Foundation 'Development YES - Open-Pit Mines NO' initiated and developed a novel approach to building opposition against the Polish coal industry. After several years of working with local communities, activists engaged in setting up the Foundation began to realize that they may have been "winning battles but were still losing the war" (Interviewee 2). Gradually, the awareness was growing that **new strategies and tactics needed to be developed** to impose pressure on the coal industry more effectively. As a result, a financial campaign was initiated by one of the Foundation's employees due to his experience of working in CEE Bankwatch. The main idea was to exert pressure on financial and insurance institutions to withdraw from financing and underwriting of coal projects, by means of writing expert reports, attending shareholder meetings or organising protests against the companies' energy policies. At the beginning, the Foundation's Senior Finance Campaigner was the only person in Poland asking energy companies uncomfortable questions related to environmental protection and climate change. However, since the Foundation started to organise trainings and lectures that enabled **transferring the knowledge** about financial campaigns to other organisations and initiatives in Poland, more activists have engaged in such initiatives. As a result, for example, there were several protests organised at banks' headquarters carried out by **Earth Strike** and **Extinction Rebellion**, as well as **Climate Camp** or the **Workshop for All Beings**. Also, the **Action Democracy Foundation** led its online campaigns against companies investing in the Polish coal industry.

However, so far, the largest campaign in Poland against financing the coal industry, in which almost all major active SIE-field-actors were engaged, was carried out in relation to plans of launching a new power plant unit in Ostroleka. **28 organisations** signed a petition to the Prime Minister and the Ministry of Energy calling for a withdrawal from the investment. Activists organised a boycott of the mBank that was about to facilitate financing for the energy company Enea (the fourth largest energy group in Poland). As a consequence, the **two largest Polish banks** - PKO BP S.A. and Pekao S.A. - withdrew from financing of the project.

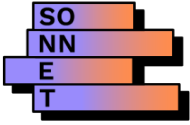
5.1.2 How do SIE-field-actors and other field-actor interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?

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



One of the main goals of SIE-field-actors has been to move away from the highly centralised Polish energy system, greatly dependent on fossil fuels, to decentralised energy production based on RES prosumerism. This shift would not be possible without changing the dominant social discourse determining who can demand to take part in discussions about the direction of the energy sector (i.e. the **cultural-cognitive pillar of institutions**). In the conventional approach, only large energy companies and the national government are seen as competent actors who should make all decisions on behalf of the whole society. Ordinary citizens are considered to be laymen without the necessary knowledge and skills to speak up on issues deemed strictly technical. The SIE-field-actors, however, have developed alternative narratives, according to which the energy transition process is primarily a social phenomenon. The way energy is produced and consumed directly affects different social groups - citizens, entrepreneurs, local governments, scientists, youth, activists, etc. - therefore, they should all be involved in the decision-making process.

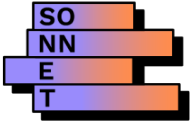
The **normative pillar of institutions** manifests itself in the case of actors impeding the development of the SIE-field, i.e. trade unions of miners. Local communities or environmental activists engaging in protests against the mining industry confront not only energy companies but also miners. As one of the interviewees explained, miners have a strong work ethic and tend to be very pragmatic. Financial considerations are more important to them than abstract problems related to the climate crisis. Some of them even claim that the climate crisis has been invented by the EU and RES producers to oppress the Polish coal industry. As a consequence, miners often consider environmentalists to be villains who want to deprive them of their workplaces. In some cases, miners are threatened by trade unionists to lose their jobs if they join the protests. Apparently, there exists a strong pressure to protect their workplaces, especially from union leaders. Sometimes they even decide to take more drastic measures. For example, during the last protest in Imielin, union leaders became aggressive towards the local protesters, shouting: "*Let's get the green weeds out*", or "*The hand raised to the mining industry will be cut off*". It was only retired miners who took the side of protesters, as they are no longer under the pressure of the mine's management, trade unions and other miners. In the presence of such strong resistance, local communities protesting against fossil fuels extraction (e.g. from Imielin) have to seek allies outside their own towns or villages. This influences how protesters organise their activities: some of them take place on-site, but others require travelling in order to exchange experiences and get support from more experienced actors. Excursions might be organised to support protests in neighbouring towns, but also to attend conferences held by larger NGOs, or meetings with representatives of foreign institutions.



SIE-field-actors only started to leverage **regulative institutions** relatively recently. Initially, opposition to the fossil fuels extraction manifested itself in organising protests or writing expert reports proving the harmfulness of conventional energy pathways. Over time, environmental organisations began to see opportunities to achieve their goals also by legal means. One example is the ClientEarth Foundation, which in 2019 filed an unprecedented lawsuit against the owner of Bełchatów Power Plant, PGE GiEK. The Foundation demanded that the court order PGE GiEK to abandon coal combustion in Bełchatów Power Plant by 2035 at the latest or to install devices eliminating CO2 emission by the same date. During the trial, the court stated that the climate crisis is a fact for which coal companies bear partial responsibility. The court obliged both sides of the process to hold conciliatory talks on limiting the impact of the Bełchatów Power Plant on the climate and environment. Moreover, the ClientEarth Foundation became a shareholder of Enea and won two cases against the energy company, ordering Enea to disclose documents proving the profitability of investing in the power plant Ostrołęka C construction. Ultimately, the company suspended the project's financing. Successful application of legal measures has primarily contributed to pushing the framing that Polish energy companies, which have been long perceived as all-powerful, may be held responsible for actions that are harmful to the environment or economically unjustified.

5.1.2.2 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)?

The empirical findings indicate that in the Polish energy sector there has been a prevailing myth according to which phasing out coal is impossible, due to its strategic role in ensuring the country's energy security. Such a strong belief is a remnant from the Polish People's Republic, when the mining industry was in its bloom, upholding the country's economy based on heavy industry. Moreover, it is believed that the mining sector is too extensive to be liquidated, as it provides jobs to thousands of miners and employees of related companies. After the political transformation, the miners united and fought for their rights, arguably most effectively among all labour groups in Poland. The mining lobby successfully convinced both politicians and the public that the state should continue to subsidise the sector to avoid a social and economic disaster. According to them, obtaining energy from other sources is not feasible in Poland due to inadequate geographical conditions for RES, overly expensive nuclear power plants development, and political risks related to dependence on gas or coal imports from Russia. For many years, this myth remained unchallenged, as the mining lobby was supported by successive governments.



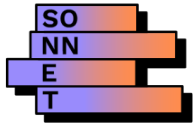
Therefore, SIE-field-actors faced a particularly difficult task of changing the dominant, institutionalised discourse about conventional energy pathways towards aiming for fossil fuels phase-out. This shows that throughout the story of the SIE-field development, the occurrence of skilled actors initiating change in the highly institutionalised Polish energy sector is of paramount importance. However, major changes in the field have been introduced as a consequence of both bottom-up pressure exerted by SIE-actors, as well as top-down regulations introduced by the EU institutions (**inter-field interactions**) and **changing socio-technical trends**.

5.1.2.3 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)?

SIE-actors, despite their peripheral positions in the energy sector, have managed to benefit from changes in the wider institutional environment: increasing public awareness about the harms of burning fossil fuels with regard to the climate change (**social trend**), dynamic development of RES (**technological shock**), and the EU's climate and environmental policies exerting pressure to shift away from fossil fuels in the European countries (**legislative trend**). Another important factor has been changes taking place in the financial sector. Already in 2013, the European Investment Bank adopted a strict Emissions Performance Standard which made it the first international financial institution to effectively end financing for coal and lignite power generation. Subsequently, more and more financial institutions withdrew from investing in the fossil fuel industry. This ultimately led to the withdrawal of the two largest Polish banks - PKO BP S.A. and Pekao S.A. - from the investment in the new power plant unit Ostrołęka C, which was supposed to be the last coal power plant construction in Europe. As a result, in establishing the energy law, legislators cannot ignore the increasingly unfavourable financial conditions that make fossil fuels projects unfeasible (**financial trend**).

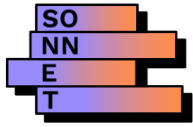
5.1.2.4 What have been the most important alliances/networks/collaborations SIE-field-actors and/ or other field-actors that emerged from these events, shocks, trends, and inter-field interactions (when, how and for what reasons)?

There have been various collaborations in the SIE-field that emerged from these events, shocks, trends, and inter-field interactions.



First, as a result of the **increasing public awareness** about the harms of burning fossil fuels with regard to the climate change, several **social movements**, initially developed in the Western European countries, started to emerge in Poland either in its original or amended form and name. These included 38 Degrees (a British not-for-profit political-activism organisation), climate camps in Germany, Czech Republic and the UK, and ecological, international, bottom-up movements like Earth Strike, Extinction Rebellion and Fridays for Future (which has developed in Poland as the Youth Climate Strike). According to the interviewees, they reached Poland mostly around 2018 or 2019 and have adopted well due to the growing public awareness and the absence of similar initiatives. Some Polish initiatives developed as formal branches of foreign organisations (e.g. Extinction Rebellion), which included related benefits (e.g. branding or available resources) as well as limitations (e.g. the need to follow specific agendas and methods). Other initiatives have been only loosely inspired, as Polish activists drew from their own experiences when engaging in activities led by these organisations or talking with their representatives (e.g. Action Democracy Foundation or Youth Climate Strike). These initiatives developed to create a space where direct and active involvement of all interested actors would be possible. They prepared the ground for a bottom-up, broad climate movement to evolve in Poland. This movement emerged as a patchwork of several initiatives characterised by flat organisational structures, democratic decision-making mechanisms, and relatively low entry levels. Some of these initiatives have engaged in novel means of protesting like civil disobedience, while others have aimed at mobilising growing numbers of supporters to take part in strikes and marches organised in various Polish locations.

Second, the **EU's environmental policies** formed the basis for local activists' claims that the government should introduce ambitious regulations to prevent air pollution in Poland, by banning the burning of solid fuels to heat homes. The first **Smog Alarm**, a bottom-up social movement for reducing emissions, was created in 2012 in Krakow, and later diffused to many other Polish towns. According to several interviewees, this raised social awareness about harms of coal-burning, and as a result, many people understood the necessity to develop alternative solutions for heating, which would be safer for human health and environment. The Smog Alarm activists' efforts led President Duda to sign amendments to the Environmental Protection Law. This allowed the Sejmik (regional parliament) of the Małopolska Region to accept an anti-smog resolution for Krakow in January 2016, which introduced a ban on heating with coal and wood from 2019 onwards. This was an important step, and soon other Polish towns introduced similar restrictions in their local policies, significantly reducing coal usage at the households' level in Poland. In order to enable that transition, in 2018 the government initiated the program "Clean Air" that has offered subsidies for replacing old, coal-fired furnaces in households. The program answered to the bottom-up pressure of the Smog Alarms, but also the EU's expectations of improving air quality and reducing harmful emissions.

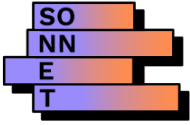


Third, the growing **reluctance of European banks and insurers to invest in coal projects** was one of the SIE-field-actors' main arguments against opening the coal-fired Ostrołęka C power plant. Ostrołęka C was supposed to be the last coal power plant construction in Europe, but it was perceived as an uneconomic endeavour due to the rising prices of CO2 emission allowances and the uncertain future of capacity market payments (a mechanism introduced by the government to ensure that electricity supply meets demand as more unpredictable renewable energy sources are implemented in the energy system). This provoked the largest campaign in Poland against financing the coal industry. The campaign was initiated in 2018 and since then has been led by the Workshop for All Beings. The **coalition 'Stop Ostrołęka C Power Plant'** was created, consisting of the Frank Bold Foundation's Polish office (a law firm aimed at solving social and environmental problems), EKO-Unia, Instrat Foundation (a progressive think-tank focused on public policy consultancy, the Climate Coalition, and the 'Development Yes - Open-pit mining NO' Foundation, among others.

As part of the campaign, 28 organisations signed the petition to the Prime Minister and the Ministry of Energy calling for a withdrawal from the investment, and the development of ambitious plans regarding reducing carbon emissions, increasing energy efficiency, and investing in RES. Moreover, the ClientEarth Foundation, which is a shareholder of Enea, won two cases against the energy company, ordering Enea to disclose documents proving the profitability of the investment. Ultimately, the company cancelled its participation in the project. Although the planned investment had received all necessary permits, public consent, and support from the power market, the two largest Polish banks - PKO BP S.A. and Pekao S.A. - decided not to get engaged in the project financing of Ostrołęka C. Meanwhile, the company PKN Orlen, a Polish oil refiner and petrol retailer, and the largest company in Central and Eastern Europe, announced its interest in building the power plant unit, but, only if it is gas-fired. According to the investor, this decision was based on new policies related to the recently introduced European Green Deal, as well as updated energy policies of the European Investment Bank. Therefore, in 2020 the decision was made that Ostrołęka C will be a gas-fired power plant.

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)?

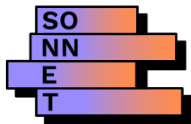
In April 2016, the **Paris Agreement** was signed by the Prime Minister Beata Szydło. The main goal of this agreement is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels. Limiting the increase to 1.5 °C would substantially reduce the risks related to climate change. This has been an important point of reference in the SIE-field-actors' demands for the **government** to set more ambitious greenhouse gas emissions' reduction targets for the coming decades.



In December 2017, the initiative '**Platform on Coal Regions in Transition**' was established by the European Commission to support EU regions heavily dependent on the hard coal or lignite industry. The aim is to develop, in cooperation with local communities and experts, regional energy transition strategies toward low-carbon economies. In Poland, there are three regions included in the Platform: Silesia (since 2017), Wielkopolska, and Lower Silesia (both since 2018). The regions can receive financial support for their energy transition plans from the **Just Transition Mechanism**, which was launched in January 2020 as a part of the European Green Deal Investment Plan. SIE-field-actors (e.g. ecological activists, local governments and communities) have also been striving to join the EU's Platform on Coal Regions in Transition, and to receive funding from the Just Transition Mechanism. They also aim to create Territorial Just Transition Plans in a collaborative way with active participation of all interested parties and officials representing all governance levels. However, the Polish government, under the influence of the mining lobby, has blocked some of the EU's arrangements towards achieving carbon neutrality and has been postponing announcing the coal phase-out date, which has resulted in a reduction of the Fund's resources available to Poland. This may have a negative impact on the transition plans prepared by Polish coal regions, which, as a result, may set much less ambitious goals than previously expected.

Arguably, the most successful, regional just energy transition process in Poland is taking place in the Eastern Wielkopolska. What distinguishes the region is that the owner of the coal infrastructure, ZE PAK, is a private company. For this reason, unlike state-owned energy companies, it could independently decide to move away from coal and to resign from opening the last open pit mine in Oscislowo. The situation in almost all other **coal-dependent regions** is much more unpredictable, as the mines and power plants belong to state-owned companies that are dependent on decisions taken by the national government. Since the coal phase-out date, a detailed strategy for energy transition, and a schedule for closing subsequent mines have still not been approved, these regions are operating in a highly uncertain environment. Local governments cannot plan a long-term transition towards a green economy, nor can be confident they will receive any EU funding. Overall, this indecisiveness of the national government has had a negative impact on the long-term socio-economic development in coal-dependent regions in Poland.

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?)

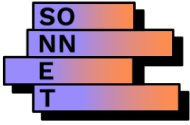


Power relations in the SIE-field are clearly unequal - at the centre are the all-powerful other-field-actors who impede the SIE's development, i.e. the government and state-owned energy companies, and on the periphery the SIE-field-actors, who seek to influence the narrative about the country's dependence on fossil fuel extraction, particularly coal. **The strongest players have incomparably more resources** - primarily in terms of finance and political power. They try to maintain the status quo, and with it their privileges, delaying the setting of a coal phase-out date and trying to limit the inclusion of other actors in decision-making processes. A good example of this was the planned 'Lex coal' Act, which was supposed to allow the opening of new mines without public consultation, and which was successfully blocked by SIE-field-actors. Therefore, a very **large part of the SIE-field-actors' efforts has been devoted to transforming these power relations** by trying to gain agency and the ability to participate in the discussion and co-decision-making about the development of the energy sector.

A very good example of the efforts made by SIE-field-actors to gain the right to be heard and to co-determine the location of mines, is the action taken by local communities in Brody with the support of environmental organisations.

In 2009, the Polish government accepted, without obligatory social consultations, the project of "Polish Energy Policy until 2030", which facilitated lignite mining in Poland. As a consequence, PGE GiEK SA, one of the largest state-owned energy companies, planned to open a new mine in the Brody commune without consulting the opinions of local communities. Thus, on initiative of local residents, in June 2009, the **1st local referendum in Poland against a new open pit mine** took place in Brody. The referendum was successful in securing the required voter turnout, and the outcomes expressed opposition to the plans of the mining industry. However, despite its success, the energy company refused to treat the results as formally binding. Therefore, in September 2009, local government officials, residents and activists formed a social committee 'Stop the Open-pit Mine'. This committee joined forces to have the referendums be officially recognised by the national government and the main investor. In 2011, the Committee wrote a petition with the support of the Polish MEP Lidia Geringer de Oedenberg to the European Parliament's Petitions Committee, to make the results of the referendum on the planned coal investments binding. The resulting fact-finding mission produced a report stating that the results of the referendum should be recognised, and incumbents must engage in a dialogue with the public. This conflict has brought much media attention to the problematic issues related to opening new open-pit mines and coal-fired power plants. As a result, the mine has not been built to this day, and the **lessons learnt have allowed for the effective protection of other local communities** threatened by the plans of the large coal companies.

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?



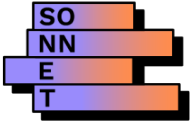
5.1.3.1 How, why, and where do SIE-field-actors and/ or other field-actors conduct activities linked to creating, maintaining and transforming institutions?

The empirical findings show that the SIE-field-actors have been engaged predominantly in **creating and disrupting institutions**. By definition, acting against the dominant energy pathways excludes maintenance work understood as “reproducing existing norms and belief systems” (Lawrence and Suddaby, 2006:230). In disrupting dominant institutions in the Polish energy sector, SIE-field-actors have been pushing a framing of phasing out or limiting extraction of fossil fuels, for instance through highlighting negative environmental and economic impacts of the fossil fuel industry. In creating institutions, SIE-field-actors have developed alternative framings in the Polish energy sector, for instance through lobbying for RES development.

To meet these ends, the SIE-field-actors have engaged predominantly in **boundary work** (arguing that it is not only energy professionals and politicians who can decide upon further development of the energy sector; rather, this process should entail collaboration between all affected parties: citizens, SMEs, local governments, NGOs, scientists, environmentalists, etc.), **identity work** (facilitating the shift from citizens as passive consumers of energy to conscious prosumers), **strategy work** (stressing the need to develop long-term just energy transition plans for the coal-dependent regions), **emotion work** (creating opportunities for people to express their anger and fear regarding the climate change and environmental threats caused by the fossil fuel industry), and **practice work** (day-to-day campaigning against political or economic agendas supportive towards fossil fuel energy pathways). Moreover, one of the most important types of institutional work conducted in the field has been **material work**. This has been manifested through different means, for instance boycotting banks by organising protests at their headquarters, physically blocking excavators at lignite mines, or physically blocking access to the planned fracking sites.

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

The SIE-field-actors have occupied peripheral positions in the Polish energy sector, having access to very limited resources compared to the most powerful actors in the field, i.e., state-owned energy companies. In order to succeed in their goals of changing the dominant discourse, they recognised the need to **tightly cooperate** with each other (i.e., through building formal and informal coalitions, and supporting each other in their initiatives, e.g. protests), to **find allies** for their cause (e.g. in European institutions), and to **engage more people** in their campaigns (i.e. through creation of a broad environmental movement). Therefore, the agency in this case can be viewed as dispersed, meaning that institutional work has been exercised by multiple actors simultaneously (Lawrence et al., 2002).



Although the ultimate goal of the SIE-field-actors has been to **influence national policy making**, they have engaged in direct lobbying only to a limited extent. This is because the Polish government has been strongly supportive of the fossil fuel industry and pro-environmental MPs have been few and far between. In the context of such an unfavourable structure of the political scene, the SIE-field-actors, a relatively small group, had to look for alternative ways to apply political pressure. Only recently, with the dynamic development of the broader environmental movement, some of the SIE-initiatives started to be perceived as having real political agency (e.g. Youth Climate Strike).

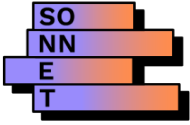
Among the most important ways of exerting **indirect political pressure** by SIE-actors are the following:

- pushing financial institutions to withdraw from providing finance to the coal sector and ensuring new coal projects; this has ultimately made further development of the fossil fuels industry economically unfeasible.
- uncovering deficiencies in Poland's implementation of the EU climate, environmental or energy regulations (e.g. in the case of anti-fracking protests in Zurawlow, anti-smog campaigns, or protests against opening an open pit mine in Oscislowo);
- organising local referenda on opening new open-pit mines (e.g. in Gubin and Brody);
- writing petitions to the European Parliament, e.g. to make the results of the local referendum on planned coal investments in Brody binding, or to take away the license for continued operation of existing Turów lignite mine in Bogatynia;
- MEPs' mediating between local communities and the Polish government by writing petitions regarding a withdrawal from the planned fossil fuel investments (e.g. in the case of the anti-fracking protests in Zurawlow).

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.

1. Transforming institutions

For a long time, SIE-field-actors limited their actions to blocking particular fossil fuel investments, being afraid of criticising the coal industry as a whole due to a strong belief that social and political support for fossil fuels is too strong in Poland. The change came only with the 24th United Nations Climate Change Conference (COP24) that took place in the Silesian city of Katowice in December 2018. It was the COP24 and the associated international attention paid to Polish climate policy that finally made it possible to **speak out about the need to shift away from fossil fuels** in Poland. The interviewees argued that it turned out to be a critically important event for the development of the anti-coal movement in Poland.



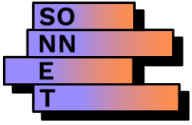
Moreover, the COP24 was used to publish a founding manifesto of the Silesian Climate Movement. During the COP24 March for Climate, a huge demonstration with several thousand protesters, a few activists from Silesia decided to prepare a banner with the slogan '**Silesia without coal**'. According to an interviewee who initiated the Movement, it was very important for inhabitants of Silesia to start speaking out about the energy transition in this region being necessary and possible. There has been a common belief in Poland that carbon neutrality goals cannot be met, mainly because of the high social costs that Silesia would have to bear in the transition process.

2. Maintaining institutions

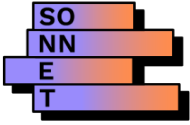
As a result of growing social awareness and an increasing number of initiatives conducting anti-coal campaigns in Poland, the year 2019 brought about some successful joint actions. For example, in October, a huge protest at the Parliament took place, where virtually all active SIE-field-actors opposed the developments on the special act 'Lex-coal' changing the current law. The proposed act was to allow the **national government to de facto decide upon opening a new mine**, without consulting the decision with NGOs, local governments or communities, and ignoring local zoning plans as well as strategic environmental assessments. Among the participants of the protest were representatives of all major organisations: The Coalition 'Development Yes - Opencast mining NO', Greenpeace, Workshop for All Beings, Extinction Rebellion, Youth Climate Strike, Climate Camp, as well as local governments' officials, representatives of local communities, scientists and experts. Altogether there were around 400 protesters. The banners read: "Who rules over Poland - coal lobby or citizens?", "Leave coal underground", and "Poland without coal". There was also a large model of a brown coal excavator prepared by the protesters. Additionally, eight organisations signed a letter addressed to the Prime Minister calling for a withdrawal of the controversial act, which ultimately happened.

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

1. In this example of transforming institutions SIE-field-actors have engaged predominantly in **strategy work** (stressing the need to decide upon the coal phase-out date and to develop long-term just energy transition plans for the coal-dependent regions), **boundary work** (arguing that it is not only energy professionals and politicians who can decide upon further development of the energy sector; rather, this process should entail collaboration between all affected parties: citizens, SMEs, local governments, NGOs, scientists, environmentalists, etc.), and **emotion work** (creating opportunities for people to express their anger and fear regarding the climate change and environmental threats caused by the fossil fuel industry).
2. In this example of maintaining institutions, the SIE-field-actors engaged predominantly in **boundary work** (arguing that it is not only energy professionals and politicians who can decide upon further development of the energy sector; rather, this process should entail collaboration between all affected parties: citizens, SMEs, local governments, NGOs, scientists,

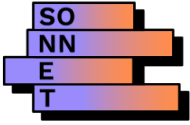


environmentalists, etc.), **emotion work** (creating opportunities for people to express their anger and fear regarding the future of the energy sector's development), and **material work** (gathering and physically blocking the passage by the parliament).



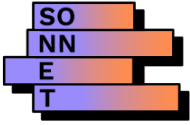
5.1.3.5 What factors have enabled and/or impeded institutional work? E.g. resources, learnt lessons and competences connected to actors/ alliances/ networks/ collaborations. Link back to the 2-4 examples

1. An **enabling factor** was that the Conference came at the right time. First, it was around then that the activities of the international climate movements, primarily those initiated by Greta Thunberg, began to gain importance in Poland. Second, the COP24 coincided with the release of the Special Report on Global Warming of 1.5 °C that was published in October 2018 by the Intergovernmental Panel on Climate Change. The report gained considerable publicity in Poland, which prepared the ground for a wider social debate about the negative effects of burning fossil fuels on the climate. Information provided in the report, as well as declarations of representatives of more environmentally concerned countries contrasted with the attitude of the most important Polish politicians, who disregarded the risks associated with further fossil fuel extraction. The official position of the Polish Government, but also of the Silesian miners' trade unions, was clearly an **impeding factor**. As President Andrzej Duda stated during the Conference: "Coal is our strategic asset. According to experts, we still have coal reserves for 200 years and it is difficult for us to give it up completely". Poland's strong attachment to the coal industry was symbolically illustrated by the fact that attendees of the climate summit were given pieces of Silesian coal as souvenirs.
2. The most important **enabling factor** was the previous experience in networking, cooperating, and organising protests gained over the years by the most important SIE-field-actors, i.e. mature environmental organisations: the Coalition 'Development Yes - Opencast mining NO', Greenpeace, or Workshop for All Beings. In addition, the inclusion of representatives of social movements (such as Extinction Rebellion, Youth Climate Strike, Climate Camp), especially young people, was very important, as thanks to that, information about the protest reached previously unreached groups of people (especially young people from large cities). Moreover, the involvement of representatives of local communities from regions exposed to the negative impacts of the coal industry, both local residents and officials, was crucial for the success of the project, lending it credibility. The last important element were experts and scientists who supported the protesters' demands with expert analyses. This was the first action in Poland based on such broad cooperation between very different groups of SIE-field-actors, who complemented each other. In this diversity laid its greatest strength in blocking an unfavourable change in the law. An obvious **impeding factor** was the attitude of the government and state-owned energy companies, who had an interest in excluding social activists, scientists and citizens from the decision-making process in opening new coal mines.



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 SIE-field and 'outside' institutional environments? Link back to the 2-4 examples

1. Among the most important intended effects of the institutional work have been the **increased public awareness** of the harmfulness of coal, the urgency of the topic of climate change and the need to set a specific date for moving away from coal with a decarbonisation strategy. In addition, the Conference was an opportunity to **establish contacts with allies from abroad**, which had an **empowering** and regenerating effect on many of the SIE-field-actors. This also allowed = SIE-field-actors to believe that it is possible to change the dominant, conservative narrative about coal in Poland, demanding its complete phasing out. In addition, there have been unintended consequences, such as specific demands and concrete political declarations. In February 2019, the political party Spring (Polish social liberal and pro-European political party led by Robert Biedroń) came out with a **postulate to move away from coal by 2035**. The environmental social movements, such as the Youth Climate Strike and the Silesian Climate Movement, quickly picked it up and put it on their banners. Since then, the topic has been most often raised in connection with the Just Transition Fund and the need to set a phase-out date in order to obtain the full amount of funding from the EU.
2. The most important **intended effect** of the institutional work was the successful blocking of the proposed 'Lex coal' act, which would have allowed the government to *de facto* decide upon opening a new mine, without consulting with NGOs, local governments or communities, and ignoring local zoning plans as well as strategic environmental assessments. In addition, **unintended consequences included** strengthening of the SIE-field-actors' networks and knowledge exchange, as well as empowering and regenerating the SIE-field-actors, often exhausted by a long struggle without spectacular achievements.



5.2 Case study 2: Participatory Experimentation and Incubation

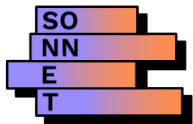
5.2.1 How have the SIE and SIE-field emerged, developed and institutionalised over time?

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?

In accordance with the SONNET definition, participatory experimentation and incubation refers to the multi-actor collaborative formats that aim to experiment with and/or test novel solutions in specific local settings. These solutions are of a socio-technical nature and can be driven by technological (e.g. innovative devices for microgrids' management) and social (e.g. novel business models for prosuming energy) developments. Some of the multi-actor collaborative formats have been referred to as energy clusters, living laboratories and real-life laboratories, among others. They involve the collaboration of actors from different societal spheres (e.g. state, market, community, third sector) at different levels of aggregation (e.g. individuals, collectives and organisations). In Poland, we describe three phases of development of the participatory experimentation and incubation.

The most important **SIE-field-actors** behind participatory experimentation and incubation in Poland, **at the early stage** of the development of this SIE-field, were local entities such as local governments and networks of local governments (e.g., Energy Cités), NGOs, companies and citizens. They were the first to start experimenting with new solutions on the ground. Some of these activities were enabled through participation in European projects, but also through bottom-up creativity and the search for new, sustainable solutions that are more environmentally friendly and increase energy independence. Examples of action driven by participation in EU projects are experiments in energy efficiency, such as the "ICE-Wish" and "Step by Step" experiments run by the City of Warsaw, or actions animated by Association of Municipalities Polish Network "Energie Cités" (PNEC). An example of bottom-up, independent niche experiment is "Osada Twórców", which aims at the creation of an off-grid autonomous settlement. The involvement of companies demonstrated by Enspirion, which via project "Energa Living Lab" tested solutions based on demand management service among 300 households.

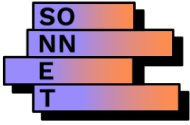
In **later phases** of the development of SIE-field, the Ministry of Energy gained prominence as the entity responsible for the Law on Energy Clusters, and the certification of energy clusters. This certification facilitated local collaboration between municipality-owned entities (such as units responsible for water and sewage or residential heat), local enterprises, and incumbent energy distribution companies. At the **last stage of the development of SIE-field**, the presence of academics and researchers, mainly with an engineering background,



became more prominent. This is illustrated by the development of research and policy consultancy project KlastER, run by the AGH University of Science and Technology, NCBJ - National Centre for Nuclear Research and IDEA Interdisciplinary Department of Energy Studies, and the Ministry of Energy. At this stage, a few energy clusters gained prominence by creating collaborations which produced and exchanged energy. Zgorzelec Renewable Energy Sources Development and Energy Efficiency Cluster (ZKlaster) is one of the examples. However, it is important to stress that the vast majority of clusters which gain the Ministry's certificates were not able to start their operations. It soon turned out that practically all clusters have difficulty in pursuing their primary objective of producing and exchanging energy. This is mainly due to regulatory impediments. The National Chamber of Energy Clusters is one of the new actors aimed at lobbying for favourable legislation, as well as networking and exchange among energy clusters. In order to verify which legal, technical, economic and organisational means would support fulfilling this task, the KlastER Project was initiated by the Ministry in cooperation with two important scientific institutes at the **last phase of the SIE-field development**. The project is aimed at developing a strategy for effective development of energy clusters through experimentation with new solutions and exchange of knowledge between actors involved on both local and national scale. This demonstrates the growing role of experts and academics in the field. The project has a wide and transparent formula: its meetings are recorded and available online (this process was likely strengthened by the Covid-19 pandemic) and is run with the participation of representatives of different sectors (state, municipality, business).

Other field-actors (who enable and/or impede SIE) are groups lobbying for energy transition based on renewable and dispersed energy, as they enable participatory experimentation and incubation in Poland by spreading the argument - both in public opinion and among decision-makers - that this is the most probable and profitable path for energy development in Poland. Here, we can list coalitions of NGOs (e.g., Polska Zielona Sieć, WWF Poland), not formalised social movements (such as Climate Strike), and educators (such as the group responsible for running the website Nauka o Klimacie, naukaoklimacie.pl). Another important group is constituted by academics, mainly representatives of technical science, who build an argument that a Polish energy system without fossil fuel is possible. An example of a prominent group active in this field is gathered around prof. Jan Popczyk from Silesia Technical University and his think-tank Stowarzyszenie Klaster 3x20 (Association Clusters 3x20). Finally, we identify the available funds and subsidies for the development of RES, which impact what actions are financially viable.

Changes to the roles of SIE-field-actors and other-field actors over time reflect that the renewable and dispersed energy system slowly is getting recognition in the Polish energy strategy, and that the relevant legislation and is accepted as a likely prominent element of the future Polish energy landscape. These changes are outlined in more depth below.



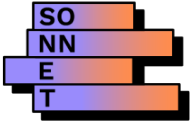
5.2.1.2 What are relevant activities, aims/goals and narratives that have been developed and manifested by SIE-field-actors and/ or other field-actors within the SIE-field over time?

The SIE-field participatory experimentation and incubation in Poland is characterised by SIE-field-actors, i.e. people and groups involved in a **diverse set of activities such as:**

- **planning and implementing experiments** focused on energy efficiency and behavioural changes in municipalities, and taking part in these experiments,
- **developing energy clusters:** building networks of collaboration on the local level which includes municipality entities, local enterprises, and energy incumbent,
- **experimenting** with local off-grid solutions for eco-villages,
- **lobbying** for favourable legal conditions for energy communities,
- **engage in research and expert debate** on the most important obstacles for more dynamic development of participatory initiatives and desired changes in legislation,
- **crafting the regulatory conditions** supporting the development of participatory experimentations (like Law on Energy Cluster).

These activities changed from one phase to another, reflecting the growing importance of the concept of the dispersed energy system, and relying on local solutions. In **the first phase**, most activities were focused on energy efficiency and financed through European funds. Municipalities and networks of municipalities played a main role, mobilising the inhabitants to take part in energy experiments. In **the second phase** of the SIE-field development, local communities led by representatives of local government or local business started to build energy clusters, often to find that under the current legislative condition, it is very difficult to fulfil their goals - that is, to locally produce and balance energy. What is important here, is the interest in the topic and the attempt to build and develop energy clusters show that for a growing number of local communities, the future of their local community is connected to the investment in renewables. Often, this is perceived also as a solution for the problem of air pollution. In **the third phase**, the most important novel activities are focused on research, expert debates, and lobbying for new regulatory solutions.

The story of the field's development shows how a new paradigm of 'socialised', dispersed energy sector has been shaped. Multiple actors operating on the local level (NGOs, municipalities, citizens, local entrepreneurs) became involved in the process of finding solutions in the energy sector, which was previously unthinkable in the paradigm of a system based on large-scale energy. This shows that their very actions were possible due to the widespread acceptance of the novel **narratives** presenting the future of the energy system as radically different than present: with a strong presence of actors such as municipalities and local companies playing important role in energy production and exchange. Additionally, in this phase, SIE-field-actors are particularly engaged in the creation of expert



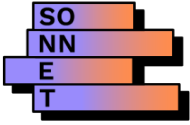
narratives on the possible role and conditions for dispersed energy in Poland, with the participation of a wide array of stakeholders from business and municipalities.

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)?

In Poland, the creation and maintenance of new **relations based on collaboration** between SIE-field-actors was one of the most important aspects of participatory experimentation and incubation. Indeed, the effectiveness of SIE-initiatives aimed at developing and testing new solutions in energy is tightly connected to the ability of various actors to establish agreement and conduct coordinated joint action. This cooperation has engaged actors on different levels of aggregation (e.g., individuals, communities, districts, municipality, region, country), but also from different societal spheres (e.g., citizens, local authorities, entrepreneurs, scientists, politicians) (Avelino and Wittmayer, 2016). Experiments conducted within energy clusters, some of which as a part of the KlastER project, have been based on the triple-helix model, i.e., engaging actors from public, scientific and private sectors. It has been recognised in the literature that the quadruple-helix model, which is created by introducing civil society representatives to a collaboration, allows for making innovations more sustainable in economic, political and social ways.

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?

Relations between SIE-field-actors and **other field-actors** (who enable and/or impede SIE) are based mainly on cooperation. We defined other field-actors as different institutions lobbying and campaigning for renewable-based and dispersed energy systems. Interactions between SIE-field-actors and other-field actors usually occur indirectly (that is, during the experimentation and incubation experiment). Rather, other field-actors shape the wider conditions of SIE-field development. With time, the impact of these actors on the direction of energy policy has risen, amplified by external trends as discussed in the next section.



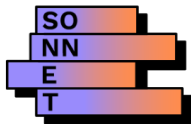
5.2.1.5 What is 'socially innovative' about the SIE (including SIE-initiatives and/ or SIE-field-actors)? How and to what extent do which ideas, objects and/or actions demonstrate a change in social relations and new ways of doing, thinking and/or organising energy?

The experiments described in the report allowed involved actors to search for new energy solutions that best suit their specific local needs and make the most efficient use of available resources. This is a significant change from the conservative paradigm in the energy sector, according to which only large energy companies and the government should decide on the direction of the sector's development and impose the system's rules on smaller players, exposing them to damages related to, among others, higher energy prices, black-outs, air pollution or environmental and climate risks. The KlastER project has allowed local entrepreneurs, local governments, scientists and independent experts influence the shape of the strategy of further development of energy clusters, also in a legislative context. However, citizens so far, do not have a voice in the debate on creating new solutions in this area, and local communities do not engage in activities conducted by energy clusters in local settings.

Citizens have been largely involved in experiments described in Phase 1 of the case study report, led by NGOs or municipalities. These initiatives have taken place only on a small scale, and without a viable potential for scaling up. Therefore, it can be concluded that there is a need to find ways of including civil society in local experiments conducted in a Triple-Helix manner, which should be enabled by the experience already gathered by citizens, municipalities and NGOs when testing novel energy solutions on a smaller scale.

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

We distinguished three phases of the SIE development, illustrating how new activities have been undertaken to answer the possibility created by changing circumstances. In the first phase, 'EU-(co)-funded projects enable first local multi-actor experiments in the field of energy' (2011-2016), local actors tried to develop novel solutions related to energy efficiency and/or RES technologies. For example, the Infrastructure Department of Warsaw City Hall participated in two EU projects: 'ICE-WISH' and 'Step by Step' aimed at conducting experiments to find new ways for improving energy efficiency among the inhabitants of Warsaw. Most of the experiments took place in the urban context. An example of a different approach is the eco-village 'Osada Twórców', which has experimented with energy self-sufficiency in a rural context. In the second phase, 'Competition for the Pilot Energy Clusters Certificates and emergence of the first energy clusters' (2016-2018), the changing legal conditions allowed for the process of developing energy clusters and initiated the process of building a dispersed energy system in Poland, with the participation of different local entities such as municipal entities, local enterprises, and energy incumbents, but with limited participation of individual citizens/inhabitants. Interestingly, these actions were especially intensive in small and medium towns, even if some of the biggest cities also tried



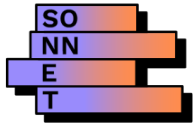
to establish their energy clusters. In the third phase, 'KlastER Project - conducting pilot projects and taking stock of the experiment' (2019-2020), with the launch of the project "Development of distributed energy in energy clusters (KlastER)" by a consortium consisting of Ministry of Energy, AGH University of Science and Technology and National Centre for Nuclear Research, new actors joined the field and focused on production of knowledge for decision-making, using both their expertise, and creating the platform for dialogue for different stakeholders. It aims to deliver a coherent Strategy for the development of energy clusters in Poland. The center of these actions is in Cracow, but due to the Covid-19 pandemic large parts of the meetings have been organised remotely.

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?

Power issues are rarely explicitly problematised in this SIE-field. However, we can interpret the struggle of the newcomers in the energy sector to take their place and play a role previously accessible only for the energy companies as an example of power struggle. Indeed, the relations between entities from municipalities and (non-energy) business on the one hand, and incumbent companies responsible for energy distributions on the second hand, are one of the most burning issues in the negotiation of the shape of the future legislation for energy communities/energy clusters in Poland. By participating in the actions aimed at developing energy system based on dispersed, locally owned, and renewable sources, SIE-field-actors implicitly take part in the power struggle.

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?

After 2016, the development of the SIE-field was a part of the wider process of energy transition from centralised and coal-based system to decentralised, renewable, and locally owned system. The growing climate and energy pressure from the EU and the withdrawal of the most important institutions from financing investments in fossil fuels have made it necessary to seek novel solutions in the Polish energy sector. Actions of environmental NGOs and pro-climate social movements, described in case study "Framing against fossil fuels", strengthen this trend locally and spread awareness that system change is inevitable and beneficial. Distributed energy has been identified as an important direction of the sector's development, which assumes the need to test social and technological innovations at a local level. Such an approach is justified by the recognition of fundamental



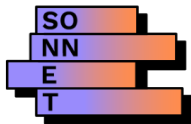
differences between regions in Poland in terms of economic, social, geographical, geological and other conditions. These narratives were accepted by SIE-field-actors, as it provided justification of their actions. However, as the participation of individual citizens/inhabitants in the experiments is rather limited, we may say that narratives of energy citizenship, stressing the importance of ownership of the shares in the energy system by individuals, so far did not influence the SIE-field.

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?

The empirical findings show that the SIE-field-actors have been engaged predominantly in creating institutions. Institutional scholars have identified various types of institutional work (e.g. Phillips and Lawrence, 2012). In this case, the SIE-field-actors have been conducting mainly three types of institutional work: **boundary work** (by redefining the conservative stance about who can be an active player in the Polish energy sector: not only state-owned energy companies and the national government, but also local authorities, small companies, NGOs, citizens, cities etc.), **strategy work** (the main aim of the project Klaster is to develop a new strategy for energy clusters in order for them to become a cornerstone for the dispersed energy sector development in Poland), **practice work** (day-to-day work in developing novel governance arrangements), and **material work** (development and testing of novel technologies in energy production, storage and distribution).

The ultimate goal of the Klaster project is to develop a strategy for the development of energy clusters. The recommendations are supposed to be included in the amendment of the RES Act and the final version of PEP2040. This shows that the action of SIE-field-actors can have a real impact on legislation at the national level. To date, an analysis of barriers to the development of energy clusters has been carried out and appropriate changes to the legislation have been proposed.

Apart from the direct attempts to influence regulation, institutional work led by the SIE-actors might also have some unintended consequences. According to the authors of the „The Concept of Energy Clusters Functioning in Poland" (Ministry of Energy, 2017) establishing an energy cluster has positive consequences that go far beyond the municipality, often emanating across the country. This means that, intentionally, members of the cluster are only able to implement objectives of an individual or local character, which may translate into the implementation of broader (and often convergent) regional and national objectives. In fact, most benefits of energy clusters were identified by the authors at the national level (e.g., contributing to the national energy security, increasing the share of RES in the national energy mix, stimulating the national economic development).

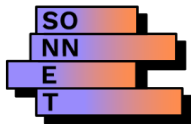


5.2.2.1 Which institutions (regulative, normative, cultural-cognitive) within the 'outside' institutional environment have shaped (including enabled/ impeded) SIEs and its SIE-fields (and how)?

The regulative pillar of institutions relates to rules, laws, policies, standards, and sanctions that are the key elements and mechanisms of compliance in these institutions. In the case of energy clusters, this institutional pillar manifests itself through its absence or incompleteness, rather than as a guide on "action and perspectives by coercion or threat of legal sanction" (Hoffman 1999). The main barrier to the development of clusters is the current law. The definition of a cluster is too general, the benefits of joining a cluster for individual entities are unclear, relations between clusters and distribution network operators are unregulated, and there is a lack of financial incentives. Furthermore, energy law and the energy market are overregulated. Therefore, according to the majority of the interviewees, the current form of energy law should be modified, as it represents a barrier to achieving the primary objective of energy clusters, namely, achieving local energy self-sufficiency (i.e., the 'doing' aspect of SIE).

The normative pillar of institutions takes the "form of rules-of-thumb" (Hoffman 1999) with regard to values, social norms, duties, and role expectations in a particular field (Scott 2001). Actors adhere to these guidelines, as their actions and beliefs are guided forms of social obligation and professionalisation. The EU was the first to signal that civil society has a shared responsibility for implementing the climate and energy policy guidelines. Before this became a norm in Poland, cities and NGOs taking part in EU projects and receiving European grants, learned that they were expected to be actively involved in finding and testing solutions in the context of energy saving, renewable energy production and energy self-sufficiency. This, however, posed significant challenges, e.g., for cities which need to develop a new language of communication treating citizens as equal partners, as well as new methods of operation within the organisation based on cooperation between departments (i.e. the 'organising' aspect of SIE). However, according to the interviewees, there is still a lack of vision in Poland on how to involve citizens in the energy transformation. A vision of the social dimension of this process is necessary for new solutions to be not only economic or technological, but also to support the development of a new energy paradigm that radically changes the role of an individual from a passive energy consumer to an active prosumer.

The cultural-cognitive pillar of institutions refers to the socially constructed, shared conceptions of reality, binding expectations and common beliefs with which the world is interpreted, or meaning is given, such as symbols, discourses and cultural categories. The shift towards dispersed energy production based on RES prosumerism and increased energy efficiency will not be possible without changing the dominant social discourse determining who can take part in the discussion about the direction of the Polish energy sector development. In the conventional approach, only large energy companies and the national government are seen as competent actors who should make all decisions on behalf of the whole society.



However, the development of the SIE-field shows that more and more local actors are engaged in the search for new energy solutions that best meet local needs. This is due to, among other things, a growing public awareness of the challenges posed by the climate crisis and the environmental, financial and health damage associated with running 'business as usual' in the Polish energy system (i.e., the 'thinking' aspect of SIE).

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)?

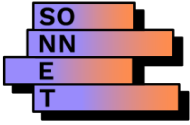
We identified the **growing pressure from ambitious climate and energy policies at the EU-level** and the withdrawal of institutions from financing investments in fossil fuels as the most important trend that made it necessary to seek novel solutions in the Polish energy sector. Distributed energy has been identified as an important direction of the sector's development, which assumes the need to test social and technological innovations at a local level. Such an approach is justified by the recognition of fundamental differences between regions in Poland in terms of economic, social, geographical, geological and other conditions.

The most important factors that shaped the field and enabled and impeded social innovation are connected to the regulatory changes on EU and state level: **The RES Act introduces the definition of a prosumer and feed-in tariffs (2015), net-metering and energy clusters (2016)**. This shapes the rules of participation in the energy system for actors previously not allowed to take part in energy production and exchange and opens new possibilities for initiatives based on local experiments. Other important SIE-field events are competitions for **Pilot Energy Clusters** held by the Ministry of Environment, and the initiation of the research and policy project "Development of distributed energy in energy clusters (**KlastER**)". These allowed for consolidation of different local initiatives and articulations of its challenges and demands. It also stimulated the policy discussion on the role of local initiatives in the future Polish energy system.

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)?

The story of the field's development shows how the new paradigm of the distributed, dispersed energy sector has been shaped. Multiple actors operating on the local level (NGOs, municipalities, citizens, local entrepreneurs) became involved in the process of finding new solutions in the energy sector, which was unthinkable in the previously existing paradigm of a system based on large-scale energy.

Before the government took action to develop and test new solutions in the energy sector, local entities such as local governments, NGOs, companies and citizens were the first to start experimenting with new solutions on the ground. Above all,



these activities were made possible through participation in EU projects, but also through bottom-up creativity and the search for new, sustainable solutions that are more environmentally friendly and increase energy independence.

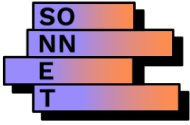
With the EU's increasing pressure to shift towards distributed energy, the government decided to launch a major pilot programme for local multi-actor initiatives to find measures supporting their energy-sufficiency. Energy clusters have been perceived as cornerstones of the transition towards distributed energy in Poland. The competition for a Pilot Energy Cluster Certificate was created by the Ministry of Energy to support their functioning, predominantly in financial ways (Phase 2). However, it soon turned out that practically all clusters have great difficulty in pursuing their primary objective, namely, to achieve energy self-sufficiency. Therefore, in order to verify which legal, technical, economic and organisational means would support fulfilling this ambitious task, the KlastER Project was initiated by the Ministry in cooperation with two important scientific institutes. The project is aimed at developing a strategy for the effective development of energy clusters through experimentation with new solutions and exchange of knowledge between actors involved on both the local and national scale (Phase 3).

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)?

The very existence of the energy clusters - the most important, although still an experimental form of participatory experimentation and incubation in Poland - relies on the creation and maintenance of collaboration between local actors in order to produce and exchange energy. Thus, **every single energy cluster** may be understood as a case of new, formal collaboration. Another important example is brought by the institutions created to boost collaboration between energy clusters, such as the **National Chamber of Energy Clusters** created in April 2020. Finally, the research collaboration between AGH University of Science and Technology, NCBJ - National Centre for Nuclear Research, and the Ministry of Energy, together with stakeholders from science, business, and municipal sector in the "**KlastER**" project provides an example of new collaboration between actors from different sectors, who try to redefine their role in energy system.

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)?

The policy and regulatory context have a key impact on the SIE-field "Participatory experimentation and incubation" in Poland. As the policy impulses for more ambitious energy and climate policy come from the level of EU, the state-level regulations have the most direct impact for the specific initiatives.



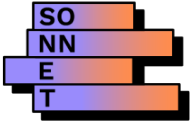
The most important decisions on the EU level include the Directive 2018/2001 on the promotion of the use of energy from renewable sources (RED II), which sets targets for the consumption of renewable energy sources from 2021 to 2030, and the Directive 2019/944 on common rules for the internal market in electricity. These directives introduce concepts such as RECs (Renewable Energy Communities) and ECs (Energy Communities), highlighting the importance of local cooperative solutions for sustainable energy, which is particularly important for the development of energy clusters and energy cooperatives. Members of energy communities cooperate in energy production, consumption, distribution, storage, sale of energy from renewable sources or provision of other energy services. Their main objective is to provide environmental, economic or social benefits. The implementation of RED II to the Polish legal system, expected in June 2021, will likely open a new chapter for the participatory experimentation and incubation.

As for state regulations, the Polish RES Act entered into force on 20.02.2015. It clarifies the principles, conditions and benefits of energy production from RES and defines some important definitions, e.g., of a prosumer. The definition of an energy cluster and an energy cooperative was introduced into the Polish legal order by the Act of 22 June 2016 amending the Act on RES, allowing for the creation of energy clusters. However, the specific legal solutions made it very difficult for energy clusters to operate efficiently.

5.2.2.6 How are 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 story of the field's development shows that initially, multi-actor formats had been developing on the local level, mainly supported by the EU grants. Through testing new energy solutions, previously powerless and unconnected actors started to learn from each other (as in the case of PNEC projects, based on cooperation between entrepreneurs and cities), so that each partner benefited from it (increased awareness of Warsaw residents about energy saving in the Step-by-Step project or real financial savings of people participating in the Energa Living Lab). Later, when the government launched the Competition for the Certificates of the Pilot Energy Cluster and the KlastER project, other forms of cooperation emerged. Actors at different levels (local, regional, national) and from different sectors (entrepreneurs, politicians, scientists) started a joint debate on the challenges related to the development of distributed energy in Poland and possible ways of solving the identified problems.

The experiments described in the report allowed the involved actors to search for new energy solutions that best suit their specific local needs and make the most efficient use of available resources. This is a significant change from the previous paradigm in the energy sector, according to which only large energy companies and the government should decide on the direction of the sector's development and impose the system's rules on smaller players, exposing them to



damages related to, among others, higher energy prices, black-outs, air pollution or environmental and climate risks. Moreover, the KlastER project has allowed local entrepreneurs, local governments, scientists and independent experts influence the strategy of further development of energy clusters and cooperatives, also in a legislative context.

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?

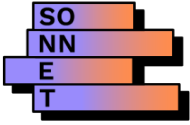
5.2.3.1 How, why, and where do SIE-field-actors and/ or other field-actors conduct activities linked to creating, maintaining and transforming institutions?

The empirical findings show that the SIE-field-actors have been engaged predominantly in **creating and maintaining institutions**. Both in case of small-scale urban experiments with energy efficiency, and in more recent experiments with energy clusters, SIE-field-actors struggle to build and maintain new forms of cooperation and try to maintain these relationships despite difficulties caused by the legal environment in which they operate. New entities such as the National Chamber of Energy Clusters, created to learn from each other and strengthen the voice of the clusters' representatives, provide another example.

On a more abstract level, we can see the efforts of the SIE-field-actors as aimed at **transforming institutions**. The shift towards dispersed energy production based on RES prosumerism and increased energy efficiency is not possible without changing **the dominant social discourse determining who can demand to take part in the discussion about the direction of the Polish energy sector development**. In the conventional approach, only large energy companies and the national government are seen as competent actors who should make all decisions on behalf of the whole society. However, the story of the SIE-field development shows that more and more local actors are engaged in the search for new energy solutions that best meet local needs. This is due to, among other things, the growing public awareness of the challenges posed by the climate crisis and the environmental, financial and health damage associated with running 'business as usual' in the Polish energy system.

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

Individuals engaged in institutional work are usually representatives of specific institutions who have direct stake in the energy transition: 1) members of energy clusters (municipalities, municipal entities, local business, energy grid



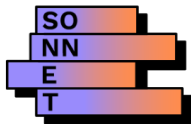
operators and providers of technologies for energy clusters; 2) expert and academics involved in research and consulting, e.g. in KlastER project; 3) policy makers responsible for regulation of the SIE-field; 4) dedicated networks of municipalities, such as Energy Cités.

We can see that the involvement of individual citizens (or their associations) is rather marginal. This poses significant challenges, e.g., for cities that need to develop a new language of communication to treat citizens as equal partners, as well as new methods of operation within their organisation based on cooperation between departments. However, according to the interviewees, there is still a lack of vision in Poland on how to involve citizens in the energy transformation, particularly in the form of energy communities' development. Creating a vision of this process and its social dimension is necessary for the new solutions to be not only economic or technological in nature, but also to support the new paradigm that radically changes the role of local communities from passive energy consumers to active and conscious prosumers, engaged in various forms of collaboration aimed at experimenting with new, energy-efficient developments. In creating this vision, important contributions come from other SIE-field-actors, engaged in lobbying for energy transition.

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.

One example of important activities aimed at **transforming institutions** is the KlastER project. The goal of the **KlastER project** is to develop a strategy for the development of energy clusters, and thus, the transformation of Polish energy system to accommodate renewable, dispersed energy sources. The recommendations are supposed to be included in the amendment of the RES Act, which shows that the action of SIE-field-actors can have a real impact on legislation at the national level. To date, an analysis of barriers to the development of energy clusters has been carried out and appropriate changes to the legislation have been proposed. The dominant activities included research from the domain of social sciences (including law) to diagnose the current situation of energy clusters and to identify main barriers; review of international best practices; creation of the broad network of expert and practitioners; organisation of the cycle of open seminars and conferences with the broad participation of expert and practitioners to discuss the specific problems and features of Polish energy clusters, and to build and strengthen existing networks.

Another example of **creating institutions** is provided by one specific energy cluster, that is, **Zgorzelec Renewable Energy Sources Development and Energy Efficiency Cluster (ZKlaster)** that was initiated in 2017. The cluster is widely regarded as one of the most effective energy clusters in Poland. Its coordinator is also the president of the National Chamber of Energy Clusters. Numerous research activities, development and testing of new technologies are conducted in the ZCluster. Within its structure, there is a start-up conducting experiments in the field of energy storage technology, and the Innovation Hub that created Poland's



first off-road electric vehicle. Currently, the cluster is building the largest photovoltaic farm in Poland.

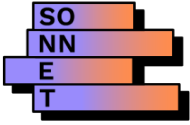
5.2.3.4 What forms do these activities linked to maintaining, creating and transforming institutions take (.e. emotion work, boundary work, strategy work, practice work and/ or values work)? Link back to the 2-4 examples

The SIE-field-actors have been conducting all four types of institutional work: **boundary work** (by redefining the conservative stance about who can be an active player in the Polish energy sector: not only state-owned energy companies and the national government, but also local authorities, small companies, NGOs, citizens, cities etc.), **strategy work** (the main aim of the project KlastER is to develop a new strategy for energy clusters in order for them to become a cornerstone for the dispersed energy sector development in Poland), **practice work** (day-to-day work in developing novel governance arrangements, e.g. by members of energy clusters), and **material work** (development and testing of novel technologies in energy production, storage and distribution).

As for the above-mentioned examples, the community created around the project KlastER is engaged mainly in strategy work, but also in boundary work by changing the discussion of the energy system in Poland. As for the second example, the people engaged in development of ZKlastER are engaged mainly in practice work and material work. However, we see that the leader of ZKlastER, who is a head of National Chamber of Energy Clusters, is also engaged in boundary work and strategy work.

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

Probably the most important enabling signal for the SIE-actors active in the field of participatory experimentation and incubation in Poland were the impulses from the EU, connected to its climate and energy policy. The EU was the first to signal that civil society has a shared responsibility for implementing the climate and energy policy guidelines. Before acknowledging it in the Polish national strategic documents, municipalities and NGOs, by taking part in EU projects and receiving European grants, learned that they are expected to be actively involved in finding and testing new solutions in the context of energy saving, renewable energy production and energy self-sufficiency. These actions started to build awareness and allow representatives of municipalities, energy companies, and small groups of citizens to collect first experiences in coordinating and participating in participatory experimentation in Poland. It also strengthened the dedicated networks, such as Energy Cities, and helped it to support municipalities in their actions aimed at improving energy efficiency. However, it is not easy to know to



what extent these early experiences were used in the next phases for the development of energy clusters.

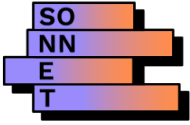
In the second and third phases, key factors which worked as an enabling and impeding factor are connected to the legislative changes. That is, the very possibility to create energy clusters enabled the representatives of the local community to start to work on their local clusters. However, legislative barriers, diagnosed by the KlastER project, made it difficult for energy clusters to fulfil their goal. The RES Act leaves quite a lot of freedom to formulate the rules of functioning of energy clusters, including mutual rights and obligations of its members. For example, the law does not provide any advantages to a cluster's members in terms of connecting their facilities to the network. The key and largely decisive factor determining whether the concept of energy clusters will succeed is the shape of future regulations concerning the organisation of clusters, rules of their operation and a clear incentive for consumers to receive electricity from producers belonging to a cluster. The legislator must answer the question who should benefit from an energy cluster's creation, and in what ways specifically. In order to fully exploit the potential of the distributed energy, it is necessary to overcome organisational, regulatory, technological, economic, and legal barriers, so that all parties are provided with favourable conditions for their development and further experimentation with most efficient solutions.

At this stage, the SIE-actors also engaged in work aimed at creation of new networks and developing new knowledge and skills, as visible in two examples discussed above: KlastER project and ZKlaster. That, in turn, helped them to address the main impending factor: the unfavourable legislation. Again, the impulse from the EU (RED II directive, which implementation is planned for June 2021) may have amplified the impact of their activities.

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

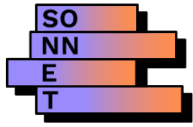
Here, we would like to consider the impact of institutional work of the KlastER project on the legislation. The ultimate goal of the KlastER project is to develop a strategy for the development of energy clusters, and thus, the transformation of the Polish energy system. The recommendations are supposed to be included in the amendment of the RES Act, which shows that the action of SIE-field-actors can have a real impact on legislation at the national level. To date, an analysis of barriers to the development of energy clusters has been carried out and appropriate changes to the legislation have been proposed. Among the recommendations prepared in extensive cooperation with the stakeholders, the most important ones are:

- clarification of legal provisions concerning energy clusters
- extending the definition of an energy cluster to allow participation of housing communities and to include energy storage in its scope of activities



- establishment of a list of "registered clusters" with dedicated privileges related to the settlement of energy input and output by the cluster to the power grid
- clarification of the rules of cooperation of clusters with the distribution network operator
- establishment of specific rules for the acquisition of energy generated in the cluster by participating local government units
- facilitation of obtaining concessions for electricity trading for cluster entities
- facilitation of the creation own network infrastructure by cluster members
- setting a special energy distribution tariff for energy clusters.

Apart from these direct recommendations, we can see that the energy clusters inspired a new concept in the Polish energy policy, that is, a creation of 300 energy self-sufficient areas, signalled recently by the policymakers. By 2030, it is expected that 300 energy self-sufficient areas based on the energy cluster model will be established in Poland, as fields for experimentation and creation of innovative solutions.



5.3 Case study 3: Financing and subsidies for renewable energy in Poland

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

5.3.1.1 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?

Key categories of actors within the SIE-field may be divided according to their function and role played in the field formation and development: from government, municipalities, energy incumbents to banks, investment funds, firms and individuals.

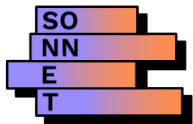
Sources and managing of funding:

Considering relative underdevelopment of this SIE-field compared to UK and NL, and dependence on the subsidies' mechanisms, an importance of public (governmental and local) agencies needs to be. The most important state-level public institution managing public funds is **The National Fund for Environmental Protection and Water Management (NFEPWM)**, and respective ministries. A similar role on the local level is played by regional and local public institutions managing public funds on the level of voivodeships, cities, and municipalities. Those agencies manage national and local public funds, as well as are operators of the European and other international funds devoted to sustainable transition investments. The funds, depending on the type of program, are addressed at and distributed among local governments (e.g. cities), public institutions (e.g. schools, libraries), firms and individuals. NFEPWM offers subsidies and preferential loans. NFEPWM is also the operator of an impactful "My Electricity" program.

Another type of funding are public and **private banks' loans**, often preferential. Loans' recipients may vary from large energy incumbents, local administrative units (e.g., municipalities), private companies and individuals. Yet another field actor, although still less prominent, are **investment funds**. Finally, we observe growing interest in innovative financial mechanisms supporting RES investments, such as **green bonds, Energy Performance Contracting (EPC), and energy investment cooperatives**. Bonds' issuers, energy service companies (ESCO) and investment cooperatives populate a niche of socially innovative initiatives in Polish energy sector.

Recipients of funding:

Recipients of funding are those actors that obtained capital for investing in RES solutions and infrastructure. They may be **local governments units, large energy**



companies, publicly managed institutions, but also private companies, communities and individuals. There are subsidy programs dedicated to those various groups.

Regulatory actors:

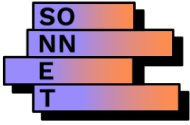
Regulatory actors, playing the role of other-field actors enabling or impeding SIE, are mainly **European regulatory bodies** (including the European Commission) and **Polish legislators and government**. Other actors, such as e.g., World Bank, play a consulting role and may serve as a reference point for SIE-field-actors' agenda. Changes in legal conditions shaped the sequence of phases of the SIE field development.

5.3.1.2 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?

Starting from 2005, the main RES support system in Poland was based on **"Green Certificates"**, or certificates of origin. The system was based on the obligation imposed on energy sellers to obtain and submit to the President of the ERO (Energy Regulatory Office; pl: URE, Urząd Regulacji Energetyki) a certain number of certificates of origin of electricity generated from renewable energy sources (so-called "Green Certificates"), or to pay a substitute fee. That is, producers of energy from renewable sources had guaranteed the purchase of the energy they produced.

From 2015 (RES Act), medium-scale RES installations started to be supported by **the auction mechanism**. Under the auction mechanism, the Energy Regulatory Office allocates fixed amounts of support for each energy source. The RES act also introduced **the system of net-metering** for energy prosumers. The details of net-metering, together with energy prices and costs of micro-installations, have a decisive impact on whether the investment in small-scale RES installation is economically profitable or not, and thus impacts available financial mechanisms and citizens' willingness and capacities to invest in RES. Under net-metering mechanism, the surplus of energy produced by the prosumer may be stored in the power grid and then used by the prosumer during periods of lower production. That is, renewable energy prosumers can use all the energy they produce (which is the most advantageous option) or put it into the grid where it is stored and receive a discount.

The year 2019 signals a new phase in the field of funding and investment mechanisms in RE in Poland by introducing the number of incentives for individuals willing to invest in PV micro-installations. First, since 2019 (i.e., in settlement from 2020) 20% expenses for thermo-modernisation has been made deductible from income. The **tax relief** can be spread over 3 years, and the total cannot exceed PLN 53,000 (ca. EUR 12,000).



Second, in July 2019 the Ministries of Energy and of the Environment launched **the program "My Electricity"** dedicated to households who want to become prosumers. Another important change brought the new, broader definition of prosumer. With the amendment of RES Act from 25.06.2019, prosumers entitled to benefit from net-metering can be both a household and entrepreneurs for whom energy production is not the subject of their predominant economic activity, if they generate electricity from renewable sources in an installation up to 50 kW. This change partly transposes the RED II directive.

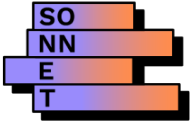
5.3.1.3 What types of interactions/ relations exist between SIE-field-actors and/ or other field-actors? What types of informal and formal alliances, networks, collaborations have existed (and possibly still do)?

There are several types of relations to be identified. From the early phases of the field emergence, we observed the **relation of influence and adaptation** between EU regulatory policies and Polish government. Polish legal context had been gradually adapted to European requirements, starting from the preparation process to Polish access to the EU, and then to more and more demanding and ambitious directives towards energy transition and climate change mitigation. It can be said that this adaptation has been oftentimes reluctant on the part of Polish authorities, both on the level of narrative and an actual implementation. Nevertheless, it is clear that this impact is key for understanding the conditions of RES sector development in Poland.

Furthermore, the government through managing agencies (mainly NFEPWM) shapes relations with SIE-actors and SIE-field-actors, designing and addressing certain financing instruments for them. For example, the auction system and "My Electricity" program enable actors (companies and individuals, respectively) to access the market of RES production, and become subjects in energy exchange. It can be said that - to a certain extent - parties setting the regulatory framework, and offering and managing capital for investments, are **creating (new) field actors** (e.g., prosumers) designing their capacities and functions through funding opportunities' offers. Those (have potential to) change the network of relations between different actors in the energy sector (e.g., energy incumbents and smaller energy producers; energy distributors and local energy communities).

5.3.1.4 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?

The characteristics of those relations result from types of influence described above. The introduction and evolution of different financial and investment mechanisms for RES depends on the evolving public policies, which often provoked heated debates and contestation. Two most important voices in these debates represent, on the one hand, advocates of sustaining the status quo - both in

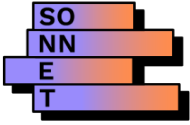


regards of dominant fuel type and organisational structure of the energy system, and on the other hand - advocates of evolution towards decentralised and low-carbon energy systems. For decades, the first position was dominant, which was reflected in the limited support for RES development. During this period, the relation between two positions was clearly 'antagonist'. To a certain extent it was perceived as a zero-sum choice. The tension can be illustrated with the story of FiT in 2015, first put into law, then changed into a net-metering system before coming into force. That undermined the trust of the actors connected and dependent on the SIE-field of finance and investment mechanisms, such as potential prosumers, firms from the sector, and commercial banks granting loans for PV micro-installations. Lack of trust and transparency in the process of policymaking remains an important problem in the relations between policymakers and other actors in the field.

On the other hand, in recent years (esp. since 2019), when a necessity of shifting away from coal has been acknowledged also in the official narratives, we observe a rise of interest in RES financing and development on the part of large energy companies. In consequence, programs such as "My Electricity", addressed at individual prosumers, are welcomed with reluctance by those large players. To a certain extent we can identify an (indirect) competitive relation between "old" and "new" energy producers, considering that financing programs for those two groups rely on the same sources of capital. Although the power between the two groups of SIE-field-actors is still distributed very unequally (in favour of big energy companies, of course).

5.3.1.5 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?

With a little exaggeration, it can be said that the development of the field itself is 'socially innovative' in the context of Polish energy sector. Adapting to European directives, and responding to social and civic pressures, as well as to the emerging market changes (access to RES technologies, rise of electricity prices), have resulted in the emergence of new actors, roles and activities related to energy production and consumption. According to SONNET's conceptual framework, the field of financing and subsidies for RE in Poland is clustered at the intersection of social interaction based on "exchange" and "organizing" manifestation. Within this frame in the Polish context, a key change in social relations is an emergence of the legal and empirical notion of prosumer. Referring to social interaction's type variable, a role of prosumer reshapes the meaning of energy end consumer and changes his/her relationship with an incumbent energy provider/distributor. A prosumer, generating his/her own energy supply becomes to a certain extent independent from an incumbent monopoly. Furthermore, storing a surplus of generated energy in the grid, relying on a net-metering mechanism, prosumer enters in relation with an incumbent energy provider/distributor that is now based literally on a mutual exchange. That shift has the potential of



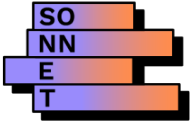
broadening the function of energy from a “narrow” form of commodity to more “complex” form of commodity/asset. A prosumer’s energy use practices would then be potentially shaped by not only consumer’s, but also entrepreneurial objectives (“organizing” manifestation’s variable). The level of understanding of various energy use practices’ impacts is likely to rise, incentivising more efficient use of energy.

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

For decades, energy production and distribution were centralised and dominated by (mainly state-owned) large energy companies. The growing access of financial capital for RES development for different actors - other the traditional energy companies - is slowly but steadily changing the structure of the ownership of the energy sources, and enabling the individuals and organisations previously excluded from the processes of energy production to take this new role. The specific rules assigned to the given financial instrument critically impact who can take this new role in the energy system. We can see that with the passage of time, the possibilities for the individuals / house-owners to finance RES are much more accessible. At the same time, it is still difficult for groups such as energy cooperatives or other forms of community energy to enter the system due to regulatory obstacles. This area is almost entirely shaped by the policies on different levels (European, state, and regional), and public institutions play a dominant role in shaping and supervising the SIE. At the same time, other actors - such as banks, households, and firms from the PV sector - play an active form as intermediaries, receivers of subsidies and loans, or contractors building the actual RES installations. These relations are based on cooperation. However, in the crucial moment when the direction of the policies was decided, like during the time when the RES Act was accepted in 2015, the involvement of different parties in the public discussion included the elements of conflicts.

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?

Actors engaged in financing RES investments, especially smaller installations and micro installations, directly support an agenda of energy decentralisation. Hence, in their nature, those investment activities contribute to gradual changes in power relations within the energy sector. There is certain resistance towards attempts to energy decentralisation, that displays in slowness of changes introduced and their limited scope, as well as instances of withdrawal (e.g., “Anti-wind turbines act”, FiT). Within the field under study, the **key factor in power distribution seems to be an access to the funding and investments mechanisms**, in other words: an issue of who (what entities) are allowed to become investors, under what conditions, and with what benefits (*power to*). Inclusivity of the funding programs is still relatively restricted to certain legal entities (e.g., energy companies, local government units). The status of prosumer still does not include collective prosumers (although changes in the RES Act towards introduction of a such category are expected).

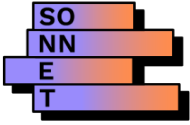


EU policies, forcing Polish governments towards green solutions, create favourable conditions for important shifts in political power between sectors. The Polish RES landscape is now dominated by large incumbents' investments, such as wind farms. But the change in political perspective also creates opportunities for prosumers and smaller investors, and SIE that they carry. Slowly, prosumers become actors to be reckoned with (ca. half a million of voters), and their interests shall be addressed by politicians.

Finally, changes in access to energy sources resulting from development of funding offer are accompanied by broadening the narrative about energy. **While the narrative presenting energy as a key national security issue remains strong and predominant, the ecological and economic narratives are on the rise.** Those changes correspond with a potential challenge to the dominant actors (e.g., large energy companies) brought by an emergence of energy prosumerism and a growing interest in alternative models (e.g., investment cooperatives, EPC contracting and ESCO firms). Also, the language used for promotion of programs such as "My Electricity" and "Clear Air" refers to ecological values, economic rationality, health issues and healthy lifestyle ("Stop Smog"), indirectly weakening the narrative focused on national security.

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 they been legitimised and/ or contested by several actors within the SIE-field? Have there been any key changes over time?

We observe an on-going search for innovative financial mechanisms for RES development, based mainly on the examples from countries with more progressive SIE-fields (namely: Western European countries). Those mechanisms can be: green bonds, Energy Performance Contracting (EPC), or energy investment cooperatives. The leading role in this search is played by experts and think-tanks, entrepreneurs and social entrepreneurs, in many cases inspired by the models widespread in other countries. They stress both the environmental benefit and financial profits as the rationale for the participation in the schemes under development. Efforts to establish and promote such mechanisms become more dynamic after 2019, that is, in the last of the fourth phases we identified in our analysis. We can see the signs suggesting that in the near future, these innovative financial mechanisms will be more popular. Transition-oriented narratives and activities, for decades perceived as "leftist" and progressive, have been getting legitimisation in recent years, due to already discussed EU influences and developments in national energy policies.



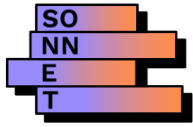
5.3.2 How do SIE-field-actors and other field-actor interact with the 'outside' institutional environment and thereby co-shape the SIE-field over time?

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)?

The regulatory context for financing and investment in RES in Poland, shaped by regulative institutions (**UE, national legislature, national and local governments**), is key to understanding the conditions of this SIE-field. For decades, energy production was almost exclusively reserved for state owned energy companies, closely entangled with the coal sector. Along with exposition to European regulations, and in order to get access to substantive European funds, Polish legislators gradually introduced laws allowing for alternative mechanisms for RES financing to emerge (from public subsidies, through auctions, net metering, tax deductions, to the legal notion of prosumer). In response to those changes in the regulatory environment, private SIE-field-actors, such as banks and private companies (e.g., ESCO) got engaged in developing and offering RES investment mechanisms. However, those mechanisms remain constrained by (still relatively "conservative" in terms of business models and funding instruments) legal regulations (e.g., notion of collective prosumer, that would likely open doors for cooperative solutions, is still not existent in Polish legal acts).

Regarding a normative context, **public opinion** in Poland (that can be perceived as the other field actor, given its potential impact on politicians and decision makers through voting and social pressure) considers RES as the safest and most perspective energy source among all other energy sources (over 80% declares trust in RES in respect to both those criteria). The polls indicate that the vast majority of the Poles consider RES development to be in favour of increasing social and civic influence on energy related decisions. This trend shall be recognised as an enabling condition for SIE-field development. The impactful role of **bottom-up civic and ecological movements**, as well as experts and think-tanks, inspired by and cooperating with similar European actors, should be acknowledged.

Finally, regarding the cultural-cognitive institutions' development and impact, an example of institutionalisation of a **prosumer status** displays reshaping of social understanding of energy production and consumption. Acquiring the status of prosumer incentivises people to adopt a more entrepreneurial approach towards their everyday energy-related practices and habits. It also likely enhances ecological awareness. Innovative financing and investment mechanisms (including individual and collective prosumerism, but also virtual energy cooperative investing, EPC mechanisms, and others) can be perceived as forms of operationalisation of changing social attitudes, providing tools to actively reconstruct the Polish energy institutional field towards gradual



decentralisation, supported by strong normative, economic and institutional influence of European Union.

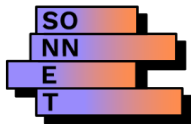
5.3.2.2 What are the key events, external shocks, trends and inter-field interactions that enable/ impede SIEs and its SIE-fields (now and in the past)?

The development of the SIE-field can be outlined as **a series of adaptations to European directives and regulations**, through gradual integration of the Polish regulatory framework to the EU's one, and gaining access to European funds. In the first phase - before **Poland's access to the EU in 2004** - the financing for RES was virtually inaccessible. In the second phase, from 2004 to 2015, the access to the financial mechanisms - mainly subsidies and preferential loans - was shaped by the EU Operational Programs, including Regional Operational Program. That shows the impact of both the EU policy, and state and regional governments', that decided on the details of the specific programmes. The system of the Certificate of Origin (so-called Green Certificates) offered limited support for new RES.

At this period, the discussion on the shape of the more systemic support for RE on the state level started, but policymakers were not able to agree for the specific solution until **2015, when the RES Act was finally accepted**. That resulted from the heated public debate on the best system of prosumers' support: at the first version of the RES Act, they were supported through FiT, which was changed into net-metering before the Act came into force.

Next phase, from 2015 to 2019, is marked by the introduction of two main mechanisms: auctions for middle-scale RES and net-metering for prosumers' micro-installations. At this period, the **electricity prices have risen** significantly, especially for enterprises and municipalities (due to the special policies protecting households from rising energy prices). Together with the **decreasing prices of devices for energy generation** (mainly PV), that created strong incentives for investment in RES. However, at this time, we observed instances of regulative "backlashes" or "step-backs" in SIE-field development. The broadly discussed example is the so-called "Anti-Wind Turbine Act" from 2016, setting unparalleled standards of the distance between human settlements and wind turbine locations, which virtually stopped the dynamic development of wind turbine power plants.

Nevertheless, at this period, thanks to the relentless work of activists, the issue of adverse effects of fossil fuels use - both for air quality for heating and climate in energy production - started to be **recognised by the public as an issue of grave concern**. Public opinion polls showed the positive image of low-carbon energy sources and the willingness to invest in RES and energy efficiency. All these trends participated in creating the enabling conditions for more innovative forms of financing for RES, which started to be considered at this period, to become more mature at the next stage. The fourth and last phase started in 2019. It is marked by the introduction of highly popular public programs of public subsidies and tax allowance, which encouraged the record number of individuals to invest in PV. For the first time, the individual prosumers become a significant part of the Polish energy system.



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)?

Without a doubt, those events and trends conditioned the SIE-field functioning and allowed its emergence. As already mentioned, the field has been 'externally-driven', i.e., dependent on the political and social decisions and trends (especially coming from the EU). Polish authorities, and in response to the law changes - private and individual actors, seem to be responsive and adaptive to the changes.

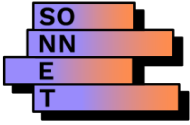
However, it would be fair to say, that once given opportunities, the SIE-actors (individuals, companies, communities) display an active and entrepreneurial attitude and make an effort to exploit circumstances. Also, the energy incumbents and decision makers are gradually more accepting of the changes, acknowledging external conditions such as climate crisis and EU policies and directives, but also seeing opportunities in RES development. In recent period, the top-down initiatives based on market mechanisms started to be offered. Energy Performance Contracting (EPC) and energy investment cooperative provide important examples. Although so far, they did not have significant impact, their existence illustrates the search for new, more innovative financing models of more innovative organisational forms of developing RES. The regulative changes currently under discussion, such as allowing for operation of virtual and collective prosumers, are likely to strengthen this trend.

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)?

Poland's access to the EU in 2004 enabled and facilitated knowledge and good practices exchange. Polish social and environmental movements benefited from lessons learnt from their more experienced foreign partners. They also used them to leverage their voice in lobbying for RES Act development, and more broadly - creating conditions for RES development in Poland. Hence, the pressure on Polish authorities to adjust legislation to requirements of transition comes from two sides: from outside (EU's directives) and from inside (Polish social and civic movements and think-tanks, emerging RES sector's companies, public opinion).

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 development of the SIE-field is strongly dependent on the climate and energy



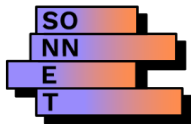
policies decided on the level of the state and of the European Union. **The state regulations have a decisive impact** on what kind of finance mechanisms is accessible - and for what types of actors. It has both direct impacts, when it decides about the rules of the distribution of the public funds, and indirect, when it sets the rules which impact the profitability and the very legality of various market-based solutions which do not rely on public funds. Regional and urban policies also play a role; however, it heavily depends on the economic condition of a given locality (whether or not there are local funds for investment in RES available), and they are conditioned by nationally set legal constraints.

It is worth stressing that the **state policy is under a strong influence of the European Union's energy and climate policies**. One example of this impact provides the Operational Programmes supporting RES development. Another one - the fact that the very energy strategy accepted by Poland has to accommodate the RE targets accepted in RED I and RED II directives. Additionally, the EU policies shape "external" factors, such as the rising prices of electricity from coal resulting from the ETS system. In effect, the most important SIE actors represent public institutions, such as The National Fund for Environmental Protection and Water Management (NFEPMW), or private and special banks. Bottom-up initiatives, such as energy cooperatives, still struggle to have an impact on the field, but we can see the signs showing that they are likely to be more significant in the near future.

5.3.2.6 How are 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?)

Funding RES and creating the legal status of prosumer, in their very nature, bring a potential of inclusion, democratisation of power relations within the energy sector. For decades of centralised monopoly of state-owned energy companies, access to the field has been closed. So, the emergence of the SIE-field of RES financing and investments in itself somehow transforms power relations. That being said, we should acknowledge the scale and pace of those changes. A significant increase in the number of individual prosumers, and RES (mainly PV) micro installations, has been observed only very recently. The large-scale investments in RES are still carried by the dominant energy companies. The legal context, especially concerning collective prosumerism, opportunities and incentives for energy communities, is still underdeveloped. Field's dependence on the public subsidies limits an actual empowerment of smaller players.

At the same time, the emergent changes lead to quick and dynamic development of new market segments (such as PV service companies and RES investments consulting). The public awareness of the climate crisis and the role of the energy sector in its mitigation has grown significantly. Hence, on the level of narratives and attitudes (in a way - symbolic power), the steady transformation is to be observed.



It is an interesting moment to investigate this SIE-field in Poland, to (potentially) research the change in the making.

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?

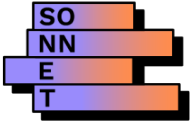
For finance and subsidies for RES, the regulative environment is of crucial importance. As the energy sector remains highly regulated, it is a decisive factor which impacts whether specific actions are economically profitable or even legal. Within this SIE-field, key activities consist of **lobbying** for regulations supporting RES, **creating endeavours** and service firms supporting RE installations and production (e.g., ESCO firms, PV service firms), **creating** subsidy and preferential loans **programs** within relevant institutions (NFEPWM, banks).

The changes and developments occur on the level of **law** (esp. RES Act and creating a legal status of prosumer), on the level of **practices** (esp. micro installations, but also auctions, EPC), and on the level of **networking** (e.g., knowledge exchange with foreign organisations, experts and NGOs, attempts to establish energy cooperatives, community energy projects).

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)?

Due to the SIE-field dependence on regulative conditions, key institutional work takes place at public regulatory institutions (government, ministries, but also sector institutions). Significant influence of relations and negotiations on the EU arena should be acknowledged (pressure on transforming institutions within the energy sector). On the other hand, there is a bottom-up work within an emerging practice of prosumerism, and attempts to establish RES investment communities, and energy communities. Furthermore, within large energy incumbents, there are efforts towards colonizing and dominating the developing RES sector (i.e., to maintain its centralisation and limit its decentralisation, through maintaining legal constraints and through market mechanisms).

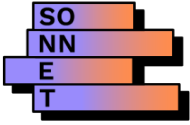
Regardless of constraints, the analysed trend towards RE production and its financing decentralisation is beneficial for emerging actors (individual prosumers, soon-to-be collective prosumers, service companies). Actors such as banks granting loans, as well as NGOs and think-tanks supportive of the transition, also benefit. On the other side of the scene are coal industry and coal-based energy producers, who are losing guarantees of public financial support, and who



are experiencing significant increase of costs and forecast of forced end of their operations.

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.

- 1. Creating institutions:** One of the examples of the institutional work conducted through the active and successful lobbying is done by the Krakowska Elektrownia Społeczna (Krakow Social Power Plant), which one of the main aims is lobbying for the energy transformation. They already have several successes in their efforts to change the law. For example, they tried to extend the period for settling discounts for individual prosumers from 15 years to 25 years, which they managed to achieve. In the context of energy cooperatives, they also sought to formally introduce the definition of collective prosumers and to amend the law so that it is possible to establish energy cooperatives also in cities (current definition of energy coops applies only to initiatives in the countryside). It has already been announced that these changes will be introduced in the next amendment to the RES Act.
- 2. Transforming institutions:** an important example discussed in our report is involvement of Piotr Woźny's team in development of "My Electricity" programme within related ministries and NFEPWM. Seen as institutional entrepreneurship, those efforts were aimed at creating a new financing program for prosumers within quite unfavourable context of incumbents dominated energy-related institutions.
- 3. Creating institutions:** Yet another example is a new NFEPWM's endeavour (starting from February 2021) combining the subsidy, available under the Clean Air program, with the financing of the investment from a bank loan. It is also the implementation of the recommendations of the World Bank. The aim is to significantly broaden the outreach of the Clean Air program. "An important aspect of this offer will be the coverage of loans with Bank Gospodarstwa Krajowego guarantees, which will allow the program to be extended. Thanks to BGK guarantees, the loan availability will be much greater. Banks will be able to propose better investment financing conditions. For example, by resigning from the requirement to use additional security." Many commercial and cooperative banks have already announced their interest in joining this initiative.
- 4. Transforming institutions:** the attempts to transform an existing institution of prosumer by introducing a collective prosumer legal status. This process is ongoing and involves various actors, such as think-tanks, NGOs, independent experts, as well as established public institutions and energy incumbents. The plans focus on designing models of consulting and models of investments that would lead to creating energy cooperatives/communities' models with the greatest potential.

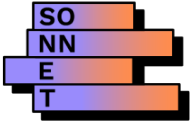


5.3.3.4 What forms do these activities linked to maintaining, creating and transforming institutions take (i.e. emotion work, boundary work, strategy work, practice work and/or values work)? Link back to the 2-4 examples

1. KES example can be analysed through the lens of **strategy work**, as well as **values work**. Regardless of ongoing struggles with actually practically launching the SIE-initiative, its members make an effort to influence decision makers and to create more favourable conditions for collective prosumerism. They also conduct educational and awareness raising activities, in order to influence both public opinion and decision makers, as well as those who would potentially either join the initiative or establish a similar one. KES is an example of grassroots, long-time oriented endeavour that aims to first build the conditions needed to their actually intended activity.
2. "My Electricity" program: Although the financing mechanism itself is not particularly innovative, building such a support program for prosumers (new institutional status) is perceived as a break-through in Polish energy landscape. Hence, it can be analysed in terms of **boundary work**, i.e., reshaping an understanding of the relationship between energy producer/provider and a consumer.
3. "Clean air" program development: combining subsidy with the financing of the investment from a bank loan. Such an alliance bears features of a **strategy institutional work**, bringing together different institutional logics in order to make a desired outcome more effective.
4. Collective prosumer: announced changes in RES Act allowing collective prosumerism (new legal status) is an example of both **strategy work and boundary work**. It is strategic, because it would result from long-lasting lobbying efforts on the part of NGOs, experts and social initiatives. It is also likely to further change the energy sector's landscape, by introducing new actors and further decentralising RE production. It is boundary, because it would reshape, even further than an individual prosumer legal status, an understanding of the relationship between energy producer/provider and a consumer.

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

1. Impeding factors limiting KES development are regulative constraints, namely lack of collective prosumer in Polish law, and limited definition of coops. Among enabling factors, the key ones seem to be: connections and lessons learnt from foreign initiatives that inspired KES establishment; networking and communication skills of its members; shifting of public attitudes towards more



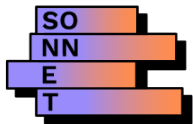
favouring RES development and financing; pressures from the EU towards decentralisation of RE production.

2. Impeding factors for "My Electricity" program were: reluctance on the part of institutional gatekeepers, due to their relations with coal sector and energy incumbents; institutional inertia, conflicting interests between related ministries. Among enabling factors, the key ones seem to be: shifting of public attitudes towards more favouring RES development and financing; pressures from the EU towards decentralisation of RE production; improvement of economic status of many Poles (who had capital to invest in micro installations); successful PR of the program and its simple structure.
3. Impeding factors may be, again, regulatory constraints, as well as challenges of cross-sectoral cooperation. Among enabling factors, the key ones seem to be: shifting of public attitudes towards more favouring RES development and financing; pressures from the EU towards decentralisation of RE production; pressure on the part of potential prosumers (individual and collective) for ensuring more RE. financing opportunities.
4. Impeding factors for establishing legal status of collective prosumer: reluctance on the part of institutional gatekeepers, due to their relations with coal sector and energy incumbents; institutional inertia, conflicting interests between related ministries; relatively weak bargaining position of potential coops. Among enabling factors, the key ones seem to be: shifting of public attitudes towards more favouring RES development and financing; pressures from the EU towards decentralisation of RE production; improvement of economic status of many Poles (who had capital to invest in RES); pressure on the part of potential prosumers, as well as NGOs, think-tanks and experts, for ensuring more RE financing opportunities.

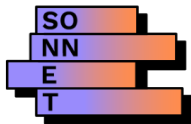
5.3.3.6 What have been intended and unintended effects (i.e. contributions) derived from conducting institutional work? What influence have they had on SIE-field and 'outside' institutional environments? Link back to the 2-4 examples

Main impact of the discussed examples on 'outside' institutional environment seems to be an emergence and development of the new market sector providing PV and heat pumps services, as well as consultancy for prosumers. Number of new jobs has been created in this new competitive environment.

Furthermore, due to intense lobbying activities, multi-stakeholder voice was heard. Popularity of "My Electricity" program, as well as awareness rising activities of independent experts and organisations such as KES, lead to growing interest in establishing energy communities (e.g., in the apartment buildings in cities), that is supported by local municipalities.



Another important consequence, on more general social level, is that the topic of energy production and consumption became a subject of discussion. General public, energy consumers, became more aware of energy issues, as well as the role of energy sector in climate crisis. That may be perceived as a contribution to maturity of civic society.



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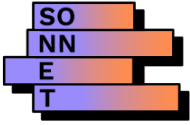
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Appendix: Three case study reports

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