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SOCIAL THEORY: CENTRAL AND EASTERN EUROPE

STAN**RZECZY**/26 TEORIA SPOŁECZNA. EUROPA ŚRODKOWO-WSCHODNIA

/// NEW ENERGY REGIMES

ISSUE EDITORS: AGATA STASIK, ROMAN CHYMKOWSKI, WŁODZIMIERZ KAROL PESSEL

TRANSFORMING ENERGY SYSTEMS, TRANSFORMING SOCIAL SCIENCE
LIFTING THE RESOURCE CURSE
THE GRASSROOTS ENERGY TRANSITION
THE TAINTED SHADOW OF THE GREEN REVOLUTION
ENERGY CITIZENSHIP
FANTASTIC ENERGY SOURCES

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#26

CONTENTS

INTRODUCTION

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AFTER FOSSIL MODERNITY: TOWARDS NEW ENERGY REGIMES AND NEW SOCIAL SCIENCES

Agata Stasik
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Sociology is a late child of western modernity. As an institutionalised system of knowledge, it was born of accelerated urbanisation, the spread of capitalist labour relations, and other fundamental social changes that were part of the overall process known as industrialisation (Smil 2018). Machines powered by energy from burning fossil fuels – especially coal and oil – were the driving force of the process. The western societies studied by the classic thinkers of sociology were formed on this basis.

Not only did the use of fossil fuel energy increase production, it also accelerated the circulation of goods and people. European expansion would not have been possible without these resources and the "invention of speed" (Studeny 1995). Colonial empires, whose bloodstream consisted of sea and land transportation routes secured by armies moving at unprecedented speeds, could not have been built (Ward 1994; Birtchnell et al. 2015). The forced or voluntary mobility of people – migration for work, education, or better living conditions on the one hand, and travel or tourism on the other – were associated with the development of public and individual means of transportation. In this regard, the best metonymies of modernity are the train and car. While they use different kinds of fossil fuel (coal and oil), both have permanently shaped our civilisation (Seiler 2008; Esposito 2020).

The energy from fossil fuels, which has various forms and many practical applications, can also be understood metaphorically. It is a powerful force that often goes unnoticed yet sets entire societies in motion. Never in the history of the world has social mobility – both vertical and horizontal – reached such a scale. From the beginning, the energy that powers industrial societies weakened the assignment of individuals and entire groups to their place in the social structure. In the capitalist, industrial economies of Europe and the United States the importance of coal meant that a specialised part of the working class – the miners involved in extracting the coal – controlled the supply and thus gained a measure of subjectivity at the price of their perilous work (Mitchell 2013).

Currently, there are many indications that we are in the midst of another civilisational change. It involves a planned and forced shift away from "fossil modernity" (Folkers 2021), that is, an economy based on an energy industry that relies entirely on fossil fuels. It is impossible for the process to take place without social and political consequences, although it is very difficult to foresee all of them today. For this reason, energy research is a fascinating field for the social sciences and humanities, as the texts in this issue of *State of Affairs* compellingly illustrate. We can see how energy research serves as a test that reveals the strengths, limits, and dilemmas of our present-day social sciences and humanities, while also pointing towards possible developmental trajectories in the years or decades to come.

Four features of this research field contribute to its significance. First, it compels us to pay attention to material infrastructure in analysing stability and change, and causes us to question approaches that are blind to this dimension of reality (Smil 2023). Second, as the heart of economies, the energy industry is and will continue to be a political and geopolitical issue – not only due to specific technologies but also due to the geography of energy grids (Yergin 2020). Third, this research field entails the challenges of interdisciplinarity and transdisciplinarity: the understanding of complex systems often requires the integration of methods and insights drawn from various academic disciplines and fields of practice (Loorbach et al. 2017). Fourth, it raises dilemmas of neutrality and engagement. In the face of the climate crisis and the realisation that change in the energy sector is among the most crucial responses to it, energy researchers may find themselves compelled to adopt new roles and new forms of collaboration with other actors – or they may refuse to answer this call and strive to remain neutral. We believe that the present issue of *State of Affairs* will appeal not only to scholars directly engaged in energy research, but also to

a broader readership interested in the challenges and future of our evolving disciplines. At the same time, the significance of the topic for our collective future extends to all those who are concerned with energy not only as scholars but also as citizens and users.

How do the texts in this issue shed light on these tensions and dilemmas? Rather than summarising each article, we will provide a brief overview of how some of the texts engage with the fundamental challenges of energy research. In doing so, we aim to highlight the diversity of the research perspectives we seek to celebrate. As editors, we do not align ourselves with any particular stance, although some are closer to our views as authors and researchers than others.

From its very beginning, social and humanist research on energy has attracted scholars from a wide range of disciplines – from historians and sociologists to philosophers and cultural theorists. A frequent analytical approach conceptualises energy systems and their related institutions as a "seamless web" (Hughes 1986): a co-evolving arrangement sustained by the alignment of technologies and institutions that emerged within specific configurations of power but have since acquired a resilience of their own. This perspective powerfully foregrounds questions of structure and agency, continuity and change, particularly, though not exclusively, in the context of the urgent call to move away from fossil fuels. At the most fundamental level, such research acknowledges the role of fossil fuels in modern civilisations. Adam Hanieh's book *Crude Capitalism: Oil, Corporate Power, and the Making of the World Market*, which is reviewed in this issue by Bartosz Matyja (2024), falls within this line of inquiry. It shows that material infrastructure is the underlying fabric of the current power structure. This perspective makes any discussion about changing energy systems – or altering our relationship to energy itself – a conversation about the altered future of modern societies in a zero-carbon version. Bartosz Kamiński (2024) explores the topic in his article "The Energy Transition Is Just the Tip of the Iceberg." Michael Marder's book *Hegel's Energy: A Reading of* The Phenomenology of Spirit (2021), reviewed by Bartosz Wójcik (2024), takes this consideration to an even higher level of abstraction in proposing a reimagining of Hegelian dialectics ("reframing energy as the ontological and material core of Spirit's unfolding"), while at the same time addressing pressing socio-political and ecological crises.

However, it is not always necessary to remain at the level of questioning fundamental systemic change. At times, the tools of the humanities and social sciences are employed to better understand where such change

might begin. This is what makes research on the social aspects of energy so compelling. It enables us to ask both about the future of capitalism and about a district heating plant in a provincial town, and to work to make them part of the same conversation.

In this vein, Błażej Popławski in his article "Lifting the Resource Curse in Africa's Energy Sector" (2024) systematically examines how history and institutional structures have shaped the processes and outcomes of fossil fuel extraction in Nigeria, Angola, and Ghana. He seeks to identify what kinds of changes are needed to ensure a more equitable distribution of the benefits arising from these processes. Discussion of the different relationships that energy production has created in certain places is inextricably linked to the broader discourse on overcoming the legacy of colonialism.

In "Transforming Energy Systems, Transforming Social Science" Agata Stasik and her co-authors (2024) explore the role of social scientists in collective action aimed at reconfiguring technologies, institutions, identities, and interests, in order to replace specific fossil-fuel solutions with low-carbon alternatives. They conceptualise this process as collective experimentation. Their approach resonates with Alexis Shotwell's (2016) notion, referenced by Maja Rup, of "shaping unpredictable futures" – a framework that rejects the illusion of full control, ideological purity, and linear progress. Instead, it advocates for building the future through an embrace of complexity, interdependence, and action in the face of uncertainty. Jerzy Stachowicz draws attention to the role of imaginaries and imagination as resources for shaping new configurations. He investigates the kinds of energy to be found in Polish science fiction of a century ago (Stachowicz 2024).

Framing the energy system as a configuration built on interwoven infrastructures and institutions emphasises its role as an invisible foundation for both everyday practices and entrenched relations of power and exploitation. This perspective is one of the main reasons why many energy scholars are compelled to move beyond traditional disciplinary boundaries. The tendency is evident in several outstanding works reviewed in this issue. For example, Szymon Wróbel writes in his review that the book *Energy and Experience: An Essay in Naftholog*y, by Antti Salminen and Tere Vadén (2015), is "a beautiful example of transdisciplinary and openly anti-disciplinary thinking […] that emanates […] freshness and […] courage and power of thought. […] The authors combine reflections from the fields of economics, engineering, sociology, history, and, above all, philosophy" (Wróbel 2024: 288). The contribution of the philosopher Ewa Bińczyk in her work *Uspołecznianie antropocenu* is equally significant and is reviewed here by Andrzej Frelek. The

book explores the promises of post-growth as a fitting response to the planetary environmental crisis and delineates a new intellectual and practical field shaped by insights from planetary science, ethical reflection, economics, social research on systemic transformations, and other areas. Similarly, most of the authors appearing in our issue consciously draw on the insights of multiple disciplines. Błażej Popławski, in "Lifting the Resource Curse in Africa's Energy Sector" (2024) employs a multidisciplinary perspective grounded in history, economics, political science, and development studies. Maja Rup in "Energy Ethics: The (Im)Purity of Renewable Energy Sources. An Analysis of Offshore Wind Farms in the Baltic Sea" (2024) works within the framework of energy humanities. She engages with critical posthumanism and feminist new materialism to understand ethically problematic issues and to identify the most vulnerable points and the actors most likely to be affected by the new "green energy" projects. This allows her to bridge the discussion about the possibility of simultaneous economic growth and ethical energy production with an analysis of a specific case. Katarzyna Iwińska (2024) presents a detailed analysis, operationalisation, and empirical application of the concept of "energy citizenship." Although the term was originally proposed by a scholar affiliated with social geography, it currently crystallises debates, research, and policy proposals across the broad field of "social studies of energy," which brings together sociologists, anthropologists, economists, and public policy scholars, among others.

The book *Climate and Energy Politics in Poland: Debating Carbon Dioxide and Shale Gas* by Aleksandra Lis (2020), which is reviewed here by Claudia Foltyn (2024), also crosses disciplinary boundaries. It employs analytical concepts from science and technology studies to examine how new entities, such as carbon dioxide and shale gas, reshape knowledge production and governance structures at the local, national, and EU levels.

In this context, the article by Radosław Tyrała and his co-authors, "The Grassroots Energy Transition in Poland through a Sociological Lens" (Tyrała et al. 2024), stands out. Although the research they discuss was conducted as part of an interdisciplinary and practice-oriented KlasER project, they remain consistently grounded in the concepts and theories of sociology and explore which classical approaches best capture the dynamics observed in the field. Paradoxically, adhering strictly to the methods and language of a single discipline has become the exception.

The dominance of inter- and transdisciplinary approaches stems in part from responses to how climate science findings on fossil-fuel use will affect the social sciences: their purpose, their criteria for success or

excellence, their methods and theories. Energy research is thus a fascinating prefiguration of a possible future for the social sciences.

Stasik and her co-authors address this issue directly. They note that a significant portion of contemporary energy research assumes an engaged stance, with researchers actively supporting processes of transformation. At the same time, by adopting this role, researchers are faced with a range of new expectations, for which they are not always well prepared, and which may not be fully supported by the institutions that hire and evaluate them, or by academic promotion systems that are still largely oriented towards traditional disciplinary achievements. Nevertheless, the authors do not abandon the idea of new roles for social research in the processes of socio-technical change but rather advocate for greater institutional support for such risky experimentations.

The texts published in this issue remind us, however, that if the humanists and social researchers who engage in the energy transition are motivated by an awareness of the harmful consequences of fossil-fuel dependence, this does not necessarily imply their support for current decarbonisation policies. On the contrary, many writers reflect critically on the blind spots and dead ends of present efforts towards change, particularly where these fail to adequately address the violence, injustices, and inequalities produced and sustained by the existing solutions. The insufficiency of "green energy" projects is directly confronted in the article "The Tainted Shadow of the Green Revolution: The Cobalt Conundrum in the Democratic Republic of Congo" by Błażej Popławski and Roman Chymkowski (2024), which exposes the realities of cobalt extraction in South Africa. The authors' analysis sheds light on the often-overlooked material foundations of so-called clean technologies and reveals the new forms of suffering and exploitation that are entailed in producing them. Similarly, in analysing the development of offshore wind farms in the Baltic Sea, Maja Rup argues that limiting the energy transition to a mere substitution of one energy source for another, without addressing non-emission environmental impacts and social justice concerns, will cause the transition to fall short of its promises. On the other side, in the book *Gaz łupkowy w Polsce. Historia, magia, protest* (Szołucha 2021), which is reviewed in the issue by Anna Ptak (2024), Anna Szołucha draws on anthropology, political ecology, and critical social theory to remind us that projects involving exploration for fossil fuels may also harm local communities.

The analyses offered by these authors point again to the broader and more fundamental questions explored in Bartosz Kamiński's article and in

Ewa Bińczyk's book (reviewed in this issue): namely, whether a successful energy transition is possible only if it involves radically reducing energy consumption and abandoning the pursuit of constant economic growth. But even if the ethical case for such a shift is compelling, how might it actually be implemented and administered? This question brings us back to the first key feature of the energy humanities and the social sciences: the issue of structure and agency, stability and change, and the need to understand the mechanisms of a deep socio-technical transition.

We hope readers will find this collection of texts, which give voice to a wide range of positions on researcher engagement and the theoretical and methodological choices that it entails, worthwhile.

The texts in the first part of the issue exemplify the different roles that researchers have adopted in relation to the transformation of the energy system. This variety of perspectives reflects the richness and complexity of the ongoing discussions about the role of science and researchers in the context of socio-technical change. Agata Stasik and her co-authors view researchers as supporters of energy-transition initiatives. In order to provide possible solutions, such researchers should not only draw on social theories and methods, they should also, most importantly, collaborate with field actors. Katarzyna Iwińska offers an in-depth review of the meanings of "energy citizenship" and discusses the research tools and empirical findings derived from the term. She explicitly aims to support a just and democratic energy transition, though her article does not employ a co-creation framework. Błażej Popławski, by analysing the historical and institutional conditions of the "resource curse," seeks to make recommendations that could lead to positive change in regions whose development trajectories have so far failed to ensure a fair distribution of benefits from resource extraction. Radosław Tyrała and his co-authors do not set goals related to assisting the transition. Rather, they aim to understand the dynamics of energy-related processes by applying classical sociological concepts, such as the "sociological void" and "apparent actions." While their conclusions may have practical implications, this is not their explicitly stated focus.

In the second part of the issue, we invite readers to consider a form of critical, engaged scholarship that interrogates the project of sustainable/clean/green transition and points both to its local failures and to the conceptual contradictions inherent in the pursuit of green growth. Bartosz Kamiński contrasts the liberal vision of green growth with the post-growth paradigm. Maja Rup highlights the ethical dilemmas posed by large-scale infrastructure projects undertaken in the name of green energy. Błażej

Popławski and Roman Chymkowski examine practices connected with cobalt extraction in the Democratic Republic of the Congo and reflect on the implications of these for the broader vision of a green transition. Finally, Jerzy Stachowicz, while not addressing the limitations or disappointments of the green transition directly, offers a historical review of imaginary energy futures and reminds us of the crucial role that imagination and shared visions have played in opening new paths for transition.

Finally, it is important to emphasise that while we hope this issue offers an interesting overview, it should not be regarded as a comprehensive survey of the most significant trends in energy research either in Poland or globally. Analyses of several critical topics, such as the challenges and strategies of coal-transitioning regions, energy poverty, or the development of nuclear energy, are notably absent. However, some of these topics can be found in the included transcript of a discussion between academic sociologists and energy experts with sociological backgrounds. In the discussion, which was moderated by Marta Stumińska-Kutra and centred on Agata Stasik's book *Przełamać klincz węglowy. Zbiorowe eksperymentowanie wokół zrównoważonej transformacji*, Aleksandra Wagner, Radosław Tyrała, Kamil Lipiński, and Marta Anczewska reflect on the usefulness of the concepts of carbon lock-in and collective experimentation for understanding and changing the energy landscape. This discussion helps readers better understand how current dilemmas in transforming the energy system in Poland can be viewed through the lens of changing social-science disciplines, and also to see the risks of experimenting with engagement and transdisciplinarity. With that, we would like to invite readers to continue following – and contributing to – the growing fileds of social studies of energy and energy humianities by sharing insights that inspire both critical thought and transformative action.

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FROM OBSERVATION TO ENGAGEMENT

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TRANSFORMING ENERGY SYSTEMS, TRANSFORMING SOCIAL SCIENCE: SOCIAL RESEARCHERS AND COLLECTIVE EXPERIMENTATION IN ACTION*

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/// 1. Introduction

The accelerating climate change and the coexistent biodiversity crisis are among the many recognised challenges stemming from human activity's impact on the atmospheric composition and terrestrial living conditions (Steffen et al. 2015). The response to the threats identified via the work of natural scientists is a call for urgent, globally coordinated efforts towards a deep sustainable transition (Schot & Kanger 2018; Huang & Zhai 2021;

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Bińczyk 2024). Sustainable transition is most advanced within the energy sector, which is responsible for the majority of greenhouse gas (GHG) emissions. What is more, to meet the set objectives of GHG rapid reduction, similar transitions must soon extend to other industries, such as agriculture and construction (IPCC 2018: 17–18). The farmers' protests against the Green Deal and the Nature Restoration Law in numerous European countries in 2024 remind us how crucial it is to maintain social support for this policy direction (McLoughlin 2024). The complexity of this undertaking can be overwhelming as it entails the widespread and rapid introduction of novel technologies; their integration with existing infrastructures; accompanying lifestyle, behavioural, and business model changes; and winning and maintaining public support for these processes by creating benefits distributed fairly in highly diverse contexts.

As sustainable transition demands an unprecedented mobilisation of resources, it is worth asking how the skills and knowledge developed within the social sciences can serve as valuable assets in this process. We argue that such transition requires not only an integrative trans- and interdisciplinary approach (cf. Cherp et al. 2018) harnessing the explanatory and predictive power of different academic disciplines, but also the emergence and consolidation of new understanding of the social researchers' role in the process. To put light on that, we reflect on our experience from a specific research project aimed at supporting stakeholders in creating solutions that would foster enduring support for sustainable transition by aligning with local resources and needs. Inspired by the understanding of socio-technical change as a translation – and not, for instance, a diffusion of innovation – prevalent in actor–network theory (ANT), we propose to frame the dynamics of socio-technical change as a collective experimentation for sustainable transition (cf. Stasik 2024). That allows us to capture the necessity for simultaneous modification of attitudes, interests, institutions, and infrastructure in the process of developing sustainable solutions. We argue that the successful support of this processes necessitates a shift in both the understanding and performance of social research – as well as in the social institutions that enable this work. Translation will only be effective if it also engenders change within the sociological community itself. With that argument, we contribute to the rich and diverse discussion within the social sciences that has emerged to support sustainable transition processes (Loorbach et al. 2017). To acknowledge that, below, we shortly present the perspective of sustainable transition studies on the transition dynamics, introducing the notions of carbon lock-in and multi-level perspective.

In the following section, we provide a detailed account of the actions our team undertook within the "Green Heat" project, led by researchers from the Institute of Fluid-Flow Machinery of the Polish Academy of Sciences and conducted in the city of Legionowo.[1] Our objective was to support the creation of local solutions for low-carbon heating. We reflect on how the involvement of social scientists can enhance this process of collective experimentation.

We start with the observation that the social scientists attempt to support sustainable transition processes in several ways. First, they develop theoretical models of change governance that account for the social dimensions of this process – unlike the necessary planning that focuses on the transformation of technological systems – thereby facilitating better planning and management of the transition process. Second, they assist stakeholders – from European policymakers to local informal groups campaigning for cleaner air – in developing specific solutions that have the potential to replace fossil fuel-based systems, with special attention paid to the social dimension of the process. Third, there is the potential to integrate these perspectives: theories and models developed by social sciences can support action-oriented stakeholders, and the knowledge gathered in this process, transformed by the effort of engaged social scientists, can help to further refine models of sustainable transition governance.

All these directions of action encourage the search for new approaches to scientific work and collaboration with societal partners. Those include incorporating the needs of stakeholders from the very beginning of the research process while leveraging the strengths of social sciences over, for instance, consultancy research – namely keeping its ability to generate knowledge applicable beyond the initial context, and subjecting developed models to transparent evaluation and discussion. The latter often relies on close collaboration with researchers from other fields, such as engineering or natural sciences. Scholars often refer to this mode as transdisciplinary or transformative research. Furthermore, considering the dynamics of expectations within the academia, both towards individual scholars and the institutions that employ them, transformative research must also be

[1] The "Green Heat – Towards Collaborative Local Decarbonization" project benefited from the Applied Research Programme grant from Iceland, Liechtenstein, and Norway through the EEA Grants. The project's aim was to contribute to the elimination of fossil fuel-fired boilers in Poland and to present feasible scenarios to decarbonise energy systems in Polish households. The project lasted from February 2021 to April 2024. This article adapts parts of the project's deliverables, both conceptual and empirical reports: Dembek et al. (2021, 2022), Dańkowska et al. (2024). The development of the concept presented in this article also received support via a grant of the National Science Centre, Poland (2018/31/D/HS6/02972).

excellent according to academic evaluation criteria – that is, publishable in top-tier journals and publishing houses. Thus, transition researchers face an extraordinary array of expectations: their work should contribute to mitigating global environmental crises by finding local solutions; it should be useful to partners from other scientific disciplines and, most importantly, from other sectors, such as local government or business; and its process and outcomes should yield insights important for the development of social theory.

We argue that a thorough discussion about field experiences in transformative social science is essential for properly embedding this concept and advancing this type of research practice. We are confident that reflection on our experience can provide a valuable reference for researchers planning similar interventions. We recognise that meeting the accumulated expectations of transformative social research may require structural changes in the organisation of research, as well as the creation of new identities and career paths for the researchers undertaking these efforts. Consequently, drawing upon both literature and our field experiences, we conclude with recommendations on how to effectively engage social science representatives in supporting collective experimentation for sustainable transition.

/// 2. Breaking the Carbon Lock-In and Transforming the Research Practice

Despite the strong scientific consensus on the necessity of conducting a sustainable energy transition, and the broad consensus among elites and political leaders as evidenced by the widespread rapport on the Paris Agreement,[2] the slow pace of changes is frustrating (e.g., Bińczyk 2018). On the one hand, due to the unique nature of the current transition – primarily aimed at mitigating the devastating external effects of fossil-fuel combustion rather than providing obvious benefits to users, such as lower prices or better functionalities (Grübler 2012) – a shared vision of the future and political support are essential conditions for its implementation (Kern & Rogge 2016). On the other hand, it is naive to believe that political will alone suffices to achieve this goal (Roberts et al. 2018). In this context, the social sciences offer a nuanced understanding of how attachment to fossil fuel-based solutions – sometimes referred to as carbon lock-in (Un-

[2] The renewed withdrawal of the United States from the Paris Agreement in January 2025 underscores how fragile such support can be – delving into the mechanisms driving this fragility is a crucial focus of social science research.

ruh 2000) – remains embedded in the foundations of the system, and what levers we can use to challenge this situation and pave the way for change.

Sustainable transition studies developed to support this radical change. The production and use of energy is one of the most important topics in the field of transition studies (cf. Klein & Coffey 2016; Ruggiero et al. 2018; Schreuer 2016). Initially, it drew from traditions of innovation studies, sociology of innovation, institutional theory, science and technology studies, management and organisational sciences, and selected strands of economics – particularly evolutionary economics. Over time, sociology and political science on the one hand, and studies on the dynamics of complex systems on the other, have become increasingly significant sources of inspiration (Loorbach et al. 2017: 612). The perspective of transition studies assumes that the answer to contemporary environmental problems – such as climate change and loss of biodiversity (cf. Steffen et al. 2015) – demands structural changes in the production and use of energy, food, and other goods and services (Geels 2011), accompanied and enabled by the change of regulations, values, lifestyles, and business models. Here, despite its radicalism, the demand of structural change does not considerably differ from the decade-old official recommendation of established international bodies such as the World Bank (2012).

Several features make sustainable transitions special in comparison with other, historical cases of innovation diffusion (Geels 2011). First, sustainable transitions are goal-oriented; the number of accepted policy targets, from the Paris Agreement, through Sustainable Development Goals, to decarbonisation targets agreed upon in RED II directives, demonstrates what it specifically means. That is, they display concrete objectives and a quantifiable indicator set to achieve by the collective efforts of different actors from the public, private, and civic sectors. Second, the innovations developed to tackle sustainability problems quite often fail to offer obvious benefits for the users, as their added value lies in minimising the externalities caused by the dominant socio-technological arrangements.[3] Third, the sectors that need sustainable transitions the most – such as energy or agri-food – are those where large and powerful companies dominate, which makes their involvement in the process of change both crucial and complicated. What is more, the transformation of large infrastructure is

[3] This is not to say that green innovations offer no benefits for the users – clean air after the replacement of fossil fuel-fired boilers is a great example. Indeed, their design should aim at offering such (co-)benefits. Still, the main reason to employ decarbonisation polices is to address the effect of fossil-fuel combustion on the climate, and some of the new solutions supposed to help in achieving this goal seem rather complicated to the users.

particularly difficult due to the longevity of material structures and the substantial techno-institutional interdependencies. Significant path dependencies lead to the regime's resistance to technological and institutional changes. Importantly, planning and decision procedures perpetuate these characteristics of the regime by neglecting radical system alternatives and focusing on limited value concerns (Truffer et al. 2010). As possibilities for change result from the interplay of incumbent actors' strategies and the actions of allies supporting decarbonisation, pathways to transition will clearly vary depending on the social, technological, and organisational context (Gui & MacGill 2018). This means that we cannot simply transfer technological solutions that enable energy transition in one context, because its success relies on a variety of local conditions.

One of the most influential perspectives in sustainable transition studies is the multi-level perspective (MLP), developed by Frank Geels, Johan Schot, and others. It focuses on the processes of structural change, investigating how emerging innovations struggle with existing socio-technical systems and what conditions they need to impact those systems. MLP relies on concepts from evolutionary economics, science and technology studies, structuration theory, and neo-institutional theory (Geels 2011: 26). It uses the framework of three levels: socio-technical landscape, socio-technical regime, and niche innovations. We should not understand these as ontologically different; instead, we may paraphrase ANT and say that "higher" levels are more stable as their basis includes multiple strong connections between various human and nonhuman actors: people, institutions, and pieces of infrastructure. These connections create lock-ins, which make it very difficult for new solutions to break through to the mainstream. Indeed, that is possible only if the socio-technical regime adjusts and transforms.

In MLP, breaking the stability of the regime requires pressure from the landscape – for example by changing international regulations, such as the emissions trading systems (ETS) – and simultaneous challenge by niche innovations. The latter emerge in relatively small networks of actors who support and invest in them based on a shared vision. However, pressure from the landscape often appears as the main cause of destabilisation; it can also stem from social or technical problems intrinsic to the regime, or from competition with emerging (niche) alternatives. What is more, pressure can be

> of economic nature (e.g. shrinking markets, changing markets, supply problems, competition from new entrants or new technologies, etc.), resulting in performance problems and decreasing financial

> resources, or of socio-political nature (e.g. changes in policy, public opinion, cultural discourse, social movement protests, etc.) affecting the legitimacy of the regime. (Di Lucia & Ericsson 2014: 12)

According to MLP, it may be helpful if the development of innovations occurs in protected spaces, without the necessity to directly compete with incumbent actors, who usually offer more mature and efficient solutions than products at the early stage of the innovation journey (Rosenberg 1976: 195). This observation leads to the focus on the interrelation of social and technological change: development in the niche is necessary not only to perfect technology but also to create new practices, meanings, and user routines. This, in turn, puts high hopes on the potential impact of experimental, pilot, and demonstration projects, which constitute an important phase between research and development (R&D) and market diffusion. Co-creation of innovation in the niches serves as a crucial resource for sustainable transition, and thus, it is one of the most important terms for organising the thinking about the mechanism of system transformation (Sengers et al. 2016).

Referring to this tradition, we propose the notion of "collective experimentation for sustainable transition" as a useful device which renders visible how overcoming the carbon lock-in by introducing new default solutions requires transformation in relationships within entire networks of cooperating actors and creation of new coordination mechanisms. This concept enables us to demonstrate how seeking appropriate responses to observed planetary crises leads to the simultaneous generation of knowledge, the introduction of technological innovations in the form of new devices, and the development of associated new identities, social practices, relationships, and rules. Inspired by the ANT tradition (Latour 2005), we see carbon lock-in as composed of heterogeneous elements, including humans, technologies, texts, institutions, and even natural phenomena. These elements are not predefined or stable but undergo constant shaping and reshaping through interactions. Thus, we stress that collective experimentation is inherently embedded in interactions with the elements of the existing regime, which shapes these innovations while they alter it too. That is, we highlight the understanding of (socio-technical) change as "translation." In the process of translation, diverse actors – both human and nonhuman – interact, negotiate, and influence each other, leading to the formation and transformation of networks. Through translation, these heterogeneous elements come together and align to form a network in a series of interconnected actions.

This process allows us to trace the relationship between experimentation and the material devices and institutions that constitute carbon lock-in: specifically, how actors in the experimentation process simultaneously utilise available resources, modify and expand possible courses of action, and contribute to changing the conditions for thinking, acting, and organising in the energy sector (see Wittmayer et al. 2022). We also emphasise that collective experimentation for transition requires broad engagement, and its success demands collaboration with the actors entrenched in the carbon lock-in.

Indeed, the necessity to engage with stakeholders in the creation of socio-technical innovations enjoys wide acknowledgement in the academia and among practitioners (Chilvers et al. 2018). Thanks to the early (upstream) stakeholder engagement, the innovation design accounts for different values and interests, which can be a key to its successful implementation. Two categories of stakeholders are essential: first, organised stakeholders such as policymakers, industry representatives, large nongovernmental organisations (NGOs), local authorities, or powerful social movements; and second, the "regular people" who are not particularly active as members of powerful institutions but have a stake in the problem the innovation is about to solve. We can understand the engagement with the first group as negotiation with the spokespeople of the current socio-technical regime, although – especially at later stages of the transition process – organised stakeholders may also promote the change. The engagement with powerful stakeholders reflects the basic challenge of sustainable transitions: the involvement of powerful actors in the process of change is crucial but causes many complications, as they often show more interest in diminishing change than its acceleration (Markard et al. 2020). Members of the second category include citizens, potential users, or members of local communities. In the energy sector specifically, the concepts of "energy citizenship" and "energy democracy" invite us to rethink the possible ways to engage energy users as more active stakeholders of the changing energy system who can support more progressive policies or oppose the change (Ryghaug et al. 2018; Wahlund & Palm 2022). Their involvement may bring crucial insights and contribute to the innovation's success, although it often proves difficult to meaningfully arrange.

The development of various forms of local cooperation for energy production, consumption, and trading, such as energy communities and energy clusters (Bauwens et al. 2022), may serve as an exemplary case of collective experimentation. On the one hand, it represents an iconic example of social innovation in the energy sector – solutions that create new

opportunities for action, forge new interests, groups, and identities, and may impact the pace and direction of the change (Sovacool et al. 2023). Simultaneously, it drives the search for new technological solutions and prompts the exploration of new operational methods for the power grid, such as enabling local energy and flexibility markets (Vernay et al. 2023). On the other hand, understanding the development of energy communities – and the ongoing challenges they face – requires acknowledging the extent to which their capabilities have inextricable links with their entrenchment in the institutions and infrastructure of the socio-technical regime at every stage of their existence (Ceglia et al. 2020; Stasik & Dańkowska 2023). Another example includes interventions conducted in the form of "living labs" or "city labs" (Hossain et al. 2019): their growing popularity results from the reflection on the significance of experimentation in the context of real-world challenges. These initiatives rely on the collaboration of various urban actors – including representatives of public administration and often involving social researchers – to develop and test new solutions for sustainable development before deciding on their broader implementation (see, e.g., Dembek et al. 2022).

Thus, the understanding that the adaptation of sustainable solutions requires transformation in relationships within entire networks of cooperating actors motivates us to account for the needs, interests, and practices of local stakeholders who are to live with it – and profit from it in the short and long term. Against this background, we analysed how the contribution of social scientists supported the collective experimentation on the zero-carbon solutions for heating systems in Legionowo.

/// 3. Site of Experimentation: Challenges of Heating System Transition and the "Green Heat" Project

3.1. Heating System in the Carbon Lock-In

The issue of modernisation and decarbonisation of the heating systems in Poland is both important and urgent. First, the primary source of heat remains coal combustion. In 2022, fossil fuels such as coal, gas, and heating oil generated 82% of the energy in collective heating systems, while only 12.6% of energy came from renewable sources. In individual heating systems, as much as 55.2% of households in Poland used district heating for their rooms. At the same time, 20.9% of households used hard coal for this purpose, 14.6% chose natural gas, and 20.9% opted for firewood. Only

0.69% of households used heat pumps, and 0.4% employed solar energy (GUS 2023). Additionally, over the past 20 years, CO_2 emissions from heating have only decreased by about 15.5%.

Heating is one of the main reasons of air pollution. Thirty-three out of the fifty most polluted cities in the European Union (EU) lie in Poland, which resulted in widespread anti-smog campaigns (Frankowski 2020). The EU's climate and energy targets, national laws, and local regulations have a significant impact on the decarbonisation process, serving as key stimuli for energy transformation development.

However, the decarbonisation of heating systems faces numerous challenges. With district heating predominantly sourced from fossil fuels, users have little agency in the transition to zero-emission alternatives, as this shift primarily depends on the actions of district heating providers – although public pressure can influence the pace of change. In contrast, households responsible for their own heating play a vital role in driving the transition, acting as both owners and investors. However, their engagement is contingent upon a variety of factors, encompassing attitudes and values concerning energy transition and climate change mitigation, as well as the perceived benefits and drawbacks of available alternatives. Specifically, the high initial costs of investments in energy efficiency and renewable energy technologies serve as a significant barrier for households. In this regard, it is essential to consider socio-material disparities among households and the issue of energy poverty (Sokołowski et al. 2023; Stojilovska et al. 2024). Many households currently see no alternative to their existing heating systems, such as gas, stating that renewable energy systems are still at the early stages of development. At the same time, when given a supportive context, the dependence on individual agency allows for potentially faster and more adaptable progress than the more centralised transformation of district heating. In this situation, existing subsidy programmes play a vital role but are often insufficient. Ensuring stability in the rules and regulations that underpin these programmes, along with information campaigns and organisational support in filling out relevant applications, is a crucial aspect. Russia's full-scale war against Ukraine, the resulting energy crisis and rising energy prices, and concerns over the instability of fossil-fuel supplies and their prices added a layer of uncertainty for engaged actors.

Thus, due to its complexity and importance, eliminating fossil fuel-fired boilers from Polish households, namely the goal to which "Green Heat" was to contribute, requires broad engagement in collective experimentation for sustainable transition.

3.2. "Green Heat": Experimentation Team to the Rescue

The "Green Heat" project assumed from its beginning that solutions – nonexistent when the project started – must emerge through experimentation. After coining the idea, the consortium gathered in the IdeaLab format,[4] an innovative way of generating research projects through intensive workshops involving scholars from various disciplines to address challenges on a specific topic. The format assumes building interdisciplinary teams with people unfamiliar beforehand, to develop intentionally bold and risky responses to socially relevant needs. These origins of the "Green Heat" project added to both its strengths and advantages, and to its limitations unfolding throughout the project's implementation.

The project assumed employing transdisciplinary knowledge to develop and exercise a participatory process of co-creating alternative heating solutions. Engaging stakeholders, both organised entities and "common residents," was both necessary and appropriate for the project's scope. The research team intended to participate in the process of multilayered change, combining its technical, organisational, and social aspects. Adequately, the project team consisted of engineers, social scientists, system scientists, economists, and education experts. They were to support the participatory process via cooperation, contributing to the co-creative effort. The interdisciplinarity of the research team put epistemological translation in the centre of the process.

Initially, acknowledging the challenges of interdisciplinary cooperation and the variety of interests among the stakeholders, the team assumed certain developments in Polish regulatory environment. Those expectations included the introduction of collaborative business models – such as energy communities, new to Polish law – within the project's lifespan, namely before 2023. By the end of the project, that still did not happen effectively. As a result, the pool of eligible business models for heating systems alternative to the coal- and gas-based ones remained quite limited. This limitation further conditioned – and corresponded with – a small variety of technical solutions to introduce; considering the scarce or nonexistent options for collective and/or communal scenarios, the most popular option was a simple, individual replacement of a carbon intensive heating source with a heat pump, often combined with photovoltaics (PV) installation

[4] The IdeaLab workshop "Cities for the Future: Services and Solutions," organised by the National Centre for Research and Development, took place on 2–6 March 2020 in Otwock, Poland (for details, see https://www.gov.pl/web/ncbr-en/idealab).

and retrofitting. Then, exploring the possibilities for more experimental scenarios via looking for less obvious solutions to the fossil-fuelled heating problem faced hindrance by a rapid increase of uncertainty caused by Russian full-scale invasion of Ukraine in 2022 and the resulting energy crises, economic turbulence, and inflation. That leads us to consider the limits of bottom-up experimentation and its dependency on both the national policies and changes in the broader environment. At the same time, the question about the role of social researchers in the process remains open for investigation.

/// 4. Collective Experimentation in the Field

Below, we outline the project stages where the involvement of the social sciences team was most significant. These stages include: (1) preparation for activities: dialogue with project participants about the importance of participation in planning the transformation and joint stakeholder mapping; (2) local diagnosis based on qualitative and quantitative data analysis; (3) workshops with residents; and (4) stakeholder consultations aimed at developing specific solutions. Their aim was to generate knowledge about the social expectations and readiness for action, and to mobilise different stakeholders to participate in the collective experimentation. We highlight the difficulties encountered during these stages, describe how we addressed them, and signal the broader insights for transformative research that one can draw from these challenges.

4.1. Preparation: Building Common Ground

Acknowledging the disciplinary diversity of the project members as both a strength and a challenge for the collaboration, the project assumed a face-to-face meeting that would last two days and allow for better understanding of how these diverse perspectives might feed the experimentation process. However, due to the COVID-19 pandemic and related restrictions, the project team could not meet in person for a long time. Instead, we organised a series of shorter online workshops hosted by the subsequent teams, intended to present their perspective and foster mutual understanding. Although that was the best solution in the described circumstances, we believe that a face-to-face workshop would have benefited the team more. The social sciences team presented the approach that identified the stakeholders' commitment to the new solution as the key condition for suc-

cess, no less important than business viability and technical feasibility. Attempting to translate this general rule into specific actions, we invited our partners to consider the role of different stakeholders in the tasks planned by subsequent teams – namely how their involvement might lead to better-quality outcomes, but also how they could profit from the project's actions.

In the following weeks, the social sciences team also led a workshop on the stakeholders' identification. Discussions in groups composed of the members of different teams allowed them to exchange knowledge and learn about each team's understanding of the decarbonisation challenge, derived from their disciplinary affiliations. For the social sciences team, the workshop provided better understanding of the project partners' knowledge needs related to local residents' readiness for actions.

Although these meetings fulfilled their initial goals, we believed that they should continue in the following years. To build the understanding of how different disciplines may contribute to collective experimentation is not a one-time event, but rather a process that should play an important role in the inter- and transdisciplinary project management.

4.2. Entering the Field: A Local Diagnosis

The initial diagnostic phase of the "Green Heat" project was a cornerstone in the participatory, iterative, and locally embedded process aimed at decarbonising residential heating systems in Legionowo. The study took place between September 2021 and June 2022. Its primary goals were to understand the residents' perceptions of energy transition and identify barriers and motivators for adopting renewable energy solutions. Specifically, the diagnosis sought to answer key questions regarding how the residents viewed the shift from fossil fuel-fired boilers, their readiness to invest in new renewable energy solutions, and their motivations and concerns surrounding this transition. This social diagnosis proceeded in a broader context where the project partners were simultaneously conducting a technical diagnosis via mapping the existing heat sources, infrastructure, and housing conditions in Legionowo, and analysing potential financial and business models to adopt in Legionowo. Through these combined actions, we intended to render visible the entanglement of the social, technological, and financial dimensions of a local transition.

To conduct a thorough diagnosis, we selected appropriate research methods and consulted them with project partners. This collaboration was crucial to align the research tools with the expectations and needs

of all project members. The research methods included document analysis, a representative survey of 500 households, and in-depth interviews with residents. Desk research involved reviewing existing documents to understand the air pollution situation in Legionowo, the city actions supporting the residents in transitioning from fossil fuel-fired boilers, and other relevant local conditions. The representative survey aimed to gauge the frequency and distribution of attitudes towards domestic heat sources and modernisation prospects. The survey included the following sections: household characteristics, such as building features or household composition; heating-related practices, attitudes, and opinions; knowledge and opinions on the environment and energy transition; and socio-demographic data of respondents. We conducted in-depth interviews with forty-seven residents – a diverse group with varying characteristics, including age, gender, heating source, and building type. At the first stage, we conducted eighteen semi-structured interviews with twenty-three interviewees – that is, thirteen individual interviews and five interviews with two respondents. The interview topics included: values regarding household heating; evaluation of the current heating system; attitudes towards replacing the heating source; views on collective community action; and opinions on climate change, air pollution, and energy policies at local, national, and European levels. Additionally, we conducted individual interviews with public housing residents: six interviews with residents using coal for heating, and eighteen interviews with users of heat pumps.

Having analysed the data, we presented them to the project team for discussion. This collaborative analysis was vital for aligning the project's subsequent phases with the diagnosed needs and attitudes of the residents.

However, during the diagnosis phase, several challenges emerged that influenced the project's trajectory. First, recruiting participants and encouraging discussions about heating systems proved difficult due to the perceived technical and mundane nature of the topic. Additionally, the COVID-19 pandemic imposed significant constraints, shifting a large part of interactions online and reducing the scale and scope of engagement activities. Also, due to the severe disturbances to almost every area of everyday life, residents and other stakeholders displayed less interest in the project's topic than initially expected. The alarming challenges of energy transition seemed to have given way to more urgent ones, namely health risks and economic crisis. Second, many residents were unfamiliar with or sceptical about new solutions like heat pumps or energy communities. The legal and economic frameworks for these solutions were only slowly evolving, adding

to the uncertainty. Furthermore, the project aimed to move away from fossil fuels, including natural gas, which the vast majority of residents viewed as an abstract and entirely unrealistic idea. The reason was the perceived harmlessness of natural gas as a heat source in terms of both air quality and climate change, as well as its popularity and lack of proven alternatives. Third, ensuring that the diagnostic results could inform practical interventions was a persistent challenge. We had to look for ways to make the results of the diagnosis actionable in terms of both project objectives, namely creating tailored solutions for the elimination of fossil-fuel boilers, and the process itself, namely effective communication and collaboration within the team and with external stakeholders. The fourth challenge was that of project planning and structure. We envisaged the diagnosis as the first stage of the project. The overall plan initially assumed that the diagnostic findings would remain consistent throughout project duration, providing a stable foundation for developing solutions. However, significant changes in external conditions emerged during the project, making timely adaptation crucial for achieving its objectives. In particular, the Russian invasion of Ukraine and the resulting crisis in fossil-fuel supply, as well as inflation and rising prices of energy created a situation of very high uncertainty, severely hindering the stakeholders' readiness to engage in experimental solutions and to undertake additional investments. The participatory and experimental character of the "Green Heat" project made it vulnerable to contextual changes.

In response to these challenges, we decided to adopt several strategies. First, to make the diagnostic results useful and adaptable, we employed a methodological tool of personas, commonly used in design and marketing (Hand et al. 2005; Nielsen 2012). Personas are fictional representations of user groups that capture their expectations, experiences, and behaviours (LeRouge et al. 2013). Based on cluster analysis of survey data (Zarańska 2015) and data from interviews, we created the following six personas: "Indifferent district heating user," "Community-engaged district heating user," "Stubborn coal proponent," "Stigmatised coal burner," "Distressed gas-boiler user," and "RES enthusiast." For example, the Indifferent district heating user views heating as a seamless service and is largely unaware of the energy source or costs, with limited interest in renewable energy. The Stubborn coal proponent values coal for its perceived independence and resists change, requiring proven technologies and stable financial benefits. Second, recognising the dynamic external conditions, we conducted a second survey two years after the first survey study – that is, in January

2024 – on the new random sample of 500 Legionowo residents to track changes in the residents' attitudes and understand how external turbulences affected their views.

Based on our experiences, we offer the following recommendations for similar transdisciplinary and experimental projects. First of all, personas or other tools and methods used in more practice-oriented fields, such as user experience, design, or marketing, can effectively translate social diagnosis results into actionable insights (Dańkowska et al. 2025). These tools facilitate communication with project partners and external stakeholders, including local authorities and residents, and support joint decision-making. Second, project design should demonstrate flexibility to accommodate significant external changes. Regularly updating the diagnostic understanding and remaining responsive to new developments can enhance project resilience and relevance. Moreover, ongoing consultations with project partners and stakeholders are essential for aligning research activities with practical needs and expectations, ensuring that solutions have roots in the lived realities of the target community.

Finally, we should consider the prediction that the near future is unlikely to allow us to avert crises similar to those experienced during the project (Homer-Dixon et al. 2021; Hening & Knight 2023; Hausner & Krzykawski 2023). The task of social researchers and representatives of other sciences responsible for project planning is to attempt to design the process in such a way that it creates clear incentives for participation even during times of turmoil and uncertainty. For inspiration, let us recall that some groundbreaking social innovations – such as the development of the cooperative movement – emerged precisely in response to crises that individual actions could not address. To this end, it is important to strengthen the focus on creating direct benefits for potential users of new solutions, including enhancing their resilience – the ability to cope with current and future shocks. This, however, necessitates a significant expansion of the social researchers' role beyond the traditional remit of data collection and even beyond facilitating dialogue and promoting sustainable development education. Successfully fulfilling this expanded role requires both additional resources and a transformation of researchers' professional identities.

4.3. To Have a Say: Citizen Workshops

We conducted four workshops with the residents of Legionowo to involve the community in the transition to decarbonised residential heating sys-

tems. These workshops, held between November 2021 and May 2022, were largely remote due to COVID-19 restrictions, with one in-person meeting at a municipal public library. Participant numbers ranged from seven to fifteen per session. The workshops aimed to present the project and its objectives, understand the residents' values and perceptions, inform them about potential solutions, and gather feedback on technical and business preliminary solutions.

In the first workshop, we introduced the project and facilitated discussions on local heating issues, different heating sources, and the future of Legionowo in terms of climate change and air quality. The second workshop aimed to discuss technological solutions that one could consider in the residential heating system's decarbonisation in Legionowo. To present these preliminary solutions and discuss them with the residents, we prepared three graphics with the technical project partners, illustrating different models: (1) domestic heat production and neighbourhood energy storage; (2) district heating and cooling microgrids; (3) a district heating plant expanding district heating networks based on renewable energy sources (RES). The meeting agenda included a presentation, followed by a discussion among participants to gather their opinions on the feasibility of these models in Legionowo.

The third workshop covered various government subsidy programmes for heating source replacement, like "Clean Air," "Stop Smog," or "My Electricity," as well as municipal initiatives. The final workshop explored factors influencing the low-carbon energy transition, including existing funding programmes, the impact of the Russian invasion of Ukraine, rising energy prices, and legal constraints.

The key conclusions from the workshops included the residents' concerns about poor air quality in Legionowo, the slow pace of fossil fuel-fired boiler replacement, some interest in but also scepticism about cooperation-based business models – for example due to preferences for owning heating systems – and the significant role of city authorities in initiating new solutions. The participants also highlighted the need for clearer rules in existing funding programmes, a consultation point in the city, and information campaigns on funding opportunities. Inflation, legal changes, and the unstable international situation due to the Russian invasion of Ukraine acted as challenges for planning heating source replacements.

The citizen workshops also faced several challenges. Conducting remote workshops due to COVID-19 restrictions posed difficulties in engaging participants. Recruiting the residents was challenging, and it was hard to

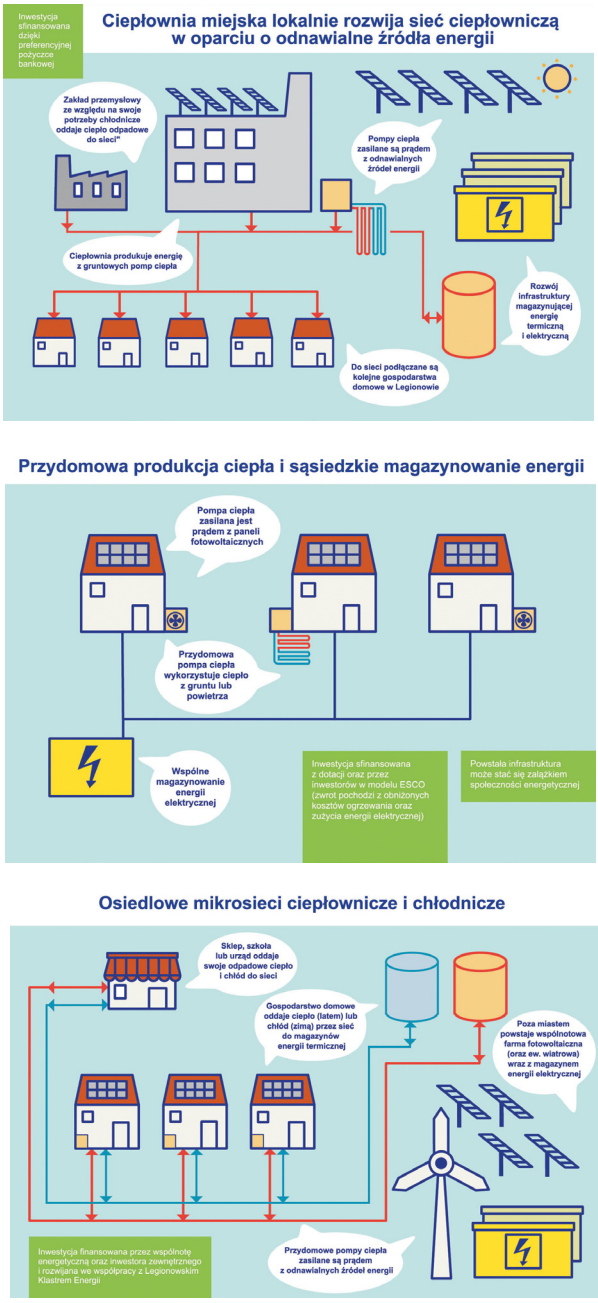

Figure 1. Three graphics illustrating preliminary technical and business models considered in the "Green Heat" pilot project in Legionowo: (1) domestic heat production and neighbourhood energy storage; (2) district heating and cooling microgrids; (3) a district heating plant expanding district heating networks based on RES.

Source: "Green Heat" research project materials, developed by the research team and presented during workshops with residents.

explain the benefits of early participation. Additionally, the three graphics illustrating different technical and business models proved too abstract and difficult for participants to understand, as these solutions were either non-existent or uncommon in Poland. Also, the proposed draft solutions lacked the detail needed for full comprehension by the residents along with the concrete benefits the residents could derive from them, particularly financially.

To address these challenges, we encouraged participation by offering various incentives, such as gadgets, shopping coupons, information on funding opportunities for heating source replacement or thermal modernisation, and technical analyses for buildings or apartments by the technical project partners. We used online group activity tools and leveraged the residents' contacts to invite others to participate. Dedicated posters and leaflets were created, and we utilised city communication channels and collaborated with local organisations to spread information about the workshops. We also engaged the residents at public city events, like NGO fairs.

Based on our experiences, we offer the following recommendations. In transdisciplinary projects, technical and business partners might expect clear guidelines on residents' needs and preferences to shape appropriate technological solutions and business models. However, our experience reveals that, particularly in the energy sector, residents struggle to engage in co-creation early in the process due to a lack of interest, knowledge, or motivation. This underscores the need to rethink the "energy citizen" model. Our experience indicates that it is crucial to acknowledge the limitations that hinder early resident engagement when there are no concrete solutions for residents to discuss, consider, and understand – including the understanding of tangible benefits for end users. In this perspective, social scientists play a pivotal role in enhancing residents' interest, knowledge, and motivation within the context of evolving external conditions and emerging opportunities. Crucially, effective participatory processes depend on tapping into existing social networks, where building partnerships with local organisations is essential for facilitating resident engagement. Collaborations with local environmental groups, smog alerts, or community leaders are key. Given the constraints of time and resources in research projects, building resident engagement from scratch is nearly impossible. Thus, leveraging established community relationships and social capital is paramount for successful citizen participation. Importantly, the timing of resident involvement influences the relationship between social and technical partners. Early engagement in social co-creation is essential to prevent it from becoming a mere formality, thereby ensuring a more balanced collaborative process.

4.4. Constructing Future Options: Consultations with Institutional Stakeholders

The "Green Heat" project team conducted stakeholder consultations involving the Legionowo City Hall, municipal companies, financing institutions, energy firms, and other entities, such as the Mazovian Energy Agency. Stakeholders discussed the project's objectives, identified collaborative opportunities, and showed interest in project-developed solutions. In particular, the team conducted consultations on potential solutions with representatives of the Legionowo City Hall and municipal companies to receive feedback from institutions central to the development and implementation of the suggested ideas. For instance, "Green Heat" proposed a universal mapping method allowing municipalities to identify buildings with high heat consumption, eligible for various funding schemes. In response, the City Hall emphasised the need for clarity regarding housing communities eligible for district heating network connection and funding utilisation. However, diverse heat sources in multifamily buildings pose a challenge, as they qualify for varying subsidy schemes. Consultations with municipal companies highlighted proposals like capturing waste heat from municipal sewage systems, with interest shown both by the Water and Sewage Company and the Heating Energy Company, albeit facing technical challenges. Other options discussed included expanding district heating based on RES, developing microgrids, and transitioning district heating away from fossil fuels, among others.

The "Green Heat" consortium further engaged in multiple stakeholder consultations to identify solutions for decarbonising the Legionowo residential heating system, focusing on two primary models. For instance, the model for the residential blocks on Daliowa Street aimed to replace existing gas boilers with ground-source heat pumps and PV panels. The key stakeholders included housing communities, municipal authorities, and private companies. Initial meetings with the Municipal Budgetary Authority and the Legionowo City Hall identified specific buildings for the pilot, with detailed discussions on technical and financial aspects. Subsequent meetings with private drilling companies and heat pump manufacturers addressed potential technical and social challenges. A site visit further facilitated practical planning. The following stakeholder consultations, including financial assessments and expressions of interest from several private companies, refined the project's scope. The Legionowo vice mayor and the Heating Energy Company president showed strong support, considering

funding options through the "PFR for Local Authorities" programme. Finally, the project team met with representatives of four housing communities on Daliowa Street, the Legionowo City Hall, a private energy company, and the Municipal Budgetary Authority. They discussed four transition scenarios, highlighting available nonrefundable funds, and recommended a scenario ensuring complete elimination of local GHG emissions.

Based on our experiences, we have identified several challenges for social scientists when conducting consultations with external partners in decarbonising residential heating systems. Successful consultations require the involvement of technical partners who can provide detailed explanations of proposed solutions. Social scientists can support these initiatives by highlighting additional factors, such as citizens' viewpoints; however, they are not in a position to lead these consultations independently. Moreover, our experiences show that long-term stakeholder engagement relies on existing institutions, such as cooperatives, organisations, and local governments, which will assume ownership of the implemented solutions once the project concludes and researchers depart. This partnership is crucial for the long-term sustainability of the proposed initiatives. Social scientists may play a unique role in facilitating consultations with technical partners and local institutions. They act as catalysts, initiating discussions and emphasising the importance of incorporating residents' perspectives into the solutions. However, one must remember that local actors – namely town administration and local utilities – are the ultimate decision-makers, especially after the project's conclusion. Finally, the success of social scientists' efforts is more pronounced in areas with a dense network of intermediary institutions that have close contact with residents. As already mentioned, the favourable result of low-carbon energy transitions depends significantly on local communities' social capital, which social scientists can help build and strengthen. Their actions are most effective when they leverage and enhance the existing social resources, ensuring that local entities are prepared to carry forward the proposed initiatives.

/// 5. Transforming the Collective, Transforming the Research Practice: Reflections for the Future

While the "Green Heat" project concluded, the need for sustainable transition – in Legionowo and beyond – did not, and neither did our commitment for the fostering of locally entrenched sustainable solutions. We remain convinced that engagement of local actors supports the emergence

of locally relevant benefits, and thus allows for the creation of stable social support for the solutions that caused it. If collective experimentation shows its full potential when co-created by the variety of concerned actors, the contribution of social scientists may lead to the inclusion of different perspectives that would remain unnoticed without this effort. "Green Heat" fulfilled this very goal, namely stakeholders' identification, local diagnosis, workshops, and consultations. At the same time, the overall aim of creating new solutions – based on the new business model and technological solutions – was only partly successful. Here, the strength of carbon lock-in – which manifested itself in regulatory obstacles and the support for the coal-based heating systems in the time of crisis through subsidies for households using coal to heat their houses – offered no space for the development of technologically feasible, business-viable, and socially acceptable new solutions, although the experimentation on Daliowa Street reopens this perspective. At the same time, our experience allowed us to revise some of our expectations related to the dynamics of engagement. Thus, when planning future projects oriented towards fostering collective experimentation, we will pay close attention to the following aspects.

First, to strengthen the potential of collective experimentation, one should devote even more time and effort to interconnect the findings on the social and technological dimensions of the process and the methods that produce them. Indeed, representatives of all disciplines have their habits on how to plan and carry out the research, which also secure the quality and the approval of colleagues, as in the peer-review process. Similarly to all other aspects of carbon lock-in, this one stabilises the system and ensures its efficient functioning but may restrain the necessary change. Thus, the question of how our research activities may evolve after considering new aspects of the process – to yield better and more relevant outcomes – refuses easy generation and execution, demanding a continuous effort instead. Social scientists, especially those trained in science and technology studies, may be prepared better than other partners to facilitate these processes. Here, we see the further transformation of the very methodological principles of different disciplines as a necessary part of collective experimentation – as discussed for more than two decades by proponents of postnormal science (Funtowicz & Ravetz 1993; Healy 2011).

The second recommendation stems from the reflection on the expectations towards representatives of social scientists expressed by project partners and institutional stakeholders – namely that we will be able to present what *the society* wants. Here, we should stress that the local public opinion

towards the issue at stake needs not only discovering, but also creation through the project actions. In the "Green Heat" project, we summarised the results of our diagnosis using personas to present the residents not only as they were at the moment of research, but also as relatively ready to change while the circumstances evolve. Similarly, the presentation of graphics of different future solutions aimed to build an attitude which remained absent before the project started. We believe that the goal of encouraging meaningful engagement in transition demands even more methodological experiments, particularly those that promote dialogue between disciplines and between stakeholders. Simultaneously, we must be aware of and reflect upon the values of traditionally conducted research – both in social and other sciences – which may weaken or become lost in this process. This requires a balance between striving for effective communication facilitating joint action and the rigour and precision guaranteed by established scientific methodology.

At the same time, our attempts to build the residents' engagement in the discussion on the heating system transition gave us a lesson of humility. Notwithstanding the obstacles – from COVID-19 restrictions to the Russian invasion of Ukraine – we discovered that the task of building engagement around the issue of heating transition as part of the project tasks is very difficult and demands resources, such as time, that researchers usually cannot commit. In this situation, we acknowledge that one should strive to build meaningful engagement not from scratch but through partnership with the preexisting social groups and network. However, in many places in Poland these groups are too weak to lead the effort. This reveals an important barrier to the upstream participation of common residents in the experimentation process. Contrary to some models of individuals described as "energy citizens," most residents must see the tangible benefit to engage in a discussion on sustainable solutions.

This observation leads us to the fourth point. Accepting the pragmatic attitude of the majority of local public, which only strengthens in the time of crisis, a project aimed at the creation of sustainable solutions should prioritise delivery of understandable benefits for users in the short and medium timespan. This attitude does not close the possibilities of creating important social innovations, but it accepts the fact that the vast majority of participating individuals perceives environmental benefits as interesting additions, not as the main motivator. Furthermore, we observed that the experience of crisis and uncertainty demotivated parties to engage with the project. Thus, acknowledging the turbulent time and

reality of polycrisis, we must learn to design the process in such a way that it appears as a solution in the turbulent time, not as additional burden. This instance, however, expects researchers to act as "community organisers," which demands a distinct set of knowledge, skills, and predispositions. Since combining these diverse roles is exceptionally difficult, the formation of multidisciplinary teams offers a promising approach. We should implement this strategy with the awareness that it will inevitably lead to new challenges, such as ensuring goal alignment among collaborators with varying backgrounds.

Finally, understanding the social dynamics of the transition processes contributed by social scientists allows for translating the results of collective experimentation between different arenas and levels. We can amplify the impact of local effort if we find effective ways to show decision-makers how they can use experimentation results to achieve goals that are important for them, as well as ways to help them understand how the conditions they shape impact – and impede – the potential of most ambitious local actions. We can also support peer-to-peer learning between local stakeholders, from local governments to NGOs and business innovators: here, the coordination of the efforts with technological partners is key, as the interested parties are ready to hear about social aspects of the process only if we present it as entanglement with technological transformation.

All of these actions – spending resources on fostering deeper understanding between project partners and discovering the transformative potential of collaboration for the very disciplines we come from; searching for methodological innovations that show society in the context of intended actions; building meaningful partnerships with local organisations; searching for modes of engagement that appear as solution to the crisis; and communication of the importance of the experimentation to the decision-makers and peer organisations – transcend the traditional list of social researchers' tasks. Many of these actions are time-consuming and require specific skills and attitudes which differ from the analytical skills mastered by scientists during their long training. What is more, engagement in these actions will not necessarily gain recognition during the evaluation of both researchers and the institutions that hire them. In conclusion, to build the critical mass of experiences and skills necessary to amplify our impact, we need to create more institutional support for such experimentation in the social science itself – which adds to the list of recommendations.

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/// Abstract

The accelerating climate change and biodiversity crisis necessitate an unprecedented mobilisation of resources for a sustainable transition. This article explores how the anticipated contribution of social science to this transition requires a redefinition of social researchers' roles. Drawing on sustainable transition studies, actor–network theory's concept of translation, and insights from a transdisciplinary research project supporting stakeholder-driven solutions, we offer recommendations for researchers engaged in similar endeavours. We demonstrate how the need for simultaneous modifications of attitudes, interests, institutions, and infrastructure within sustainable solutions also applies to the organisation of scientific research itself.

Keywords:
sustainable transition, collective experimentation, transdisciplinary research, transformative research, energy transition

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ENERGY CITIZENSHIP AND ITS APPLICATION IN THE ENERGY TRANSITION IN POLAND

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/// Introduction

Poland, as a member state of the European Union (EU), is obligated to implement its energy strategy in alignment with the European Green Deal, which mandates that all member states achieve climate neutrality. In February 2024, the Polish government updated the National Energy and Climate Plan (Krajowy Plan na rzecz Energii i Klimatu – KPEiK) with new ambition scenarios in fulfilment of the obligation set out in EU regulations (Ministerstwo Klimatu i Środowiska 2024; Igliński et al. 2022). However, recent decades have seen failures and a lack of action towards successful decarbonisation in the energy sector in Poland (Sokołowski & Bouzarovski 2022). The country's heavy reliance on coal, which has long been protected for political and social reasons, coupled with delays in developing renewable energy, particularly wind power, has hindered progress (Mrozowska et al. 2021; Pietrzak et al. 2022). Furthermore, regulatory obstacles, such as restrictive policies on wind farm locations and underinvestment in grid infrastructure, have also slowed the shift to renewables. This has led to higher energy costs and continued dependence on coal and gas. Even though the government has introduced various plans and energy strategies in the last years, including the Nuclear Power Plant Programme (in 2009), the Energy Policy of Poland until 2040 (in 2021), and the Polish Hydrogen Strategy (in 2022), these initiatives have consistently failed, leaving decision-makers, politicians, academics, and experts still debating what actions are needed.

Consequently, during conferences and academic seminars focused on the energy transition, discussions often culminate in a central question: what hinders the energy transition process in Poland? Among the multidisciplinary panels of academics and practitioners addressing this issue, a consensus has rarely been reached, although numerous barriers have been identified, including infrastructure limitations, concerns over national sovereignty, market affordability, and inadequate or non-existent regulations. Social scientists have stressed that issues such as energy poverty (Karpińska & Śmiech 2020; Sokołowski & Bouzarovski 2022), energy democracy, justice (Iwińska et al. 2023; Tarasova 2024; Van der Wel et al. 2024), and cultural aspects of public acceptance, responsibility, and energy awareness, are matters of importance in connection with a geopolitical and technological transition to a net-zero economy (LaBelle 2020; Nyga-Łukaszewska et al. 2023; Černoch et al. 2024). From this perspective, the energy choices of individuals and communities also need to be analysed. For example, Sokołowski and Bouzarovski (2022) argued that, prior to the 2020s, the significance of households in the coal phase-out was largely misrecognised and poorly diagnosed. However, multidisciplinary energy congresses dominated by engineers, decision-makers, and representatives of business rarely take the bottom-up approach and citizen-level context into account. Although there is complete agreement that social acceptance is needed for an immediate, successful, and effective energy transition, such acceptance is seen as just a minor aspect of the vast "energy transition challenge." For social scientists, the answer to the main question of what is holding up the energy transition in Poland is more complex, though it still includes the lack of democratic, inclusive governance in energy systems and the lack of an energy-citizenship culture.

While energy democracy highlights the political and technical dimensions of energy transitions through a focus on who controls energy production and consumption, the key agents should still be citizens, and the citizenship role has three dimensions: legal status and rights, activity, and membership (Montalvo et al. 2021; Szulecki & Overland 2020). The idea of energy citizenship (EC), which has developed alongside the idea of energy democracy, aligns with two dominant conceptions of citizenship. The civic-republican view emphasises active participation, where citizens are engaged in political and community processes. In this context, energy citizenship involves individuals actively contributing to the energy transition through informed decision-making and participation in energy governance. On the other hand, liberal-individualists frame citizenship as a formal legal status

with associated rights, such as access to energy or information, while placing less emphasis on active political engagement (Montalvo et al. 2021). Here, EC is about holding rights and responsibilities related to energy without requiring active participation.

Although not yet fully conceptualised, EC plays a crucial role in the framework of energy democracy by fostering the active participation of all community members in the energy transition. It focuses on citizens as central actors, not just consumers, in shaping energy policies and governance (Wahlund & Palm 2022). By integrating citizens into the energy transition, energy citizenship serves as a bridge between technical governance and the active role individuals play in achieving a just and sustainable future. Thus, this paper summarises recent research on EC and presents a preliminary analysis based on a survey conducted in Poland (2024). The aim is to emphasise the importance of individual-level actors in shaping, through EC, a just transition in the Polish energy system.

/// The Genesis of Energy Citizenship and Current Trends in Research on the Subject

The EC framework encapsulates the rights and responsibilities of individuals and communities in shaping the energy system. At its core, EC involves active citizen participation in energy decisions, with an emphasis on proactive engagement, advocacy, and ownership. This concept "humanises" the energy transition by encouraging public involvement beyond passive acceptance. While energy democracy and EC both promote citizen engagement, they differ in approach. Energy democracy movements often push for more radical models, such as local cooperative ownership. In contrast, policymakers and energy companies tend to support more consumer-oriented forms of participation in the energy market. Together, these concepts highlight the evolving role of citizens in creating more democratic and inclusive energy systems, with varying visions of what participatory governance should look like (Lennon et al. 2020).

Patrick Devine-Wright (2007), who first created the concept of EC, approached the topic by taking into consideration both the socio-cultural level, where issues are socially constructed, and the psychological level, where behaviours are shaped. He concluded that although members of the public are viewed as passive observers in the development of the energy system, they should be seen as active participants. The role of citizens should be shaped by the idea of a fair distribution of rights and responsibilities in

addressing the impacts of energy consumption (Devine-Wright 2007: 71). According to Devine-Wright, understanding how individuals and communities perceive, interact with, and ultimately support or resist energy transitions is essential for fostering EC. He focused on wind power and renewable energy sources (RES) and claimed that public acceptance is not a static or uniform phenomenon but a complex and dynamic process shaped by various social, cultural, economic, and political factors (Devine-Wright 2007). Devine-Wright's critical review highlights the need to move beyond simplistic models of public acceptance that view resistance as merely a barrier to be overcome. Instead, he calls for a more nuanced understanding of public engagement as a participatory and collaborative process involving the values and experiences of citizens in their local and cultural contexts and political arenas.

In this vein, Lennon et al. (2020) argued that energy citizenship remains an under-theorized concept within energy governance scholarship. Researchers have pointed to the need for further research to clarify its definition and practical implications, particularly given that political discourse on energy transitions has been predominantly shaped by technical and economic considerations. Still, the focus on economic factors has often overshadowed broader discussions about the social and participatory dimensions of energy citizenship (Palm 2021; Mullally et al. 2018).

Wahlund and Palm (2022) notice, however, that the advent of energy democracy, justice, and EC signals a paradigm shift because it foregrounds citizen participation as central to the transition towards sustainable energy systems. They present a spectrum – from radical models advocating local cooperative ownership championed by energy democracy movements (representative forms of participation) to consumer forms of participation promoted by policymakers and energy companies – and highlight individual behaviours and grassroots participation in energy initiatives. Another example is the research of Laakso et al. (2023) in Finland, where they focus on housing cooperatives and employ a practice-theoretical approach to show the interconnectedness of decision-making and various forms of participation in the energy system. They discuss three forms of EC: enthusiastic engagement in housing cooperatives, resistant and counteractive membership in the community, and individual energy behaviours as a form of daily practice. This understanding of EC predominantly highlights individual and collective actions such as prosumerism and sustainable consumption practices.

Despite the transformative potential for EC, the lack of a clear definition of the concept poses challenges, as neoliberal interpretations of "good citizenship" increasingly influence policy debates, particularly within the EU. The interpretations often conflate the roles of "energy citizens" and "energy consumers," blurring the distinctions between direct, representative, and consumer-driven participation and activities that could dilute the democratic ideals underpinning EC. According to the above-mentioned researchers, the uniqueness of EC is its individual-level approach, specifically in regard to (1) the rights and responsibilities of citizens to participate in the transition to sustainable energy systems actively, (2) the evolution of attitudes away from passive energy consumption towards meaningful engagement with energy use in daily life, and (3) energy consciousness and the fostering of energy literacy (Lennon et al. 2020; Wahlund & Palm 2022; Laakso et al. 2023; Srinivasa Rao et al. 2024). Nevertheless, empirical interpretations of EC often vary, depending on the priorities of those who use the term.

Recently, more definitions of EC have been proposed in applied research, usually within EU-funded Horizon Projects, which focus on citizen engagement and the role of households and communities in the energy transition. For example, in the Energy PROSPECTS project, EC is defined as "a constellation of actors (in a context) and how it (1) enables/supports citizens to become active private and/or public energy citizens; (2) acts as a collective energy citizen by contributing to change in the energy system or as individual energy citizens and how they realise their potential in a private, public or organisational setting" (Vadovics et al. 2022; Debourdeau et al. 2024; Thalberg & Hajdinjak 2024).

Parallelly, a group of other researchers defined EC as people's belief that they have rights and responsibilities in regard to a just and sustainable energy transition, together with the drive to take action based on those rights and responsibilities (Hamann et al. 2023; Held et al. 2024). This definition proposes the conceptualisation of beliefs on two levels of analysis (individual and collective), as the authors claim that some perceptions of rights and responsibilities might be those of a community or group rather than an individual.

As a consequence of the new definitions and interpretations of EC, the criticism was made that the concept encompassed too many diverse aspects of people and energy transitions (Silvast & Valkenburg 2023). First, EC signifies the active participation of people in energy systems and reflects

diverse engagement levels among citizens. Regarding participation, energy attitudes correlate with environmental awareness and values as well as with energy (procedural) justice (Sovacool et al. 2016; McCauley et al. 2013). According to Held et al. (2024), attitudes towards energy use and environmental issues are closely aligned with the cognitive and behavioural components of EC. Similarly, pro-environmental behaviours are more strongly associated with (biospheric) values than with knowledge. Notably, individuals who prioritise these values also tend to advocate for social justice and equality for all people.

Second, EC has become an interdisciplinary approach that integrates psychological, legal, and economic dimensions, and usually refers to collective responsibility for a just energy transition. The citizen-centred approach applies mainly to rights and duties akin to EU citizenship. However, researchers also indicate that beliefs and norms at the individual and collective levels are grounded and react to the legal perspectives (Hamann et al. 2023). Building on this fact, EC is also inherently linked to the concept of energy democracy, which focuses on the active engagement of citizens in both energy production and decision-making processes. Many researchers further claim that this democratic involvement is essential for achieving equitable energy systems and facilitating the broader use of RES (Ringholm 2022; Devine-Wright 2007; Walker & Devine-Wright 2008; Wahlund & Palm 2022).

Third, Schlindwein and Montalvo (2023) call for heterogeneity of engagement. This means that EC includes various types of citizens, such as consumers, prosumers, and policymakers, and highlights individuals' diverse behaviours and roles in the energy transition. This inclusive and differentiated form has also been broadly discussed from the eco-feminist perspective, which provides data and analysis on the need to engender the energy system (Clancy & Feenstra 2019; Feenstra 2022).

/// European Energy Citizenship Research Examples

To date, EC has predominantly been conceptualised and applied within European contexts, often supported by EU-funded initiatives. The idea has gained significant traction in Europe as a framework for engaging citizens in sustainable energy systems. While there are some emerging studies in the United States and Australia, EC remains largely a European innovation (Kuch & Titus 2014). Socio-political and cultural factors unique to the European landscape play a critical role in shaping how EC is under-

stood and implemented across different countries. An interesting study on EC, which was conducted using the "Walking with Energy" methodology, explored how engaging citizens in energy landscapes can foster a deeper understanding of their energy sources and promote EC (Palm & Ambrose 2023). The study applied this method in the United Kingdom and Sweden by organising events such as physical walks to energy facilities, a virtual tour, and a language café aimed at immigrants. These activities encouraged participants to reflect on their everyday energy experiences and engage in discussions about the heating transition. Another EC project conducted in Switzerland focused on citizen-financed photovoltaics (CiFi PV), examining the participants' motivations and perceived roles in the energy transition. The study surveyed 510 participants across five CiFi PV projects and compared their characteristics to those of the general Swiss public. Participants saw themselves as active contributors to the energy transition rather than mere consumers or investors (Sierro & Blumer 2024). Using a motivational attributes scale, the study analysed the factors influencing the willingness of the participants to engage in future energy projects. The results showed that environmental concerns, local value creation, and financial motivations were significant predictors of future participation, with symbolic motivations being slightly less influential. Similarly, a Finnish study explored energy citizenship within housing cooperatives, emphasising the diversity of citizen participation in energy transitions (Laakso et al. 2023). While much research focuses on active and informed engagement, this study highlights resistance and complexity in decision-making processes. It also illustrates how everyday decisions intertwine with energy-related actions, and thus broadens the concept to include support for, and opposition to, energy initiatives.

The concept has also been used in one Polish case study. EC was applied to describe the grassroots movement and anti-fracking mobilisation in Żurawlów (2011–2015) that emerged in response to proposed shale-gas extraction. Researchers claimed that the engagement of the actors and the production of lay expertise among local activists was influenced by the interaction of the residents with NGOs and public institutions, fostering long-term environmental/energy engagement (Cantoni et al. 2018).

Cross-country studies on EC have further explored its application, particularly within the context of energy communities. In the Nordic countries, especially Denmark and Sweden, EC has been deeply integrated into sustainability and energy democracy frameworks. These nations have emphasised participatory planning, co-ownership of renewable energy

projects, and social innovation as key elements of EC. Denmark, for instance, has a long-standing tradition of community ownership in wind energy projects, where citizen involvement has been crucial to the success and acceptance of renewable energy initiatives (Wahlund & Palm 2022).

These examples show how broad and multifaceted EC remains, with its boundaries often overlapping with related frameworks such as energy justice, democracy, public participation, and so forth. This conceptual ambiguity has prompted calls for clearer operationalisation to ensure more consistent methodology and the development of research and policy applications (Silvast & Valkenburg 2023).

/// Methods: How Should Energy Citizenship Be Measured?

Since EC has been widely discussed, the need for tools to quantify it has grown. To address the methodological expectations, a study led by Johanna Held (2024) aimed to provide an empirically validated scale to measure EC based on psychological aspects of public engagement in energy transitions (Hamann et al. 2023). This scale was focused on key dimensions such as (1) beliefs about energy-related rights (e.g., the right to affordable and renewable energy), (2) beliefs about energy-related responsibilities (e.g., the responsibility to participate in sustainable energy efforts), and (3) motivation to action, which measures the willingness of individuals to act on these rights and responsibilities.

The research involved two stages: "item generation," using deductive and inductive methods, followed by pretesting in a sample (N = 51) to refine the scale. The deductive approach began with a clear definition of the EC concept, which is grounded in existing literature. This involved identifying the key components (energy justice and energy transition) and sub-categories that constitute EC, and then the inductive approach was implemented by engaging an interdisciplinary team of experts to discuss and evaluate the generated items (Held et al. 2024: 3–5). The final version of the scale was tested on large datasets in Austria and the Netherlands (N = 2,705), where the researchers conducted factor analyses and reliability tests to confirm the scale's validity and reliability. Held et al. (2024) proved that the EC scale is a measurable construct, as the results showed that the scale is a reliable and valid tool for measuring EC. The factor analyses revealed clear differentiation between the three dimensions (rights, responsibilities, and motivation). The "action motivation" factor emerged as a key predictor of behaviours related to the energy transition, while "beliefs about rights"

were more aligned with political participation in energy governance. Overall, the EC scale was validated, and the results confirmed the factorial structure of the two subscales (individual and collective), which can be used separately or as a combined EC scale.

The authors argue that "EC is not limited to a single psychological dimension but represents a broader perspective" (Held et al. 2024: 13). It focuses on measuring EC beliefs and motivations rather than behaviours, allowing for an exploration of EC as a predictor of energy-related actions and enabling comparisons with factors like knowledge or efficacy beliefs. This approach avoids conflating EC with socio-economic status, as current EC behaviours, such as investing in sustainable energy projects, are often costly and aligned with upper-class habits. By excluding behaviour, the scale treats EC as a potential outcome shaped by beliefs, motivations, and external factors.

/// Methods: Preliminary Study of Energy Citizenship in Poland

In the research project organised by Łukasiewicz-ITECH, "Polish Attitudes towards the Energy Transition 2024," a Computer-Assisted Personal Interviewing (CAPI) survey was conducted among adult Poles aged 18+. After the pilot research, a random route method was used to maintain representativeness. Interviewers followed a set path to gather responses, using the "last birthday" method to select respondents within households in order to provide a balanced and representative sample for the survey. The sample (N = 2,012) was weighted to account for key demographic variables, such as gender, age, education level, and region (based on place of residence), to ensure that the results reflect the structure of the general population. The survey was implemented by the company INDICATOR from July to September 2024, and analysis of the results has started.[1]

The research questions were focused on attitudes and the public perception of the European Green Deal, energy transition, and pro-environmental and energy behaviours. Moreover, the new EC scale was added to the questionnaire with nine main statements, divided into three key categories ("rights," "responsibilities," and "action motivation") within two distinct subtopics (Table 1).

[1] The survey was financed by the Łukasiewicz Research Network – ITECH, within the Energy Transition Research Programme. I would like to thank my research team (Joanna Grudowska, Ewa Kawiak-Jawor, Sebastian Michalik, and Dominik Zieliński) for their help in preparing the questionnaire and for discussion on the topic. Jacek Bieliński deserves special acknowledgement for his prompt additional help with the preliminary analysis.

Table 1. Energy citizenship (EC) variables divided into subcategories (based on Held et al. 2024; Hamann et al. 2023)

EC	Rights	Responsibility	Action motivation
Energy justice	Affordable sustainable (renewable) energy as a right	Responsibility to help others in the energy transition	Willingness to prevent others from being disadvantaged in the energy transition
Energy transition	Right to information on energy efficiency, Active participation in the energy market	Sense of responsibility for contributing to the energy transition Obligation to participate in the energy market	Pride in investing in renewable energy Willingness to influence energy policy

/// Results

The initial findings reveal strong support for the perception of "affordable energy" and the "right to information on energy efficiency" as fundamental rights, with nearly 70% of respondents agreeing. However, issues of "responsibility" and "active participation" in the energy market show more variability. Many respondents remain neutral or disagree regarding personal obligations, including the responsibility to help others or contribute actively to the energy transition (see supplementary materials). Notably, age plays an important role in shaping these perceptions, with middle-aged and older individuals (46–75 years) having distinct views compared to younger generations, particularly in connection with energy rights.

Regarding "willingness to influence energy policy," the responses are similarly divided, with a substantial portion of the population either neutral or opposed to taking a more active role. These results suggest a consensus on fundamental energy rights but highlight uncertainty and division over personal responsibility and involvement in the broader process of the energy transition.

Regarding gender, the analysis of variance (ANOVA) did not identify statistically significant differences in men's and women's perception of their rights ($F(1, 2012) = 3.794$, $p = 0.052$). Although the p-value approaches the conventional threshold for significance (it remains slightly above 0.05), the indication is that, while there may be some differences in how different genders perceive rights, they do not meet the strict criteria

for statistical significance at this level. However, the marginal p-value suggests further investigation into potential gender-based differences may be warranted.

In contrast, the analysis of age revealed statistically significant differences in the perception of rights across different age groups ($F(4, 2009) = 3.935$, $p = 0.003$). Post hoc comparisons show that individuals in the 46–60 age group perceive rights significantly differently from those in the 18–30 age group ($p = 0.043$). Similarly, the 61–75 age group also exhibits a significant difference in comparison to the 18–30 years group ($p = 0.008$). These findings suggest that older individuals, particularly those aged 46–75, have a distinctly different perception of rights than younger individuals.

Table 2. Variance – "rights" and age

	age.diff	**age.lwr**	**age.upr**	**age.p.adj**
31–45 yrs – 18–30 yrs	0.047	−0.098	0.192	0.902
46–60 yrs – 18–30 yrs	0.157	0.003	0.311	0.043
61–75 yrs – 18–30 yrs	0.211	0.038	0.385	0.008
76+ yrs – 18–30 yrs	0.042	−0.164	0.249	0.981
46–60 yrs – 31–45 yrs	0.110	−0.040	0.260	0.262
61–75 yrs – 31–45 yrs	0.164	−0.006	0.334	0.064
76+ yrs – 31–45 yrs	−0.005	−0.208	0.199	1.000
61–75 yrs – 46–60 yrs	0.054	−0.124	0.231	0.923
76+ yrs – 46–60 yrs	−0.115	−0.325	0.095	0.565
76+ yrs – 61–75 yrs	−0.169	−0.393	0.056	0.242

The ANOVA results for "responsibility" and "rights" based on educational attainment indicate statistically significant differences in both cases, suggesting that education plays an important role in shaping perceptions of responsibility and rights.

For "responsibility," the ANOVA shows significant differences across education levels ($F(4, 2009) = 3.583$, $p = 0.006$) (Table 3). Post hoc comparisons reveal that individuals with secondary education differ significantly from those with primary education ($p = 0.011$), and those with higher education also significantly differ from the primary education group ($p = 0.003$). These findings suggest that people with higher levels of education perceive responsibility differently from those with lower educational attainment,

with individuals with secondary and higher education showing the most pronounced differences. Other comparisons, such as between vocational and secondary education or vocational and higher education, do not show statistically significant differences, indicating that the perception of responsibility does not vary substantially between those intermediate levels.

Table 3. "Responsibility" versus education

	edu.diff	**edu.lwr**	**edu.upr**	**edu.p.adj**
Vocational – primary	0.148	−0.017	0.313	0.104
Secondary – primary	0.181	0.028	0.334	0.011
Post-secondary – primary	0.118	−0.193	0.429	0.838
Higher – primary	0.213	0.053	0.373	0.003
Secondary – vocational	0.033	−0.102	0.168	0.963
Post-secondary – vocational	−0.029	−0.332	0.273	0.999
Higher – vocational	0.065	−0.077	0.208	0.722
Post-secondary – secondary	−0.063	−0.359	0.234	0.979
Higher – secondary	0.032	−0.097	0.161	0.960
Higher – post-secondary	0.095	−0.205	0.395	0.910

Table 4. "Rights" versus education

	edu.diff	**edu.lwr**	**edu.upr**	**edu.p.adj**
Vocational – primary	0.073	−0.104	0.250	0.796
Secondary – primary	0.159	−0.006	0.323	0.064
Post-secondary – primary	0.436	0.102	0.770	0.003
Higher – primary	0.219	0.047	0.390	0.005
Secondary – vocational	0.086	−0.059	0.231	0.485
Post-secondary – vocational	0.363	0.038	0.688	0.020
Higher – vocational	0.146	−0.007	0.299	0.070
Post-secondary – secondary	0.277	−0.041	0.595	0.122
Higher – secondary	0.060	−0.078	0.198	0.759
Higher – post-secondary	−0.217	−0.539	0.105	0.351

In the case of "rights," the ANOVA also indicates statistically significant differences across educational levels ($F(4, 2009) = 5.476$, $p < 0.001$) (Table 4). Post hoc analysis reveals that individuals with post-secondary education perceive rights significantly differently compared to those with primary education ($p = 0.003$). Those with higher education also differ considerably from the primary education group ($p = 0.005$). Additionally, there is a significant difference between those with post-secondary education and those with vocational education ($p = 0.020$). These findings indicate that individuals with higher education levels, particularly those with post-secondary and higher education, tend to perceive rights differently from those with lower educational levels. The comparison between secondary education and primary education approaches significance ($p = 0.064$) and suggests potential differences, but this result does not meet the conventional threshold for statistical significance.

In summary, perceptions of rights and responsibilities vary significantly across different educational levels, with individuals possessing secondary, post-secondary, and higher education having perceptions that are distinctly different from those with primary education. This indicates the important role of education in shaping individuals' views on responsibility and rights in the context of social and civic engagement.

/// A Polish Case Study of Energy Rights, Responsibility, and Willingness to Act

The results demonstrate strong support among Polish respondents for fundamental energy rights and procedural and distributive justice, particularly the right to affordable energy and access to information on energy efficiency, with nearly 70% of respondents in agreement. However, in regard to a sense of responsibility and active participation in the energy transition, the findings reveal a more divided stance. This aligns with studies showing limited engagement due to knowledge deficits and institutional barriers, particularly among younger and less educated groups (Ryghaug et al. 2018). Many respondents either expressed neutrality or outright disagreement with the idea of personal obligations, indicating a lack of civic motivation to contribute actively to the transition. This suggests that while the public values the protection of energy rights, there is limited willingness to engage personally in the collective responsibility needed for a successful energy transition. Collective engagement and individual willingness to act should be compared, as scholars claim that individuals identify both

through personal identities ("I") and as members of social groups ("we"), which may influence EC (Held et al. 2024; Hamann et al. 2023). Collective engagement could be tied to membership in energy communities, national or EU groups, or political parties, which were not analysed in this survey. Collective identities play a crucial role in shaping citizens' engagement in energy transitions, highlighting the social dimension of EC beyond individual actions. Although Polish social capital is generally increasing, the formation of active, involved, and responsible citizenship skills is not improving (Hejwosz-Gromkowska 2020). The results on the EC scale reflect significant societal differences influenced by age and education. Age-related disparities show that individuals aged 46–75 are more aware of energy rights than those aged 18–30, reflecting generational differences in values and experiences with energy systems. Such findings align with studies examining the role of age in fostering personal norms and responsibility, which are crucial for active EC (Röderer et al. 2024).

The generational difference in the perception of rights and responsibilities could stem from varying levels of civic education or shifts in values and attitudes towards energy and environmental issues.

Although the above results are preliminary, there is a visible need to activate all age groups, particularly younger generations, who may be pivotal in organising energy communities and driving the transition towards sustainable energy systems. Empowering these younger cohorts through targeted policies and education could be key to fostering their active involvement.

Moreover, education emerges as a critical factor in shaping pro-environmental behaviours and attitudes towards the energy transition. Respondents with higher levels of education (secondary, post-secondary, and higher education) have significantly different perspectives on rights and responsibility compared to those with primary education. This finding reinforces the arguments in existing literature that suggest that higher education fosters critical engagement, greater acceptance of energy transition policies, and the ability to adapt RES (Srinivasa Rao et al. 2024). Therefore, tailored communication and educational strategies are crucial to promoting EC across diverse demographic groups (Hejwosz-Gromkowska 2020; Laakso et al. 2023; Lennon et al. 2020).

Despite the recognition of energy rights, the results indicate a broader issue: limited civic engagement and a general lack of motivation to participate actively in the energy transition. Many respondents expressed the

need for knowledge and better information about energy issues. There is a gap in energy justice, and the public feels insufficiently informed to act. This suggests that, beyond fostering responsibility, efforts must also focus on fulfilling the right to access comprehensive and transparent information about the energy transition and other incentives and support (Devine-Wright 2007; Seyfang et al. 2014). Ryghaug et al.'s study (2018) indicates that the utilisation of technologies such as smart meters and photovoltaic panels can facilitate enhanced engagement, particularly when policies are designed with inclusivity and accessibility as core principles. Addressing these barriers through targeted educational and participatory initiatives, especially for younger cohorts of the population, is crucial to bridging gaps in EC and fostering a just energy transition.

/// Limitations of the Study and Next Research Steps

The findings of this study, while insightful, are not without limitations. The paper provides preliminary CAPI results but does not fully explore the underlying factors influencing the varying degrees of responsibility and willingness to act among different demographic groups. One limitation is that the data is based on self-reports only, which means we collected declarations, and actual behaviour was not measured in our study. Further research is needed to understand what would encourage individuals, especially those who are young and less educated, to take more proactive roles in the energy transition (Devine-Wright 2007, 2008). There is also a need to investigate the barriers preventing greater engagement at both the individual and institutional levels. Moreover, it would be interesting to compare the EC individual level with various group/collective levels in different Polish regions. Additionally, to capture evolving perceptions or the broader context of political, economic, or technological developments influencing energy transition failure, it would be worthwhile to explore further topics with qualitative methodologies. Finally, since EC is changing, complex, and not fully developed, it will probably have further methodological developments, and new scales will soon be tested. As Ringholm (2022) puts it, EC "expresses itself in a multitude of forms, and new forms and expressions are probably invented as we write." Thus, working on a new EC concept and methodological improvements would still be beneficial.

/// Does Low Energy Citizenship Hinder the Energy Transition? Some Conclusions

While energy democracy and citizenship are often discussed in tandem, their distinct focuses on governance and individual agency demonstrate the multifaceted nature of participatory energy transitions. Understanding these nuances can inform more effective strategies for engaging citizens in sustainable energy practices. Unlike energy democracy, which emphasises institutionalised approaches, such as community ownership and structural reforms, EC tends to focus on individual and collective actions such as prosumerism and sustainable consumption practices. These practices frame participation as a form of self-governance rather than as participation anchored in legal obligations or entitlements. The energy transition for the general public does not mean solely a change in electricity bills or taxes. The shift towards RES and decentralisation of the energy system is a complex process that requires infrastructural changes and the active involvement of citizens, which is possible only with a proper understanding of changes and trends in the energy system, acquaintance with the "sustainability vision," and belief in the importance of actions on various levels. To address these challenges, the bottom-up approach must be supported by long-term incentives, which should also be added to the legal system (Walker & Devine-Wright 2008).

In the Polish context, this individualistic framing without proper systemic support seems to be more challenging than in Western countries (where the EC concept and scale were developed) due to cultural and historical factors. EC emphasises behavioural change and situates itself as an active yet decentralised mode of contributing to energy transitions. The energy system in Poland, however, is still rooted in a centralised, coal-dominated model that reflects the historical legacy of heavy industrialisation and state-controlled energy policies. This legacy has resulted in an institutional framework that tends to favour large-scale, centralised energy projects over grassroots or community-led initiatives, creating barriers to the development of EC. Additionally, EC reflects people's mindsets. Thus, in the structural context of the energy system, the conflation with the cultural system is visible. The EC scale, which encompasses both individual and collective perspectives, pictures the ways in which people think, perceive their responsibility, and act within the energy transition framework they have inherited – a framework that often limits their capacity for active participation to a minimum.

Furthermore, the government's "just transition" energy policy, which involves a slow implementation of decarbonisation and energy price freezes, may inadvertently suppress motivation or agency by reducing the perceived urgency or necessity of individual or community-led actions. While such measures aim to protect citizens from the volatility of energy markets, they may simultaneously create dependency and reduce the drive for decentralised, grassroots solutions. This dynamic reveals the tension between protective state interventions and the cultivation of active, participatory EC, and raises critical questions about the pathways to fostering meaningful engagement in Poland's energy transition.

The concept of EC presented in this paper offers a new framework for bridging broader discussions on energy democracy with the active participation of individuals and communities. Although the deficit of EC is not the sole factor impeding the progress of the energy transition, it will undoubtedly play a significant role in shaping the pace and forms of the planned changes.

The validated EC scale used in the CAPI survey offers a quantitative assessment tool that was used to evaluate the Polish "EC mindset." These results can be treated as a preliminary diagnosis and definitely need further in-depth research. The results presented in this paper show strong public support for fundamental energy rights, including affordable energy and access to information, with the majority of respondents emphasising the importance of procedural and distributive justice (McCauley et al. 2013). However, attitudes towards personal responsibility and active participation remain divided, reflecting barriers such as knowledge deficits and institutional limitations, particularly among younger and less educated groups (Ryghaug et al. 2018). These results are challenging in the context of the Polish government's KPEiK project, which envisions the creation of approximately 300 energy communities and around 2 million prosumers by 2030 (Ministerstwo Klimatu i Środowiska 2024). Achieving these ambitious targets depends also on the preparedness of citizens to take on active roles in the energy system. The Ministry of Climate and Environment is working on making settlements with prosumers more favourable and just, as noted by Minister Miłosz Motyka in regard to ongoing efforts to adjust settlement factors (Energetyka24, 2024). While such measures are crucial, they come amid a narrowing window for achieving net-zero targets by 2030. The reality is that neither the state nor local actors, such as individuals, local governments, and energy communities, are fully prepared for this transition.

To enhance public engagement in the energy sector, tailored strategies for different energy actors are essential. Schlindwein and Montalvo (2023) suggest that prosumers need tax credits, access to knowledge, and support for electricity production and storage. Policymakers must strengthen institutional frameworks and integrate research insights to create evidence-based, effective policies. Businesses can drive sustainability by adopting efficient practices and investing in RES. Lastly, energy communities, which function on a local and collective level, require policies that emphasise the benefits of shared goals and collective action. Many researchers claim that EC should be supported through targeted initiatives, policies, and cultural shifts that empower citizens to actively contribute to the transition (Wahlund & Palm 2022; Lennon et al. 2020; Szulecki & Overland 2020). This needs a broader, general understanding of the society in question as well as a narrow, local focus on the individual and community levels.

In summary, EC might be recognised as a critical enabler of just and sustainable energy transitions. Without the active involvement of citizens, achieving long-term climate goals will remain elusive. Energy transition requires the engagement of society and coordinated efforts at multiple levels of governance. The scale and framework of EC are thus important areas for future research.

/// Appendix

Table 1. Energy citizenship scale of nine items (descriptive statistics), *N* = 2,012

	Strongly disagree	**Rather disagree**	**Neither agree nor disagree**	**Rather agree**	**Strongly agree**
I believe that affordable sustainable (renewable) energy is an important right for all of us	5%	5%	20%	32%	37%
I have a right to information on the energy efficiency of various products	2%	6%	19%	32%	42%

	Strongly disagree	Rather disagree	Neither agree nor disagree	Rather agree	Strongly agree
I consider it an important right to be able to actively participate in the energy market (e.g., to be able to produce/sell/exchange/store energy)	3%	9%	31%	31%	26%
I believe it is my duty to help others participate in the energy transition (e.g., by sharing my knowledge)	7%	14 %	25%	36%	18%
I feel a responsibility to contribute to the energy transition	9%	16%	34%	25%	16%
I believe it is my duty to actively participate in the energy market (e.g., energy production/sale/exchange/storage)	11%	18%	36%	22%	14%
I am ready to act to ensure that no one is disadvantaged in the energy transition	10%	17%	38%	22%	13%
Investing time, effort and money to be able to use more renewable energy is something I am proud of	10%	18%	37%	21%	14%
I am ready to influence energy policy and legislation	11%	20%	36%	21%	12%

Gender

Table 2. Average factors by socio-demographic characteristics (gender)

Gender	Responsibility	Rights	Action motivation
Women	0.021	0.036	0.008
Men	−0.023	−0.041	−0.013

Table 3. Variance – responsibility versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	0.991	0.991	1.505	0.22
Residuals	2012	1325.290	0.659	NA	NA

Note: There are no statistically significant differences.

Table 4. Variance – rights versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	2.892	2.892	3.794	0.052
Residuals	2012	1533.750	0.762	NA	NA

Note: There are no statistically significant differences, but $p = 0.0516$.

Table 5. Variance – action motivation versus gender

Term	df	sumsq	meansq	statistic	p.value
Gender	1	0.224	0.224	0.314	0.575
Residuals	2012	1433.350	0.712	NA	NA

Note: There are no statistically significant differences.

Age

Table 6. Average factors by socio-demographic characteristics (age)

Age in yrs	Responsibility	Rights	Action motivation
18–30	−0.034	−0.084	−0.030
31–45	0.023	−0.038	0.040
46–60	0.016	0.073	0.022
61–75	0.042	0.126	−0.004
76+	−0.096	−0.049	−0.113

Table 7. Variance – responsibility versus age

Term	df	sumsq	meansq	statistic	p.value
Age	4	3.121	0.780	1.185	0.316
Residuals	2009	1323.161	0.659	NA	NA

Note: There are no statistically significant differences.

Table 8. Variance – rights versus age

Term	df	sumsq	meansq	statistic	p.value
Age	4	11.947	2.987	3.935	0.003
Residuals	2009	1524.695	0.759	NA	NA

Note: There are statistically significant differences.

Education

Table 9. Average factors by socio-demographic characteristics (education)

Education	Responsibility	Rights	Action motivation
Primary	−0.153	−0.139	−0.106
Vocational	−0.002	−0.068	0.022
Secondary	0.025	0.015	0.046
Post-secondary	−0.035	0.297	−0.019
Higher	0.059	0.078	−0.022

Table 10. Variance – responsibility versus education

Term	df	sumsq	meansq	statistic	p.value
Education	4	9.395	2.349	3.583	0.006
Residuals	2009	1316.887	0.655	NA	NA

Note: There are statistically significant differences.

Table 11. Variance – rights versus education

Term	df	sumsq	meansq	statistic	p.value
Education	4	16.574	4.144	5.476	0
Residuals	2009	1520.068	0.757	NA	NA

Note: There are statistically significant differences.

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/// Abstract

Energy citizenship, a concept that frames individuals and communities as active participants in energy transitions, has gained significant attention as a critical element in achieving sustainable and just energy systems. This

paper builds on Devine-Wright's (2007) foundational work by exploring the concept of energy citizenship as a multidimensional and evolving phenomenon. It analyses current trends in energy citizenship, including community energy initiatives, energy transition, and justice at the intersection of climate action, environmental awareness, and European research. While existing research has developed theoretical foundations, the operationalisation of energy citizenship across diverse socio-political contexts remains underexplored. Using a recently validated scale to measure perceptions of energy rights and responsibilities, this paper presents a preliminary analysis of Polish energy citizenship. The findings reveal strong public support for fundamental energy rights. However, attitudes concerning personal responsibility or willingness to act are significantly less positive. This paper provides a summary of theoretical and practical pathways towards a more equitable and inclusive sustainable energy system, while emphasising the need for targeted initiatives to address these challenges.

Keywords:
energy citizenship, energy transition, justice, participation, energy democracy

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LIFTING THE RESOURCE CURSE IN AFRICA'S ENERGY SECTOR

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> This muddy goo, completely ignored for thousands of years, has become the most important resource. […] Without it, in many politically stable countries, voters could immediately change their sympathies and most economic powers would face a revolution. Oil can be a benefactor, but at the same time it can be a real cause of civic unrest. It is so important that economists have concluded that national economies may suffer from addiction to it. (Krajewski 2018: 8, own trans.)

> The ritual of the curse is part of an archaic mythical structure. "The myth of the curse" constitutes an integral element of a broad context delimited by the myth of the human condition – the condition determined by the fall and liberation (salvation). (Engelking 2010: 352, own trans.)

/// Introduction: Africa – A Treasure Trove of Natural Resources

Africa, especially the Sub-Saharan part of the continent, stands at a pivotal moment in its development trajectory, particularly concerning its energy sector. With the working-age population set to double or even triple by 2050 (Guengant & May 2013: 1) and rapid urbanisation underway, Africa faces both challenges and opportunities in meeting its energy needs sustainably.

African raw materials were one of the main reasons for colonisation (as was noticeable in the names given by Europeans to different territories:

the Gold Coast, the Copperbelt). The continent is home to some 30% of the world's strategic mineral reserves, 8% of the world's natural gas, and 12% of the world's oil reserves (ANRC 2016: 3). There are several oil-rich countries in Africa, with Nigeria, Libya, Algeria, and Angola among its leading oil producers. Nigeria, in particular, boasts vast reserves and has historically been a major player in the global oil market (Auty 1990). In the past two decades, commercial-quality oil sources have been found in or off the coasts of Senegal, Gambia, Sierra Leone, Liberia, Ghana, and Sâo Tomé and Principe. In addition to oil, Africa possesses substantial natural gas reserves, with states like Nigeria, Algeria, Mozambique, Egypt, and Libya emerging as key players in the global gas market. Coal also remains a significant source of energy in Africa, particularly in countries like South Africa, Mozambique, Botswana, Zimbabwe, Tanzania, Nigeria, Zambia, and Malawi, where it is used for electricity generation and industrial processes (Gary & Karl 2003).

Oil and gas revenue has been instrumental in driving economic growth, funding infrastructure projects, and supporting government budgets in many African regions, especially from the East African Rift Valley and West Africa's Gulf of Guinea. Minerals account for an average of 70% of total African exports and about 28% of gross domestic product (ANRC 2016: 3). The extraction of raw materials constitutes the majority of the income of, for instance, Angola, Botswana, Equatorial Guinea, Namibia, South Africa, and Zambia (Shaxson 2007).

However, the presence of abundant natural wealth has not always translated into prosperity for African nations. Many resource-rich countries in Africa have grappled with a range of challenges that are commonly referred to as the resource curse and that include the decline of the public sphere, corruption, economic volatility, social unrest, and ecological degradation. This article delves into the multifaceted dimensions of the resource curse in Africa's energy sector, especially in oil production in the Sub-Saharan region, and examines its historical roots, causes and effects, contemporary manifestations, policy implications, and institutional responses.

/// The Resource Curse and the Dutch Disease as Subjects of Academic Debate

The resource curse, also known as the paradox of plenty, is a controversial concept and has been examined and questioned for decades by many economists, policymakers, and scholars. It refers to the counterintuitive

situation where countries rich in natural resources, especially petroleum, alluvial diamonds, and other minerals (as well as timber, cocoa, and fish) often experience slower economic growth, higher levels of poverty, greater political instability, an increased risk of civil war, and autocratic political regimes.

The concept of the resource curse was first articulated after the Cold War, in the 1990s, when Richard Auty, Jeffrey D. Sachs, Andrew M. Warner, and Terry Lynn Karl empirically showed that states that were heavily reliant on natural resources, including in Africa, achieved worse growth outcomes than their counterparts (Sachs & Warner 1995, 1997; Karl 1997; Auty 1993). According to Auty (1993), a country can be considered to be affected by the resource curse if at least 8% of its GDP is generated by the mining industry, and at least 40% of its export earnings are obtained from the sale of raw materials. On the other hand, as Karl describes in *The Paradox of Plenty* (1997), the resource curse has stricken countries at many different levels of heterogeneous development. She closely examines five states: Algeria, Nigeria, Indonesia, Iran, and Venezuela. In these regions, dependence on oil led to disproportionate fiscal reliance on petrodollars and public spending, at the expense of statecraft. Oil booms, which create the illusion of prosperity and growth, actually destabilise regimes by reinforcing oil-based interests and further weakening state capacity.

At the heart of the theory of the resource curse lies the older concept of the Dutch disease. This term was coined by *The Economist* in 1977. The Dutch disease is an economic phenomenon that occurs when a country experiences a sudden influx of revenue from natural resource exports, leading to adverse effects on other sectors of the economy, particularly manufacturing and agriculture (Wijnbergen 1984). The Dutch disease gained prominence when the Netherlands experienced a sharp appreciation of its currency, the Dutch guilder, following the discovery of natural gas reserves in the North Sea. The influx of revenue from gas exports produced an increase in the value of the guilder, making other exports less competitive on the global market. As a result, the Dutch manufacturing sector suffered a decline in competitiveness, leading to job losses and economic restructuring (Torvik 2001; Matsen & Torvik 2005).

In the scholarly literature at the turn of the twentieth to twenty-first century, the terms "resource curse" and "the Dutch disease" were often used interchangeably (Humphreys et al. 2007). For the purposes of this article, it was assumed that the resource curse embraces all the alleged negative effects of oil on development, while the Dutch disease refers

mainly to one aspect of the resource curse, the inflationary effect of a natural resource windfall.

It is symptomatic that, in the current works on post-colonial countries, researchers much more often use the term "resource curse" than the label "the Dutch disease." Early formulations of the resource curse focused mainly on the links between poor macroeconomic performance and abundance of non-renewable natural resources (Robinson et al. 2006). These analyses were conducted – it should be emphasised – by economists cooperating with the World Bank and the International Monetary Fund. The reports they prepared – at a time when a significant part of intellectuals believed in the concept of the end of history and the triumph of liberal democracy promoted by Francis Fukuyama (1992) – represented a perspective in which the issue of development was reduced to economic growth. Their interpretation highlighted the importance of free markets, individual entrepreneurship, and minimal government intervention in the economy. In this theory, if a country has abundant natural resources, it should leverage them to stimulate growth through free market mechanisms. Along with privatising state-owned enterprises and encouraging foreign investment, governments should minimise intervention and allow market forces to dictate the exploitation and commercialisation of resources.

According to recent surveys, natural resource dependence has a significant negative effect on the growth of GDP per capita, with a 10-percentage-point increase in the ratio of resource exports to GDP depressing average growth by 0.77–1.1 percentage points per annum. Curse-like outcomes are more likely to emerge from so-called point resources (e.g., oil fields and diamond mines) than from diffuse resources (fertile land) (Brunnschweiler & Bulte 2008b; Smith 2015). Nonetheless, in the scholarly works of the twenty-first century there has been a clear tendency to change the scope of the resource curse concept and to orient it towards socio-political issues (Kłosowicz 2017: 302–310). The theory has been expanded to identify the causal links between resource abundance and other outcomes, such as corruption levels, a lack of political, ethnic, or cultural freedom, and even military conflict. A "cursed" state tends to have a very low Human Development Index (a country scores a lower level of HDI the lower its average lifespan, education level, and gross national income per capita). African states have become useful examples to confirm the theory (Klare 2001; Ross 2004; Dunning 2009).

/// Correlation ≠ Causation: The Rentier State Concept

Among the resource-cursed Sub-Saharan African countries we find states such as Nigeria (oil, gas), Angola (oil, diamonds), the Democratic Republic of Congo (coltan, cobalt, diamonds, gold), Sudan and South Sudan (oil), Equatorial Guinea (oil), Chad (oil), Zimbabwe (gold, diamonds, platinum), and Gabon (oil, timber). A number of states, including Botswana (diamonds), Namibia (uranium, diamonds, gold, copper), Ghana (gold, oil, cocoa, bauxite), and South Africa (gold, platinum, diamonds, coal), seem to be protected from, or even blessed, by their resources (Jensen & Wantchekon 2004). These examples show that there is no simple automatism that turns natural resource wealth into a "curse." According to many researchers, the phenomenon does not inevitably materialise but is merely a probability (Boschini et al. 2004).

Several factors contribute to the resource curse in Africa's energy sector, including domestic institutional weaknesses and external pressures from multinational corporations and other international actors (Collier 2006). Nevertheless, most of the literature on African economics concentrates on internal factors: notably, the quality of social institutions (Mehlum et al. 2006) and the influence of the political context on the scale of the resource curse (Torvik 2002). Weak governance structures (Ross 1999) also often result in frauds (Leite & Weidmann 2002) and lack of transparency in resource management (Gylfason et al. 1999), which undermine the equitable distribution of energy revenues and foster social tensions (Wick & Bulte 2009). In assessing the scale of the curse, the timing of the discovery of raw material deposits seems to be crucial: a country will be heavily "cursed" when the discovery of the resource is made before accountable and democratic state institutions are established and consolidated.

These processes can be easily seen in the idea of the rentier state. This concept gained prominence in the 1970s and 1980s, particularly through the work of economists and political scientists studying the effects of oil wealth in the Middle East and North Africa (MENA) region. Scholars like Hazem Beblawi and Giacomo Luciani, in their work *The Rentier State* (1987), were instrumental in formalising the theory. They analysed how non-European states reliant on external rents (like oil or gas revenues) differ from those that primarily generate revenue through taxation. According to the concept of the rentier state, in countries that principally rely on rents from natural resources, rent-seeking creates a bias towards unproductive activities. The owners of natural resources have perverse incentives to use the rents for consumption

and short-term gain rather than investing them for long-term development (Shambayati 1994). What is more, government becomes autonomous vis à vis its population because it need not tax its citizens but can instead use rents to repress and co-opt opposition or fuel clientelist networks (which in the African context are often tribal [Yates 1996]). The resulting increased level of government autonomy and the politically motivated use of rents by the elite tends to weaken – and to "curse" – the state (Aslaksen & Torvik 2006).

It is possible to observe that the resource curse is not a universal law – some rentier states suffer from it but others escape it. Just because many resource-rich states struggle does not mean resources are the cause of their problems. It is easy to confuse correlation with causation during analysis of the resource curse in rentier states. Moreover, many scholars and economists argue that the concept of the rentier state is flawed or overly simplistic, for several reasons. Many rentier states are democratic and well-governed (e.g., Botswana), and many authoritarian countries exist without resource wealth (e.g., Zimbabwe). It should also be stressed that the original rentier state theory was created before globalisation reshaped economies. Today, resource-rich states invest in sovereign wealth funds to stabilise their economies; they engage in international markets and trade, and face pressure from international organisations to adopt better governance (among other countries, Ghana). Perhaps there is a post-colonial and Orientalist stereotype hidden in the theory of the rentier state – stressing the importance of internal factors and marginalising the negative influence of colonial history and the role of foreign actors (states and corporations), which are currently reproducing the neocolonial logic of exporting raw materials from the Global South to the Global North.

/// Social, Economic, and Environmental Implications

Creating a catalogue of the effects of the Dutch disease and resource curse may give the impression that the causes of these phenomena are being reconstructed – the resource curse could strengthen negative processes and accelerate the deterioration of public institutions.

Economically, resource-rich countries often exhibit lower levels of economic growth, higher levels of poverty, and greater volatility in income and expenditure patterns compared to resource-poor states (Brunnschweiler & Bulte 2008a). The resulting limited degree of diversification of resource-rich economies produces dependence and is the major reason for the high macroeconomic vulnerability of these economies (Karl 2007). Moreover,

resource-rich countries frequently suffer from declining terms of trade shocks (Atkinson & Hamilton 2003). Overdependence on energy exports can also lead to volatility in government revenues, fiscal instability, and reduced incentives for investment in other sectors of the economy (Ding & Field 2005). Additionally, higher public investment is often provided for economically questionable projects. Particularly large and prestigious projects (so-called white elephants) belong to this category (Robinson & Torvik 2005). Furthermore, the dominance of extractive industries in the energy sector can crowd out investment in renewable energy and other alternatives, perpetuating dependence on fossil fuels.

Because resource booms raise the value of staying in power, unaccountable policymakers are tempted to create unproductive public sector employment. Instead of being used for social and educational programmes or economic diversification, oil and gas revenues are often siphoned off through embezzlement, bribery, and illicit financial flows (Gylfason 2001). This undermines public trust, exacerbates inequality, and perpetuates cycles of poverty and underdevelopment (Hodler 2006).

Socially as well, the resource curse can exacerbate inequalities, marginalise vulnerable populations, and fuel grievances and conflicts over resource control and distribution (Bulte & Damania 2008). The scramble for control over valuable resources, such as diamonds in Sierra Leone or oil in South Sudan, has fuelled civil wars and regional-ethnic conflicts, leading to immense human suffering and displacement (Alao 2007). The state crisis related to the resource curse also strengthens authoritarian regimes, as, for instance, in Equatorial Guinea (Ross 2001).

The debate on natural resources as a motive for social violence has been dominated by the juxtaposition of a "greed and grievance" hypothesis that segments of the population or regions might feel deprived of the benefits of resource-related income and therefore take up arms (Coller & Hoeffler 2001). Typically, grievance is associated with secessionist upsurges in the regions of Cabinda in Angola, the Niger Delta in Nigeria, Katanga in the Democratic Republic of the Congo, Ambazonia in Cameroon, and Casamance in Senegal.

Environmentally, the extraction and combustion of fossil fuels and the exploitation of other natural resources can contribute to air and water pollution and lead to ecological degradation, deforestation, loss of biodiversity, and greenhouse gas emissions, with the consequent exacerbation of climate change undermining the long-term sustainability of ecosystems and the livelihoods of local communities and indigenous populations.

/// Trying to Overcome the Resource Curse: Case Studies

Lifting the resource curse requires a multifaceted approach that addresses economic, political, and social factors. Several African countries have attempted to address the resource curse through innovative policy measures and governance reforms – with varying degrees of success. Three African states – Nigeria, Angola, and Ghana – were chosen to illustrate the resource curse phenomenon and the models of growth adopted by their governments.

These three countries share several similarities in terms of their economic structures and historical contexts, as well as the challenges they face. Nigeria (area 923,768 sq. km., pop. 237 m, real GDP $1.275 tn [CIA 2024c]), Angola (1,246,700 sq. km., pop. 37 m, real GDP $266.249 bn [CIA 2024a]), Ghana (238,533 sq. km; pop. 35 m, GDP $229.639 bn [CIA 2024b]) are influential within their respective regions and play key roles in regional organisations like ECOWAS (Economic Community of West African States), SADC (Southern African Development Community), and the African Union (AU). Nigeria and Angola are members of the Organisation of the Petroleum Exporting Countries (OPEC).

These three states are endowed with significant natural resources, whose export determines their economic stability. All three countries exhibit a high degree of dependency on a limited number of commodities for revenue, which exposes them to global price fluctuations. As stated earlier in this article, Nigeria is known for its oil and gas reserves, Angola has substantial oil and diamond reserves, and Ghana is rich in oil, gold, and cocoa. Each state has a colonial past that shaped its current political structures, its post-independence development, and the activity of international corporations in the extraction and export of its raw materials. Despite their resource wealth, all three nations face economic challenges, including poverty, unemployment, and infrastructure deficits. Each country has experienced political instability, coups, civil unrest, and authoritarian governance at different points in their histories. They are all currently navigating democratic processes, albeit with varying degrees of success.

/// Nigeria: A Postcolonial Resource Curse

Nigeria, a former British colony, is often referred to as the "Giant of Africa." It is the continent's most populous nation and a significant player in the global fossil fuels market. The discovery of commercial oil reserves in

the Niger Delta region in the 1950s marked the dawn of Nigeria's oil industry and set the stage for rapid economic development fuelled by oil revenues. The extraction of oil has transformed the Nigerian economy from dependency on agriculture to dependency on oil (it can therefore be said that one resource curse has replaced another). Oil revenues became the primary source of government revenue, foreign exchange earnings, and economic growth (Traub-Merz & Yates 2004).

It is not easy to find the answer to the question of who was and is responsible for the shape of the oil industry in Nigeria. Since the country gained independence the oil industry has been dominated by several groups of stakeholders: the Federal Government of Nigeria and foreign oil companies – Shell, Mobil, Chevron, Nigeria Agip Oil Company, and Elf Petroleum Limited (Idemudia & Ite 2006). The Federal Government, by virtue of decrees and laws, such as the Land Use Act of 1978 and the Petroleum Act of 1969, remains (nominally) the only authority that can legitimately enter into negotiation and grant concessions for oil exploration to international and local oil firms. Nigeria joined OPEC in 1971; six years later the Nigerian National Petroleum Corporation (NNPC) was established to manage the joint venture between the Federal Government and foreign multinational corporations. However, the NNPC is usually described as being fraudulent and vulnerable to political control. The NNPC has been accused of diverting billions of dollars through shady deals (Frynas 2000).

While Nigeria's oil boom brought about significant social and even cultural benefits (according to Andrew Apter, oil wealth allowed for the strategic construction notions of national and African culture [Apter 2005]), it also precipitated a range of challenges. One of the most pronounced impacts of oil dependency is instability and volatility, and Nigeria's economy became highly susceptible to fluctuations in global oil prices. Periods of oil booms were often followed by busts characterised by symptoms of the Dutch disease: fiscal deficits, inflationary pressures, and currency devaluations (lately this situation arose, e.g., in 2014–2016). Moreover, Nigeria's heavy reliance on oil exports led to the neglect of other sectors of the economy, and also fuelled gargantuan nepotism and favouritism, which became a part of the domestic cultural landscape (Smith 2008). Multinational companies have been annually implicated in bribery scandals to secure oil contracts, as can be read in reports prepared by state agencies such as the Independent Corrupt Practices Commission (the ICPC, founded in 2000, targets public sector corruption) and the Economic and Financial Crimes Commission (the EFCC, established in 2003, investigates financial crimes).

Nigeria is the 140th least corrupt nation out of 180 countries, according to the 2024 Corruption Perceptions Index published by Transparency International (CPI 2025).

In Nigeria, income distribution has deteriorated to such a degree that 90% of the oil revenue accrues to 1% of the population. The rentier state syndrome has fostered a culture of rent-seeking and patronage in this multiethnic country. Apart from the frequent changes of power in Nigeria, which occur through coups d'état and counter-coups (in 1966, 1966, 1975, 1976, 1983, 1985, 1990, 1993), politically connected elites siphon off oil revenues through embezzlement, bribery, and illicit financial flows, depriving the populace of essential services and infrastructure. Furthermore, the concentration of power and wealth in the hands of a few people (usually members of a tribe from the northern part of the state) has fuelled social inequality (Sala-i-Martin & Subramanian 2003; McFerson 2009).

Environmental degradation and social unrest are clearly visible in the Niger Delta region, where oil extraction activities have led to pollution, ecological degradation, and conflict over resource control. This region is suffering from crumbling administrative and social infrastructure and services, high unemployment, deprivation, and abject poverty. The inhabitants of the Niger Delta region, who are members of tribes such as the Ijaw, Ogoni, Kalibari, and Igbo, demand greater benefits from oil production (Ibeanu 2000; Watts 2007).

The Nigerian authorities have made attempts to solve these problems, but most have been unsuccessful. In 2003, the government signed up to the global Extractive Industries Transparency Initiative (EITI) to promote prudent management of revenues from its abundant natural resources to reduce poverty. The EITI Act was passed into law in 2007. Its governing body is the National Stakeholder Working Group, which consists of representatives from civil society, government, oil companies, communities, and the media. The effectiveness of this institution leaves much to be desired (Idemudia 2009). Similarly, Nigeria's Excess Crude Account, which was established in 2004 by the federal government, is a kind of sovereign wealth fund in which resource revenues are invested offshore, with the intent of stabilising the country's economy and smoothing out the impact of price volatility in oil exports. Its effectiveness has been undermined by the failure of many state governments to ratify the federal Fiscal Responsibility Act (Oshionebo 2017). Currently, Nigeria continues to face the daunting task of restructuring its petroleum-based economy, whose revenues have been squandered through corruption and mismanagement.

/// Angola: On the Path of Transformation

Nestled on the southwestern coast of Africa, Angola is one of the better resource-bestowed countries in the world, with oil, gold, iron, copper, manganese, timber, fish, and a varied agricultural basis. Conversely, its journey towards sustained economic growth has been riddled with complexities, ranging from a tumultuous history of conflict to heavy reliance on oil and diamond exports (Lújala et al. 2005).

As a Portuguese colony, Angola was underdeveloped and impoverished. Its main export was coffee. The story of Angola's oil industry begins, as in the case of Nigeria, in the late 1950s, when European geologists identified the potential for oil in Angola's offshore waters. In 1966, the first major commercial oil find was made at the Cabinda enclave, which lies separated from the rest of Angola by the Democratic Republic of the Congo, and is inhabited by members of the Bakongo ethnic group, whose native language is Kikongo. This discovery marked the beginning of Angola's fast journey into oil production and the perceived effects of the Dutch disease (Ferreira 2006).

Following independence from Portugal in 1975, the Angolan oil industry underwent a period of nationalisation as the newly formed government sought to assert control over the natural resources. A national oil company, Sonangol (Sociedade Nacional de Combustíveis de Angola), was established in 1976, based on the departing SACOR, the Portuguese oil concessionaire under the colony (Oliveira 2007). The onset of a brutal civil war between the Popular Movement for the Liberation of Angola (Movimento Popular de Libertação de Angola, MPLA) and the National Union for the Total Independence of Angola (União Nacional para a Independência Total de Angola, UNITA) faction plunged the country into turmoil, disrupting oil production and exploration activities. MPLA controlled the oil, and UNITA controlled the extraction of diamonds (Billon 2001; Sypeń 2005).

Despite the challenges posed by the long civil war, Angola's oil industry began to recover and expand in the 1990s, buoyed by peace agreements and increased foreign investment. International oil companies, including Chevron, ExxonMobil, Total, and British Petroleum, played a significant role in the revitalisation of Angola's oil sector, investing in exploration, production, and infrastructure (Ferguson 2005). However, it should be emphasised that the influence of international companies on domestic politics in Angola is much smaller than in Nigeria.

Throughout the 1990s and 2000s, Angola witnessed a series of significant offshore oil discoveries in its deepwater blocks, including the prolific Kwanza Basin and the ultra-deepwater fields off the coast. These discoveries catapulted Angola into the ranks of Africa's top oil producers, attracting billions of dollars in investment and positioning the country as a key player in the global oil market. Angola joined OPEC in 2007. The state exports 90% of its crude oil, mostly to the United States, China, and Brazil (Isaksen et al. 2006).

During this period, the main economic agents became the presidency (including José Eduardo Van-Dúnem dos Santos, president of Angola from 1979 to 2017, his family, and his powerful and mostly unelected officials); Sonangol and Endiama (Empresa Nacional de Diamantes – the national diamond company); the ruling party, the MPLA; the Ministry of Finance and a few other ministries; "the generals" (who made large profits during the war and continue to do so); and the "Empresarios de Confiança" (the oligarchs, often from old MPLA families, with their monopolies and oligopolies) (Hodges 2001; Amundsen 2014). The role of the MPLA nomenclature, the importance of the former presidential family, and the petrification of this network in the organisation of crude oil exports seem to be the main differences between Angola's situation and the situation of the oil industry in the Nigerian rentier state – which is a much less stable system, marked by the stigma of coups d'état, struggles between ethnic groups, and the aggressive policies pursued by international companies (Munslow 1999; Hodges 2004).

Present-day oil revenues are a critical source of income for the Angolan government. Nevertheless, the country's heavy dependence on oil exports has also exposed it to the volatility of global oil prices, highlighting the need for economic diversification and for eliminating corruption at the highest levels of government (Isaksen et al. 2007). Angola is the 121st least corrupt nation out of 180 countries, according to the 2024 Corruption Perceptions Index published by Transparency International (CPI 2025). The state, owing to the activity of the Direcção Nacional de Prevenção e Combate à Corrupção (The National Directorate for Preventing and Combating Corruption, DNPCB), has seen a significant improvement in its position in this ranking – by seventeen places since 2015. Since President João Lourenço took office in 2017, there has been a push to fight corruption, especially targeting high-profile figures, such as former President José Eduardo dos Santos's family members. Isabel dos Santos (Africa's richest woman and daughter of the former president) and her brother, José Filomeno dos Santos ("Zenu"), have faced investigations for corruption

and embezzlement. In recent years, Angola's oil earnings are better controlled through a budget process, as well as by the Ministry of Finance and the Central Bank.

Angola has undertaken efforts to diversify its economy and reduce its reliance on oil revenues. Initiatives such as the National Development Plan (Plano de Desenvolvimento Nacional, NDP) and the Economic Diversification Support Technical Assistance Project (Programa Apoio à Diversificação Económica de Angola, PADE) aim to promote non-oil sectors, including agriculture, manufacturing, and services. These diversification efforts are not only imperative for enhancing economic resilience but also for fostering long-term growth (in particular, in Cabinda) and reducing vulnerability to external shocks. As Angola's oil industry continues to evolve in this way, the country will face both opportunities and challenges on the road ahead (Hammond 2011).

/// Ghana: How to Avoid the Resource Curse

Resources were one of the main reasons for the colonisation of Ghana, as evidenced by, among other things, the name of this country from the period of British colonisation: the Gold Coast. As one of Africa's fastest growing economies, Ghana has made significant strides in recent years, attracting investment, fostering innovation, and driving socio-economic growth. Ghana's journey into oil production is quite short in comparison to oil production in Nigerian and Angolan history. It began when Ghana had already undergone a political transition, the political system was stable, the risk of political upheaval was minimal, and subsequent general elections were held in accordance with democratic procedures.

Discovery of the Jubilee Field, off the coast of the Western Region, was made in 2007 by a consortium led by Tullow Oil. Commercial production started in 2010. This discovery was a significant milestone for the country, unlocking vast reserves of crude oil estimated at over one billion barrels. Subsequent discoveries of oil and gas in fields such as Tweneboa, Enyenra, and Ntomme further solidified Ghana's position as a key player in the local oil market. It is worth adding that in 2008 the Ghanaian government signed a Memorandum of Understanding with the Norwegian government, with an initial focus on managing the Jubilee Field. The partnership is concentrated on avoiding the effects of the Dutch disease and thus on judicious management of the revenues from fossil fuels for

the overall benefit and welfare of all Ghanaians (Gyimah-Boadi & Prempeh Kwasi 2012).

The advent of oil production has had a profound impact on Ghana's economy, contributing to GDP growth, government revenue, and foreign exchange earnings. Ghana's oil sector has also attracted foreign investment and technology transfer, fostering collaboration between international oil companies and the Ghana National Petroleum Corporation (GNPC), a state agency. This collaboration has resulted in capacity building and knowledge transfer (Tsatsu 2022).

While Ghana's oil production has brought about numerous benefits, it also presents challenges and risks that must be carefully managed. The volatility of global oil prices poses a significant risk to Ghana's fiscal stability, revenue projections, and macroeconomic management. In response to these challenges, Ghana has implemented a range of governance mechanisms and institutional frameworks to ensure accountability in regard to oil revenues. The Petroleum Revenue Management Act (PRMA) of 2011 governs the allocation, management, and utilisation of oil revenues. In accordance with the guidelines of the PRMA, up to 70% of revenue from oil should be transferred to the annual budget. The remaining 30% is to be split into two funds: the Ghana Stabilisation Fund, which was set up to cushion against price shocks caused by the high volatility of oil prices or by unexpected drops in the production of oil, and the Ghana Heritage Fund, which is intended to serve future generations after the resources have been depleted. Since its inauguration in 2011, the Public Interest and Accountability Committee, which is responsible for the efficient management and use of petroleum revenues, has recorded numerous successes (Kopiński et al. 2013). The effectiveness of these programmes is much greater than that of similar institutions in Nigeria and Angola. It should be added that the ruling party and the president's circle have a much smaller degree of influence on raw material policy in Ghana compared to Nigeria and Angola.

The government has also strengthened regulatory frameworks for the extractive industries, enhancing transparency in revenue collection. Initiatives such as the Ghana Oil and Gas for Inclusive Growth programme aim to enhance the socio-economic impact of oil production by promoting local community engagement (Gyampo 2010). The EITI in Ghana is supported by many institutions, including the World Bank, the International Monetary Fund, the African Development Bank, the European Bank for Reconstruction and Development, and many nongovernmental organisations. The EITI aims to publicise company payments in exchange for the

use of natural resources and to provide full accounts of government revenue (Siakwah 2017).

Ghana has established a strong institutional, democratic framework that gives it a chance to escape the resource curse. The Ghanaian economy is fairly diversified (it is largely based around cocoa production); the political system appears stable. Ghana is the 80th least corrupt nation out of 180 countries, according to the 2024 Corruption Perceptions Index reported by Transparency International (CPI 2025). The activities of the Commission on Human Rights and Administrative Justice (the main anti-corruption agency, established under the 1992 Constitution) and the Economic and Organised Crime Office (which specialises in financial and economic crimes, including money laundering and fraud) are assessed positively by Ghanaian society. The country has created a dynamic civil society (Polus 2013). The economic stability achieved recently also suggests that the state will be able to avoid the resource curse.

/// Conclusion: Searching for the Antidote

Scholars have different arguments as to the curse's specific mechanics. There are various explanations as to how resource-rich economies become less diversified and how this economic homogeneity affects the breakdown of the public sphere. Discussion of the topic continues and still generates noticeable emotions. For example, in *The Licit Life of Capitalism: US Oil in Equatorial Guinea* (2019), anthropologist Hannah Appel suggests that the concept provides cover for those company practices that divert oil profits away from Africa and exacerbate local economic inequalities. The legitimacy accorded the theory also permits corporate actors to reiterate longstanding tropes about the inherent pathologies of African states and economies. Rather than focusing on corruption, Appel argues that much of what sustains capitalism is "licit" – meaning legally permissible, even if ethically questionable. In the broader perspective, she challenges the idea that capitalism is a system of free and fair markets, and she shows how colonial legacies, corporate law, and financial practices allow international oil companies to extract wealth while minimising accountability. Moreover, according to Appel, external efforts to reform the industry's excesses are premised on liberal utopias about a kind of state and civil society that simply does not exist in Africa.

Certainly, works like *The Licit Life of Capitalism* make interesting theoretical contributions to the anthropology of capitalism in the non-European

world. However, taking Appel's perspective into account does not mean rejecting the resource curse theory or the Dutch disease and rentier state concepts. She demonstrates that rather than focusing narrowly on economic growth as a determinant of the resource curse, studies should also consider the role of local factors, social inequalities, and ethnic, race, gender, and class relations. A comparative analysis encompassing the historical, economic, cultural, and tribal context of how Nigeria, Ghana, and Angola have implemented their raw materials policy seems to legitimise using the resource curse theory to describe the transformation of postcolonial economic systems, especially the energy sector.

Currently, fossil fuels shape Africa's economic stability more than ever. These resources play a central role in the formation of the continent's development trajectory, driving economic growth and improving living standards. The resource curse remains a formidable challenge for many African countries, with far-reaching implications. In the countries where one-party dominance or outright authoritarian rule prevails – as in Angola, Cameroon, Equatorial Guinea, Gabon, and Ethiopia – oil wealth will further entrench it. And where democratic systems are slowly gaining strength, where the risk of a coup and the escalation of civil war is still noticeable – as in Nigeria and the Democratic Republic of the Congo – oil wealth will test the quality of the state institutions. The risk of the resource curse appears to be lowest in countries where the discovery of rich raw material deposits occurred after the political transformation, in politically stable regions, such as Ghana.

Addressing the resource curse in states such as Nigeria, Angola, and Ghana requires a comprehensive and multifaceted approach that tackles the underlying drivers of the phenomenon. Key policy responses should include diversified industrialisation, the strengthening of governance and the rule of law, improved social welfare, and investing in human capital (Diamond & Mosbacher 2013). Undoubtedly, African nations must first of all invest in diversifying their economies beyond natural resources. Promoting sectors such as agriculture, manufacturing, and services can create new sources of income and employment, and reduce dependency on volatile commodity markets. Countries should establish sovereign wealth funds in which the state can invest resource revenues offshore (e.g., Botswana's Pula Fund has been successful in managing both long-term investments and stabilisation [Kopiński 2005; Czernichowski et al. 2012]). The resource revenue should first be distributed to the citizens and then taxed back by the state as a means of reducing the mismanagement of natural

resource revenue and introducing accountability into relations between the state and society (Humphreys & Sandbu 2007).

The development of partnerships between governments, civil society, and the private sector, with investments in education, healthcare, and skills training, can empower citizens and reduce poverty and inequality. A well-educated and healthy workforce is essential for driving economic growth. African nations should prioritise sustainable resource management practices that minimise environmental degradation and protect the rights of indigenous communities. This may involve implementing regulations, enforcing ecological standards, and fostering dialogue with stakeholders.

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/// Abstract

The aim of the article is to examine the resource curse – a phenomenon where resource-rich countries paradoxically experience economic underperformance and social instability – in Africa, especially the Sub-Saharan part of the continent. In the introduction, the energy sector and the oil-rich states in Africa are described. The article then analyses academic discussions on the use of concepts such as the "resource curse," the "Dutch disease," and "rentier states," and the entanglement of this debate in postcolonial relations between the Global North and the Global South. Next, the causes and social, economic, and environmental implications of the resource curse in Africa's energy sector are outlined. Drawing on multidisciplinary perspectives from history, economics, political science, and development studies, the article explores the complex interplay of factors that contribute to the resource curse phenomenon in three illustrative African countries: Nigeria, Angola, and Ghana. In summary, the key policy responses – the possible "cure" for the resource curse – are characterised.

Keywords:
resource curse, Dutch disease, fossil fuels, oil, Africa, Angola, Nigeria, Ghana

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THE GRASSROOTS ENERGY TRANSITION IN POLAND THROUGH A SOCIOLOGICAL LENS

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/// Introduction

In research work, we more often falsify the theses we put forward than find confirmation of them. We learn more often that something does not work or exist than the other way around. This means that researchers and scientists regularly fail, but they provide a kind of negative knowledge. This is the story of one of our research failures. It is also a story about the series of organisational and institutional failures that have accompanied the ongoing energy transition in Poland. The essence of science, however, is to learn as many lessons as possible from failures – not only to avoid mistakes in the future but also to learn something new about the world. Negative knowledge is also a useful kind of knowledge about reality. Sometimes we look for one thing and find something completely different and maybe even more interesting. And that is what happened with our failure. So what exactly was it about?

As part of the KlastER project, we were supposed to survey local, grassroots, and/or distributed forms of energy production and consumption

in Poland.[1] Our research, which was conducted in 2020–2021, involved a desk research study focused on selected energy systems (in the United States, the Scandinavian countries, Spain, and Germany), followed by desk research on energy developments in Poland and initiatives for renewable energy sources (RES). This research was supplemented by interviews with experts, then by field research conducted in selected energy clusters (including individual interviews, group interviews, and observations), and at the end by a scenario workshop. At the same time, we were involved with other team members in various conferences and expert discussions, which also gave us an idea of the "transition" processes. Our social research was part of a larger undertaking in the engineering sciences, and we had regular contact with representatives of these disciplines. Before undertaking the research, we thought long and hard about its proper theoretical embedding. We chose strategic action fields (SAF, see Fligstein & McAdam 2012). This framework combines elements of Pierre Bourdieu's (2005) field theory, new institutionalism, organisation theory, and social movement theory. Such a framework seemed appropriate in that it describes the mechanisms behind the formation of new economic and social fields, takes into account the dynamics of bottom-up processes and self-organisation, considers the interaction between different actors in the emerging fields, and allows the complex negotiation of the rules of the game within a field to be described. It offered everything we expected to find when studying grassroots and local energy; we considered energy clusters precisely in terms of an emerging field. It's fair to say that we adopted a fairly typical and safe research design. What went wrong?

It is not possible to show here the development trajectories of all the energy clusters that have been created in Poland in recent years. However, what emerges from our research is a picture of energy clusters as institutions whose development has been effectively blocked, mostly in the early stages of their existence. A good illustration of the process is the history of the energy cluster in Tomaszow Mazowiecki (Afeltowicz et al. 2024), which was established in 2018. Its core partners are the municipal commune,

[1] The conclusions we formulate in this article come from the research we conducted as part of the KlastER project. The "Development of Distributed Energy in Energy Clusters (KlastER)" project was co-financed by the National Centre for Research and Development under the auspices of the GOSPOSTRATEG programme. Project partners included the AGH University of Science and Technology and the National Centre for Nuclear Research; the partner on the government side was the Ministry of Energy, and, after its liquidation, the Ministry of Climate and Environment and the Ministry of Economic Development and Technology. We would like to thank all other members of the sociological part of the KlastER project for their contribution to the study: Jacek Gądecki, Katarzyna Leszczyńska, Katarzyna Skowronek, Marcin Zwierżdżyński, and Dorota Żuchowska-Skiba.

crucial municipal utilities (e.g., the water and sewage company, the heating plant, etc.), and the local sports association. Neighbouring communes of the city are also partners in the cluster, which was awarded a certificate of distinction from the Ministry of Energy in 2018. The local authorities have been the dominant actor in many local fields, including in the cluster. The Tomaszow Mazowiecki energy cluster is deeply rooted in the existing local structures of political and interpersonal connections, and therefore, it can be treated as a so-called local-government cluster (Stasik 2024). Despite the social and political capital of local politicians and the business people associated with them, as a consequence of the barriers posed by the local monopolist for the energy supply (PGE), lack of financing, and other barriers of a legal nature, it was not possible to create a full-fledged microgrid here. When we went to Tomaszow Mazowiecki to conduct interviews, we found many people there were eager to further develop the cluster but that there had been no achievements in this regard. The respondents were disappointed that there had been no benefits associated with obtaining energy cluster certification. We had the impression that they sought knowledge about what to do next from us, that is, from researchers. However, we were not able to help them.

We know from our interviews and field studies that the energy clusters certified under the ministerial programme mostly existed on paper. Some of them were not functioning at all. In some cases, several clusters were operated by one and the same person, who specialised in obtaining certificates, but not in developing genuine energy solutions. Some clusters were operating and achieving success, but, as our research indicated, this was happening independently of the ministerial programme. Some of the material collected even indicated that the cluster programme made it difficult for these organisations to function. Certification was not followed by any real financial, institutional, or legislative support. People associated with the clusters we reached often viewed the certification system as a kind of institutional fiction. In addition, the knowledge locally generated in the clusters was not disseminated, and feedback on what should be done to transform the energy sector in Poland was not taken into account by regulators and officials.

Energy clusters are just one of several phenomena in Poland's energy transition that we can try to plug into grassroots efforts: prosumption, cooperative initiatives, and energy self-sufficient municipalities. It is important that it was the creators of the idea of clusters who referred to grassroots categories. In our research we focused on initiatives developed before 2021;

we focused on clusters, but we also described other activities. By "grassroots energy," we mean the clusters at that time and single initiatives that had not been certified as clusters, such as the Krakow Social Power Plant. We do not consider individual consumption as grassroots energy, because such consumption does not require any vertical coordination of actions.

While grassroots energy initiatives in the national systems we analysed most often operated in a similar manner to social movements, this dimension proved to be absent in Poland – which is not to say that grassroots and/or local energy initiatives have not been attempted. However, in Poland, only one energy-independent municipality exists; energy cooperatives have not developed (according to the state of affairs on the day our research was completed). In general, it is difficult to talk about the field of social energy in Poland. Rather, we are dealing with a regionalised version of the energy monopolies existing from the socialist period. In practice, this means that energy operators and power plants can block the development of energy alternatives in various ways. And the regulators are aware that this is happening, yet little is being done about it. All this made the exploratory potential of SAF theory largely inapplicable: we were able to apply its ontology, but not the mechanisms it describes.

In the course of our study of grassroots and distributed energy in Poland, we discovered surprising parallels. What we saw was very reminiscent of processes that Polish sociology had been describing for decades in looking at the state of social institutions in the Polish People's Republic and during the political and economic transformation afterwards. What were the analogies?

Both transformations were implemented largely in the mode of mimetic isomorphism (DiMaggio & Powell 1983). Many of the organisations and institutions created in Poland during the transition era resembled what we glimpsed when looking at other systems. However, we often looked without seeing: we did not know what determined the essence of the solution. And the same can be applied to solutions imported from the West and transferred to the Polish energy sector. The concept of energy clusters is just one of many examples of concepts that have lost their original meaning in the translation process that accompanies imports (we have explained the process in detail in Afeltowicz et al. 2024). This brings us to the issue of the specific culture of institution-building in Poland. The way the Polish energy sector was designed is sometimes surprisingly similar to how capitalism and democracy were introduced in Poland. Although there are many transition models that can be applied in the case of Poland, no available

foreign model will be fully compatible. Whichever model we choose to build or copy will have unexpected side effects.

Sometimes it is difficult to see that we are dealing with mimetic isomorphisms due to the fact that organisations in Poland are adept at conducting "apparent actions" (Lutyński 2018). "Apparent actions" was a strategy for dealing with the absurd challenges people faced during the communist era. There are many indications that the propensity for such activities survived the period of socio-economic transformation. Many of the energy initiatives implemented in Poland bear the hallmarks of such activities.

An important category used to characterise Polish society of the socialist and transition era is that of the sociological vacuum (Nowak 1979). While today it is difficult to maintain the thesis of a general sociological vacuum, this phenomenon is being reproduced in the Polish energy sector. The system has been designed in such a way that it creates space for either micro and extremely individualistic solutions or top-down and macro solutions. The confluence of institutional and infrastructural factors means that there is no room for community-based initiatives at the meso level.

With all this in mind, we want to revise our original theoretical assumptions based on SAF theory ex post in this text using the ideas of a sociological vacuum in Poland and apparent actions. We will show how categories that were originally created to describe socio-economic change can be applied to describe the energy transition. We will try to demonstrate the constancy of certain social characteristics, patterns of actions, and practices despite the profound changes that have taken place in recent decades.

We want to emphasise that, in our opinion, it is definitely worthwhile to apply classical Polish sociological concepts and theories to the analysis of important contemporary social phenomena and processes, such as (but not limited to) the energy transition. Despite the change of the socio-political context, they still have considerable explanatory power.

/// A Sociological Vacuum and the Failure of the Energy-Cluster Programme in Poland

We want to explain the above-mentioned failure of the energy-cluster programme in Poland by referring to the sociological vacuum thesis (Nowak 1979). In the next section, we will identify the institutional mechanisms that are responsible for this failure and that sustain and deepen the state of the sociological vacuum in the Polish energy sector.

Stefan Nowak introduced the concept of a sociological vacuum to Polish sociology in the late 1970s. He used it in his diagnosis of the state of consciousness of Polish society in the Polish People's Republic. At that time, Poland had been within the Soviet Union's sphere of influence for more than thirty years, and this situation entailed restrictions on civil liberties and a socialist model of planned economy. Nowak's best-known and most frequently cited formulation of the vacuum thesis was in his paper "System wartości społeczeństwa polskiego" (Nowak 1979), published in *Studia Socjologiczne*. His aim was to determine which were the most significant objects, spheres of life, and areas of reality that triggered judgments and emotions, and, above all, produced a sense of identification and commitment in Poles of that period. He analysed such spheres as family life, friendship relations, democratic structures, national affairs, and religious identification. His most significant finding was that there were significant deficits in Poles' identification with social entities located at the meso level (between the level of primary groups, especially the family, and the level of the national community). He referred to this phenomenon as a sociological vacuum and described it in the following words:

> Thus, we see that between the level of primary groups and the level of the national community there is – from the point of view of people's identification and emotional involvement – a kind of sociological vacuum. If we wanted to sketch a giant "sociogram" based on people's sense of group bonding and identification, the social structure of our country thus conceived would appear as a "federation" of primary groups, of families and friendship-based groups, united in a national community, with other types of bonds between the two levels being very weak. (Nowak 1979: 160; own trans.)

In describing the sociological vacuum, Nowak stated that Poles lacked identification with meso-type structures. He did not claim the absence of such structures. Nor do we assume that there is a lack of such structures in the Polish energy sector. Attempts to institutionalise such creations as energy clusters or energy cooperatives indicate that there was an attempt to fill the vacuum at the meso level in the Polish energy field. However, questions remain as to why this has generally failed and what institutional mechanisms are responsible. Our analysis provides one answer to these questions. We assume that the sociological vacuum is a relatively constant parameter for describing Polish society in various dimensions of its

functioning. The existence of a sociological vacuum in the Polish energy sector is the result of the continued inertia of socialised energy developed at the meso-social level. As an exemplification of this thesis, we consider the history of the failure of implementing energy clusters in Poland.

There are at least two reasons to consider the situation in the Polish energy sector as an exemplification of the sociological-vacuum thesis. The first is the stagnation at the meso level of the energy sector. In describing the failure of the programme to establish energy clusters, we will assume that similar reasons lie behind the failure to establish other such structures (energy cooperatives, collective prosumers). The second reason is that the state put a strong emphasis on the development of micro levels of the energy sector. For the purposes of this article, we identify the micro sector with the development of individual prosumer energy.

More or less since 2015, when the Law on Renewable Energy Sources came into force, there has been a gradual expansion of offerings at the meso level of the Polish energy sector. These activities have aimed to accelerate the decarbonisation of the Polish economy. In official rhetoric, development was mainly aimed at lowering the cost of energy through its socialisation, that is, co-generation and balancing within local communities. The Polish state has put relatively the most effort into trying to institutionalise energy clusters. However, in spite of the several years that have passed since the programme began, only a few energy clusters had been successful by the time we concluded our study.

In the statutory sense, according to the RES Act (Art. 2, item 15a), an energy cluster is a civil law agreement that may include natural persons, legal entities, scientific entities, research institutes, or local government units, concerning the generation and balancing of demand, distribution, or trading of energy from RES or other sources or fuels, within a distribution network with a rated voltage of less than 110 kV, with the area of operation of this cluster not exceeding the borders of one county or five municipalities. The area of operation of an energy cluster is determined on the basis of the places of connection between the energy producers and the consumers who are members of this cluster. The purpose of energy clusters is to develop distributed energy for the needs of the regions concerned. They serve to improve local energy security in a way that ensures the achievement of economic efficiency and optimal organisational, legal, and financial conditions in an environmentally friendly manner. In 2018, the Ministry of Energy held two competitions for the Pilot Energy Cluster Certificate. As a result, sixty-six clusters from all over Poland were awarded such certificates.

Among other things, the certification was intended to help clusters apply for funds through the Operational Programme Infrastructure and Environment (Ministerstwo Aktywów Państwowych 2018). The research conducted under the KlastER project shows that currently only a few energy clusters in Poland are operating satisfactorily in the view of their members. A number of barriers faced by clusters have been identified, mainly of a legislative nature (Tyrała 2020). The vast majority of certified clusters have never actually started their activities and exist only on paper.

An interesting contrast to the failed attempts to promote socialised energy at the meso-community level is the way that individual householders have intensively taken to installing photovoltaic (PV) panels. We can define this as a process at the micro level because the energy produced by these installations is consumed by the people living in the household (families or single people). The rapid development of private PV installations is an unprecedented and Europe-wide success story. According to the Rynek Elektryczny portal (2024), as of November 2023, Poland had 1,382,446 PV installations with a total capacity of over 10.5 GW. This is one of the best results in Europe. We consider it to be another example of the validity of Stefan Nowak's thesis.

The rapid growth in the number of individual PV installations has been variously assessed. On the one hand, there are positive assessments, which emphasise the self-organisation and resourcefulness of Polish energy consumers. On the other hand, negative assessments have indicated that this development has been made necessary by the lack of systemic solutions – which should have been designed and provided by the state – to rising energy prices, the aging of coal-fired power plants and the constantly postponed need to modernise them, and the lack of nuclear power. In this view, the development of prosumer photovoltaics can be seen as an example of the externalisation of risk by the Polish state and the transfer of transition costs to citizens. In response, citizens are pursuing a privatisation-like strategy (Kuczyńska 2021). This process of privatising distributed energy production has been supported by the Polish state, which has subsidised it through several editions of the highly successful My Own Electricity project (Mój Prąd, a project launched in 2019 to subsidise home PV installations from 2 to 10 kW). Thus, we are dealing here with the state's real actions – rather than for show – in support of energy development. However, this is happening at the micro level, not the meso level.

Such a state of affairs corresponds to the diagnosis of "molecular development" made by Janusz Czapiński. Molecular development means

development based on activity and entrepreneurship in micro-structures, mainly among family and friends. According to Czapiński, this type of development has been taking place in Poland since 1990.

> We are in the phase of molecular development characteristic of underdeveloped countries – in opposition to the community development characteristic of highly developed countries. […] We live in a country of increasingly effective individuals and invariably ineffective community. (Czapiński 2013: 308; own trans.)

And this is exactly what we see in the case of the energy transition. While we have many entrepreneurial households, people have few opportunities to establish inter-household cooperation.

It is worth recalling Jerzy Hausner's thesis of Poland as a "soft country" in which the institutionalisation of non-responsibility is taking place (Hausner & Marody 2000). He used this term to describe the consolidation of citizens' lack of willingness to get involved in public affairs. The process is linked to the belief that these public institutions are ineffective and that the administrative apparatus is corrupt. Let's apply this to energy. The conviction that the state is not taking effective measures to provide energy security for citizens may prompt them to look after their own interests by securing themselves against an increase in energy prices. This could explain the surge in prosumption. A side effect is a lack of commitment to the development of socialised energy at the meso level, especially when such development is designed on the fly and by copying solutions from elsewhere without taking local conditions into account, as was the case with the implementation of the energy cluster programme in Poland. Nevertheless, appropriately designed programmes that consider the local context can successfully combine individual motivation with community action (e.g., see Walker & Devine-Wright 2008; Creamer et al. 2018).

An important mechanism that can play a role in the energy transition is the crowding-out effect on intrinsic motivation (see Frey & Jegen 2001). This phenomenon has been observed in countries such as Switzerland and the United States. Citizens may agree to problematic investments in their region (e.g., a storage facility for radioactive waste) if the investments are defined in terms of community interest. However, if citizens are offered individual compensation, not only does their definition of the situation change – that is, they start thinking about projects in terms of personal gains and losses – but their level of acceptance for the project also drops

radically. The intrinsic motivation to bear part of the cost of maintaining public services is replaced by an extrinsic motivation related to economic incentives or disincentives. Such a crowding out is in most cases permanent. Once citizens begin to calculate their individual economic benefits, it is impossible to switch them to community thinking. If the crowding-out effect has occurred in Poland (we are not aware of research confirming or disproving the fact), it would mean that the rapid development of prosumption, which has been promoted by the state and local governments, may have destroyed for a long time the chances of developing community energy or some form of energy democracy in Poland.

/// Institutional Mechanisms Shaping Local Energy Production and Distribution in Poland

After the climate crisis entered the mainstream public debate and national and EU policies, a variety of local initiatives to build local, distributed energy systems based largely on RES began to appear in Poland. These included energy clusters. We will analyse these emerging organisations in terms of "new institutionalism," with a focus on how local conditions influenced the organisational structure of the emerging collective actor, its internal relations, and relations with the environment. In other words, institutional logics are "socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality" (Thornton & Ocasio 1999: 804). The formation of these organisations was evolutionary. To analyse this evolution, we used the concepts of new institutionalism: embeddedness, institutional logic and field, bounded rationality, isomorphism, and the common good (Pawlak & Sadowski 2017). Some of these concepts, as a legacy of institutionalism, have entered the toolbox of the SAF concept, which we were unable to implement fully as a theoretical framework for our research. It also turned out that some categories of institutionalism, such as isomorphism, were very useful, and we will return to them later in the text (DiMaggio & Powell 1983). On the other hand, despite this wide range of concepts, a full analysis of the process of certification and the creation of energy clusters in Poland required the use of categories that are familiar to Polish sociology but that have previously been used in a completely different context.

We regard the political initiative to launch the energy-cluster certification process by the central government as a disruptive factor. The programme

was so attractive in its assumptions that many local entities applied for it. The certification formula involved the adoption and implementation of certain organisational solutions. The process was isomorphic in nature, due to political legislative pressure. Apart from the certification process itself, the central programme did not then offer support in creating new legislative solutions conducive to cluster activities or financial support for the development of activities undertaken within their framework. As a political action the programme succeeded, as the government was able to demonstrate that dozens of energy clusters had been created in a short period of time. However, these were only outward changes, mainly visible in statistics and reports. This brings us to the use of another category developed within Polish sociology: apparent actions.

Jan Lutyński introduced this category to describe actions taken by an actor or actors (often collective) in order to create the impression of pursuing or even achieving some important, officially recognised value or declared goal. In practice, as a result of the apparent actions neither the goals nor the values are realised. At the same time, the fact that the actions are for show is acknowledged by a significant part of the population, especially by the personnel of the organisations undertaking the said actions. The knowledge that the actions are for show may be widespread, but it remains private knowledge. Although apparent actions do not achieve their stated practical goals, they still require the involvement of various actors, and their dexterity and ingenuity. Such involvement is not exclusively in the discursive sphere. The concept of apparent actions has not found its way into international circulation. Even in the Polish context, it is used as a heuristic concept rather than a full-fledged analytical category. In our opinion, it is very useful, especially in studying the energy transition.

Apparent actions can be detected in the process of developing and implementing the idea of Polish energy clusters. For starters, the description of the concept of energy clusters is very vague. Energy clusters operating in the Polish context are not clusters in the sense of economic geography. They are not clusters of companies from the same sector cooperating and sharing knowledge to gain benefits. Energy clusters are networks of local government entities, scientific entities, research institutes, entrepreneurs, and possibly individuals working together under a legal agreement. The object of such an agreement is to work towards balancing energy production and consumption locally. Therefore, signing an agreement is sufficient to be regarded as a "cluster." In return, the signers can receive a certificate. In this way, the state can demonstrate that there are dozens of grassroots

energy initiatives. This is important because until recently energy clusters were one of the state's main instruments in the energy transition. Today this institution is not working, or at least that is how the situation is perceived by the participants of the many clusters covered in our research, which was conducted in 2019–2021. Based on an analysis of the data and the information gained from interviews and observations, it is difficult to indicate what benefits the energy-cluster programme has brought to the networks of actors who joined the initiative. The funding support and regulations that the government announced have not arrived. Many energy clusters exist only formally, with no activities beyond reporting. Those that do conduct research or business activities do so independently of government support or sometimes while working against it (the case of the Czorsztyn cluster is instructive; see Afeltowicz et al. 2024). It is also difficult to see benefits to the socio-economic system or the environment. In practice, energy clusters have not accelerated the transition and in some situations may even have delayed it (e.g., by lowering the level of social capital among actors interested in the energy transition). Today, the government no longer highlights clusters as an important instrument for changing the energy industry.

As our research shows, the current condition of energy clusters in Poland is not the result of resistance to change or incorrect implementation. The energy clusters look as if they were designed to present the Polish energy transition to the outside world (particularly in the EU arena) as a vibrant, dynamically developing process. This vibrant presentation was achieved with minimal real government expenditures on infrastructure, research and development, or legislative changes. A demonstration of the effectiveness of the energy-clusters programme has never happened. The key issue here is what a cluster is from the perspective of the law. While various government brochures and expert studies present clusters as energy communities developing RES and smart-grid or microgrid solutions, in practice, it is purely a certification programme.

Certification makes it possible to create a new class of legal entities and carve out a whole new sector of activity. The networks of actors that existed before the certification programme was launched were encouraged to become certified by the promise of financial support (which did not come). The process itself was facilitated because an energy cluster could be reported by a single actor (coordinator), and one coordinator could report several clusters (as happened). When it came to reporting on the health of the initiative, the focus was placed on the number of clusters and not on – say – the environmental benefits the programme had brought. Not only did the

government fail to provide real financial support, it also failed to provide demonstrators: model examples of how the clusters envisioned by the institution's creators would generate environmental or economic value. In theory, a great deal of value could have been generated by the exchange of experience between certified entities, but this did not happen. In practice, the committees and boards that could exchange and integrate knowledge were engaged in the co-creation of an institutional fiction. An exchange of information between energy clusters and legislators could have helped remove key barriers to distributed energy development through regulatory changes. In particular, support in the fight against operators capable of impeding the clusters' development would be significant. This has not happened either.

We argue here that the government's initiative to certify energy clusters is a model example of an apparent action. According to the original understanding, apparent actions have five characteristics:

(1) the action is officially recognised as important for achieving some socially important goal;
(2) the apparent action does not contribute to its realisation;
(3) the uselessness of such an action is known to everyone or almost everyone in the collective;
(4) this information is kept private;
(5) the real function of apparent actions lies in their very existence, while they may also have a residual, fictional, or merely formal existence.

The energy cluster initiative meets all the points:

(Ad 1) The introduction of RES and microgrid solutions into the Polish energy system is commonly defined as important. Energy clusters were supposed to facilitate this process.

(Ad 2) Most clusters do not take any action, and the state has not created conditions for the development of distributed energy. Those energy clusters that perform their assumed functions would have done so without the initiative itself. However, they had to produce their own infrastructure and negotiate with operators on their own. At the same time, the policy documents in question do not explain how facilitation through certification would translate into the achievement of transition goals.

(Ad 3) The state of the initiative was known to virtually all our respondents. Some of our respondents attempted to keep up appearances (mainly at the recruitment stage of the study), but during field observations, interviews, and workshops, the respondents spoke freely about what they thought of the institution.

(Ad 4) Information about the functioning of the clusters is not promoted at the national level. There is hardly any mention of the project, either positively or negatively. The information gained through interviews is still treated as private and unofficial.

(Ad 5) However, there is still a whole elaborate sphere of reporting practices. Experts "study" the state of clusters; there are advisory groups, and so forth. Reporting and the way the project is structured (the certification system) meant that the energy-cluster initiative was still in existence in a formal sense when we concluded our research.

The example of energy clusters shows that the conduct of apparent actions is not reduced to discursive procedures only. It is necessary to establish very specific mechanisms and create incentives for selected actors to join the show process. That is, the creation of a show institution requires the design and implementation of another institution, which consumes resources that could be devoted to solving an officially articulated problem. Thus, these actions might also be conceptualised as neo-apparent actions:

> They do not meet the defining characteristic of apparent actions, which is that their unsuitability (and sometimes harmfulness) for official purposes is widely known, and this information is only private and cannot be made public. "Neo" apparent actions, while in fact useless or even harmful, may enjoy a widespread – both private and public – perception of having at least "some kind" of usefulness, and sometimes even full usefulness. (Czyżewski 2009: 17; own trans.)

This type of action is fostered by an elaborate network of conflicting political and economic interests among the actors involved, with low public awareness of the importance and relevance of substantive solutions to the problem at hand. Not only in Poland is energy transition a problem of this type.

The actions of the creators of institutions for show can be considered a special case of political entrepreneurship (cf. Wagner 1966; De Vries & Hobolt 2020). Entrepreneurial action can be understood as action aimed at establishing new links between different resources and actors in order to generate new value for a given group. In the case of economic entrepreneurship, the work of assembling can lead to the creation of a new enterprise or an entire market. But there are also non-productive or even predatory forms of economic entrepreneurship, in which no value is added but

some actors gain an advantage through transfers (including the externalisation of costs and risks). In the case of productive political entrepreneurial action, a new group of interests may be formed, or the interests of a group that had a low capacity for independent lobbying may be articulated. In the case of predatory political entrepreneurship, the added value in the form of increased social capital does not appear, but selected actors instead gain individual benefits (i.e., public recognition, political or symbolic capital). In our case, grassroots, independent energy initiatives could be demonstrated to be a governmental success. At the same time, a politically pressing problem was not addressed.

The concept of apparent actions was created in a very specific political and cultural reality (the same one in which the concept of the sociological vacuum was created). The idea of apparent actions first described how individual and collective subjects functioned under the conditions of a socialist state. However, it can be assumed that apparent actions are still common in varying degrees of intensity, and sometimes they can be exacerbated. Lutyński pointed to the obligation to implement non-liberal ordinances and to avoid actions that would violate vested interests as one of the reasons for the intensification of apparent actions. Given the range of socio-economic challenges associated with the climate catastrophe, one wonders whether we are currently facing an intensification of such actions. At the same time, we are not thinking solely of the situation in Poland, but also about how legislators and dominant market players are trying to address the need for energy transition in countries such as Germany and Canada. The example of Polish energy clusters and the concept of apparent actions may prove to be useful heuristic tools there as well.

The ostensibly pragmatic mechanism

> occurs especially in situations where decision-makers are unable or unwilling to solve some problem treated as important by citizens. This is usually because the solution would lead to consequences undesirable to them, or would require the use of certain measures that are either impossible or have been deemed inexpedient. However, wishing to demonstrate that the problem is being solved or, at the very least, that the solution is considered a valid one, actions are ordered or undertaken that do not actually lead to this, but that have been officially recognised as appropriate and necessary actions. Those who conduct these actions, such as the participants in deliberations, meetings, or conferences convened in lieu of

> applying the necessary measures, are generally aware that these are of a show nature, as are, moreover, the principals and observers. (Lutyński 2018: 244; own trans.)

An example of an apparent action conceptualised in this manner could be the KlastER project itself. During the course of the project, many meetings and conferences were held and many reports were written, but it is difficult to say how they helped the development of grassroots energy. Those processes certainly involved people and resources that could have been used for the development of the field of RES.

Another "classical" sociological tool that can be used to analyse the energy transition in Poland is isomorphism. We can refer to the classical definition of institutional isomorphism and its basic types (DiMaggio & Powell 1983). We found the idea of coercive isomorphism to be useful: it explains how organisations are made to adopt certain patterns imposed by actors with power in a given field. The cluster certification mechanism was a good example of this. Its creation had the character of coercive isomorphism: the adoption of the organisational structures defined by the programme even though they were not connected with a local path of evolutionary development.

Another type of isomorphism which is important from the perspective of our research is mimetic isomorphism. This is a mechanism that occurs in situations of uncertainty and involves organisations imitating those patterns that they believe have led to success. In Western Europe and the United States (whose solutions and problems of energy transition we studied in the Cluster grant, with a final report in Gądecki & Zwierżdżyński 2020), the construction of cluster solutions appears in the context of the challenges facing the current electricity system. In Poland, we have long relied on solutions where electricity is generated in large and centralised facilities that can adjust production to meet consumption needs. In such a system, electricity flows unidirectionally: from production units to end users. This traditional system is challenged by the introduction of RES, since their output cannot be fully regulated and varies according to the time of day or year. In all the systems we studied, the active inclusion of households in the emerging cluster organisations remained an issue.

An important element of the energy transition in each country is the territorial and spatial context, including geographic considerations. Most of the available scientific literature emphasises that the formation and operation of energy clusters is dependent on local factors and should be

adapted to them on a case-by-case basis – so it is difficult to talk about the possibility of a simple transfer of practices from one place (and time) to another. Such a unifying approach unfortunately lay at the heart of the certification programme in Poland. Different locations, regions, and countries consist of very different constellations of actors and interest structures. This means that there are many different potential resources and ways to mobilise and design local networks by which implementers can create value for themselves beyond the obvious opportunities for low-cost energy extraction and accumulation. The Polish energy-cluster certification programme looks like a compilation of pieces of ideas that the developers of the programme found attractive, that worked in other contexts (mimetic isomorphism), and that were uncritically implemented into the Polish programme. No consideration was given to whether these pieces from different contexts were compatible with each other and whether they fit the conditions found in Poland, which are not homogeneous.

/// Conclusions

We conceived our role in the KlastER project as researchers not only in terms of conducting basic research but also in terms of providing information that would be helpful in designing solutions, identifying barriers, and facilitating various initiatives. And we found such information, but it cannot be said that we created it. The information was available in the system and was communicated by the stakeholders. The actors not only know what doesn't work, they are also aware of institutional alternatives. The various stakeholders know what regulations are missing to unlock transformation processes. The actors are aware that the operators can, if they wish, block the development of distributed, bottom-up energy systems, for example, by making it difficult to plug into infrastructure or by blocking local integration by not selling land. Representatives of the operators were aware of the costs to the system of mass energy prosumption (Doumen et al. 2022) and warned that these costs would soon have to be passed on to prosumers (which actually happened soon after we concluded our study). The information is in the system, and sometimes it is even consolidated and operationalised. It is just not being used. The institutional work is not focused on change, and some energy is spent on the tinkering required by apparent actions. Thus, it can be said that as social scientists we have been witnesses of useful information rather than creators of it. However, as social scientists, we can suggest why this existing knowledge is not used

to implement effective solutions in the field of energy transition. We refer here to the categories of the sociological vacuum and apparent actions in order to slightly change the perspective on the energy transition.

There are many indications that knowledge of how to change was available before the energy transition began in Poland. Poland had a chance, once again, to take advantage of being latecomers, who can just leapfrog some steps (cf. Perkins 2003). Many solutions have been tested elsewhere in the world. And many mistakes have been made that others can learn from. However, these lessons do not seem to have been learned in Poland. We often see solutions being copied, but not necessarily those that would fit our local needs and opportunities. The central and local authorities may think that it is necessary to be proactive, so they do something without necessarily being able to justify why they chose this option and not another. At the same time, we can see that it would be possible to choose options that could easily be integrated into the current system. However, incorporation is not enough to produce a transformation.

A field of grassroots, democratised energy has not been created in Poland. We can speak of isolated initiatives that have been successful. Some clusters have brought tangible value to their communities (see Afeltowicz et al. 2024). However, these are extremely positive cases – outliers – and not typical, scalable situations. If, in the course of transformation efforts, citizens' trust in the government has been destroyed because the government is seeking solutions that do not rely on externalising the costs, and if crowding-out mechanisms have been set in motion, this may mean that the paths to community solutions in regard to energy – in the spirit of energy democracy – have been buried. Digging them out may require much time, material resources, and entrepreneurial action. And perhaps the temptation to perform apparent actions rather than actually to change something will arise again. Although we have been talking here about the energy transition in Poland only up to 2021, we want to mention a few things about the energy transition in Poland that have occurred since the conclusion of our research. First, the cluster programme is no longer being highlighted, and those clusters that have shown any activity are beginning to be reframed as energy communities (for a map of energy communities in Poland, see Energetyka Rozproszona n.d.). Second, the number of energy cooperatives is increasing, and they are being presented from the start as exclusive economic initiatives (from the beginning, clusters were presented differently). Third, the idea of clusters may be resurrected at some point by legislators and regulators. Clusters can still apply for funding, alongside

civic energy communities and cooperatives. Other economic incentives for clusters are also emerging, such as discounts. Without going out in the field, however, it is impossible to determine whether the new instruments will work. It is also impossible to say whether the clusters discussed today and those we studied in 2021 are the same institutions. We do not know if the designers of the energy transformation have learned from the failure of the certification system and listened to the voices of the energy entrepreneurs who created the clusters. We are sticking to the results of our research here. We have focused on the state of the energy industry in 2021.

Our intuition is that apparent actions and a sociological vacuum are accompanying the energy transition in other countries as well. The energy communities promoted by the EU have less and less to do with grassroots energy. Apparent actions are not peculiar to Poland, but chances are that we have developed this competence to a very high degree. These are only conjectures and they require systematic research. In the same way, the fate of clusters after 2021 and the fate of other ongoing energy initiatives demand critical social analysis.

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/// Abstract

An energy transition is underway in Poland. Various socio-technical models of energy production and consumption are being tested, including prosumption, renewable energy generation, and microgrids. However, success has been limited. We show that sociological concepts developed to explain the course of the socio-economic transformation in Poland can easily be applied to Poland’s energy transition. Using such theoretical categories as “sociological vacuum,” “apparent actions,” and institutional isomorphism, we explain the lack of success of the energy transition in Poland in connection with the functioning of different types of energy communities. This text is not a report on empirical research. Although we refer to our empirical research, which we have discussed more extensively elsewhere, the text is theoretical in nature. Our goal is to bring classical sociological categories into the discussion of energy transformations.

Keywords:
energy transition, energy clusters, sociological vacuum, apparent actions, institutional isomorphism

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IMAGINING THE GREEN TRANSITIONS

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THE ENERGY TRANSITION IS JUST THE TIP OF THE ICEBERG: CHANGES IN UNDERSTANDING MODERN DEMOCRACY IN THE CONTEXT OF THE CLIMATE CRISIS

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At present, technology and the energy it requires are often taken for granted in the countries referred to as "the West," where the promise of a good life exists and public services display a certain level of prosperity. In these countries, it is often still assumed that life will get better because of technological progress and economic growth and that such progress will continue unabated in the future. This is the argument that thinkers such as Francis Fukuyama advanced after the fall of the Soviet Union and the adoption of Western solutions in many new states (Fukuyama 1992).

In this article, I will consider the liberal perspective and the degrowth perspective on capitalism, the climate crisis, and energy consumption, while taking into account the promise made by Western states to the effect that development is limitless and, through it, we will become increasingly happier and wealthier over time. I would like to highlight the problems associated with setting such goals: the energy required to achieve them, the difficulties of the energy transition, the feasibility of so-called liberal democracies due to the concentration of energy consumption and the exploitation of subordinated individuals, and, in a broader perspective, the maintenance of the capitalist order that has ultimately led to the climate

crisis. I will limit myself to the situation in Europe and to the most significant differences between the liberal approach and the stance of degrowth proponents, although I realise that my explanation will be a simplification and that not all the differences can be sufficiently discussed. Consequently, related topics such as postcolonialism, or the broader role of the Global South in this issue, will not be addressed. I am aware of the importance of these topics, but they require a more extensive discussion than can be included in this article.

In regard to the exact scope and aim of this text, I would like to add a few methodological remarks. Some readers might consider that its scope and goals are not sufficiently defined. This is because the text is not written in a foundational or, as Gilles Deleuze and Felix Guattari would say, arborescent way (Deleuze & Guattari 2005: 5–25). The introduction of a multitude of perspectives, themes, and references, the showing how concepts work and relate to each other rather than substantially defining them, and the referencing of ideas from disparate-seeming fields (e.g., politics and science) is deliberate. This methodology refers directly to the works of Deleuze and Guattari, especially their book *A Thousand Plateaus* (2005), and to the texts of Bruno Latour (1988) and Baruch Spinoza (1954). It was chosen as an example of flat ontology (Bednarek 2014; Ceder 2018), which I have attempted to apply both to the topics under discussion and to the structure of the text itself. Later references in this article to the above-mentioned works (and many others) may therefore be understood not solely as the use of source material but also as precedents for a methodological paradigm – in particular, a paradigm associated with the rhizome concept and multitude concept (Deleuze & Guattari 2005: 3–25).

/// Problems with Energy Consumption

In the period since the end of the Second World War, citizens of Western Europe have become accustomed to a level of prosperity that includes owning a home and having access to running water, electricity, and other amenities. During the postwar period, Western countries adopted extensive social programmes and improved the quality and effectiveness of education, healthcare, and pension systems (Müller 2011: 125–170). After the era of welfare states, events have continuously enhanced the level of conveniences for Western citizens, while also increasing the energy cost of these solutions, with more televisions, cars, and mobile phones per household (Ritchie et al. 2019). Data indicates that over the past 100 years the

amount of goods produced, along with the energy and materials needed for their production, has increased multiple times (Hickel 2020). The problem is particularly noticeable in the wealthiest countries, where middle-class homes are filled with energy-intensive and sometimes unnecessary items – the result of effective marketing on the part of sellers, and the ever-growing need to acquire more on the part of buyers.

Several problems with the above situation can be indicated. First, the capitalism prevalent in Western countries is based on the infinite production and consumption of private property, which leads to inequalities and an overabundance of things. The prevailing inequalities are not limited to the rich having an excess of things while the poor have none, but often, regardless of everyone's needs, there is an overabundance. The footprint of the material produced points to an overproduction of superfluous things, which is the result of the greed of the wealthiest and a measure of the exploitation of those working for them.

Second, as researchers such as Jason Hickel and Timothy Mitchell have noted, the energy sources that are most needed and used, namely coal and oil, are expensive to extract and the costs are already several times higher than in the twentieth century due to difficulties in access (Hickel 2020; Malm 2016; Mitchell 2011: 231–235; Jackson 2009: 6–13). As Mitchell writes, due to the continuous exponential growth in the desire for energy, existing extraction platforms may eventually fail to meet the demand (Mitchell 2011: 231–254). Of course, it cannot be strictly determined when the supply of fossil fuels will be depleted, but nonetheless their extraction serves only the interests of the wealthiest and impacts the climate. The price of these fuels is not the only problem – what aggravates the issue is that in many economies and branches of industry they are still indispensable or difficult to replace.

Third, unlimited economic growth and its energy cost mean a constant increase in carbon dioxide emissions, which causes climate warming and the melting of the world's ice cover (IPCC 2023). The impact of human activity on the climate has been proven by climatologists (IPCC 2023). Two terms are used in the social sciences and the humanities to describe the epoch we live in: the Anthropocene or Capitalocene (Braidotti 2013: 66; Moore 2016; Bińczyk 2023: 78–80).

It might seem that the way to solve these three problems (the unequal distribution of goods and material footprint, expensive fossil fuels, and climate warming) is to abandon the use of harmful energy sources and the economic growth that serves to protect the privileges of the wealthiest,

and to distribute goods and energy based on the needs of the people rather than the continuous enrichment of the few. This view is presented by proponents of *degrowth* or *postgrowth* concepts, including Jason Hickel, Matthias Schmelzer, and Tim Jackson, among others (Hickel 2020; Schmelzer et al. 2022; Jackson 2009, 2021). Their perspective is inspired by, among other works, a report titled *The Limits to Growth* (Meadows et al. 1972) and Nicholas Georgescu-Roegen's book *The Entropy Law and the Economic Process*, which discusses the problem of the limited amount of the Earth's resources and how the issue is related to capitalism (Georgescu-Roegen 1971). One of the most influential Polish scholars is perhaps Ewa Bińczyk, who adapts the discussion to local problems and circumstances (Bińczyk 2018, 2023).

One solution that is frequently discussed within international institutions or by politicians is that of the Green Deal and the associated idea of Green Growth. Both concepts refer to Franklin D. Roosevelt's New Deal, and both are tied to the struggle for power and the realisation of specific group interests and a certain way of life. The European Green Deal, which I will describe further below, is essentially a project formulated within a liberal approach, as it favours certain liberal values: the modern belief in constant progress, a reliance on private investments, and the legal protection of individual property. In this perspective, the existence of capitalism and a specific version of growth and "liberal democracy" is often taken for granted as part of a cohesive whole. Even if particular parties within the liberal viewpoint differ in their reflections on the matter, the general perspective is similar – if more as a family resemblance than in terms of a strict, substantial definition (Wittgenstein 1986: 31–37). The liberal stance is nevertheless clearly distinguishable from other pro-growth viewpoints, such as the communist, nationalist, and so forth, most of all because of its hegemonic position in the West in the twenty-first century (Müller 2011: 236–241).

It can be said, therefore, that attitudes to the climate crisis are primarily a political matter – it is about who exercises power and whose needs are privileged. Second, the solution – whether it assumes maintaining growth or not – involves a change in the approach to energy use, which may influence the understanding of concepts such as capitalism or democracy. In this respect, the energy transition appears to be merely a harbinger of much deeper transformations – those that may change not only the ways in which nation-states function but also the everyday lives of ordinary citizens. Similar matters have already been discussed (Mitchell 2011: 1–42; Jackson 2021),

but I would like to consider a wider approach, encompassing the Western tradition of political ontology, which will be discussed later in the article.

/// Energy: An Instrument of Power or a Commodity?

In his most famous work, the seventeenth-century philosopher Thomas Hobbes described what he believed "power" to be. In contemporary terms, it could be defined as authority. He argued that "the power of man […] is his present means, to obtain some future apparent Good," and such good is pleasure or some other object of desire (Hobbes 1965: 41–42, 56, 66–70). Hobbes asserted that the desire for power never wanes, and to this view other English intellectuals later added the ideas that people should formulate scientific knowledge in such a way as to dominate nature (Bacon 1902: 11, 99–100) and that increasing one's power by the appropriation of land and goods is morally and rationally justified (Locke 1988: 285–302).

The writings of these seventeenth-century philosophers (and many others) became a justification for the actions of European capitalists, colonisers, and other exploiters, leading to the development of methods for obtaining and maintaining entire systems of labour and energy, which allowed for unprecedented increases in power (Środa 2020: 67–85, 235–248; Bellamy & Diamanti 2018: 1–16). When Hobbes wrote that "The Sciences are small Power" because few people understand them, he could not foresee how much power they would allow Europeans to achieve in the following centuries. As Timothy Mitchell writes, "the industrialised world brought into being with the energy from coal was also a colonising world" (Mitchell 2011: 84) – industrialisation could not have occurred without the use of concentrated energy (Mitchell 2011: 15), and without energy, it would not have been possible to subjugate people, resources, and land on such a scale. Therefore, it can be said that the phenomena of industrialisation, colonialism, the building of hegemony by European countries and the United States, and their use of energy, are closely related (Said 1979: 284–295). Mitchell adds that without the use of energy on such a scale, contemporary parliamentary democracies would also be impossible (Mitchell 2011: 1–6). How can this be explained?

Early European democracies were not only governments of the people but some of them were also states striving to achieve or maintain hegemonic positions in Europe and the world (as was particularly evident in the nineteenth century). This dissonance between the ideals of freedom, equality, and justice, and the brutal subjugation of people and non-humans

is perhaps best seen when considering energy from two different points of view: the state's and the people's. If we assume that the goal of the modern state is to ensure the security of its citizens, then this is not possible without an energy level that ensures the functioning of the military, police, healthcare, and, currently, the operation of computers and public transport. Therefore, in accord with the logic of capitalism, states (to avoid dependence on others) have often sought exclusive energy sources at all costs, or have tried to control and monopolise access to existing ones (Mitchell 2011: 54–59; Fücks 2015). Caring for citizens, for instance, through reducing working hours, did not occur on the initiative of the state. Similarly, capitalists and colonisers did not invest in factories or ships that could cross oceans in order to develop social policies and care for the less fortunate. These goals had to be achieved by the wage workers themselves, and one of the reasons it was possible was that they controlled coal extraction (Mitchell 2011: 21–26). Social policies were also introduced as a conservative response to socialist demands, for example, in Bismarck's Germany (Król 2014: 65–120). Thus, it can be said that state care, and subsequently the promise of prosperity, arose from the (direct and indirect) initiative of the working class and the governed people, not the rulers and the wealthiest – for the latter, only profit and self-interest matter. This is well illustrated, for example, by the transition from a coal-based economy to one based on oil, which required less maintenance and made it harder for workers to force changes on capitalists (Mitchell 2011: 31–36). Processes and practices such as outsourcing, the use of tax havens, or operating within shadow economies, serve the same purpose: regaining control over capital, increasing one's power (as in Hobbes's theory), and therefore removing democratic rule from the people. In economies that are still based on coal (such as China or India), labour is often organised in such a way as to hinder unionisation or punish protesters (Hornby 2016). The coal mafia that existed in India played such a role (Venugopal Rao 1983: 10–12), and after the coal industry was privatised in 2019, international corporations were able to capitalise further on the commodity (Kumar 2020).

As Andreas Malm states, "the reappearing autonomy of labour has provided one incentive for the diversification, multiplication and expansion of the circuit of primitive accumulation: and wherever capital has gone, more fuels to burn have been uncovered" (Malm 2016). The phrase "diversification, multiplication, and expansion" aptly describes capitalism as a process seeking molecular lines of flight to achieve profit and fulfil the desire for power (Deleuze & Guattari 2005: 213–222). In other words,

within capitalism, things such as social dissatisfaction, strikes, unionisation, and many other circumstances are treated as temporary obstacles that can be mitigated to maintain the operation of the capitalist system.

On the other hand, citizens who have become habituated to a certain level of prosperity will want to maintain it at all costs. As subjects of contemporary liberal democracy and capitalism, they will protest against a loss of individual freedoms and private property (Althusser 1970). People are accustomed to amenities that are dependent on the concept of private property, and these amenities require a lot of energy to maintain and develop further. It will not be an easy task to change these tendencies, but as some scholars suggest, we need to expand our imagination to seek new ways of understanding what changes are necessary in our social and political life (Bińczyk 2023: 9–13, 132–136).

In other words, current ideas of democracy, freedom, and equality are founded on a history of violence and exploitation. In modern societies (above all in Western countries), we elect authorities who will maintain our growing energy consumption, even if it means destroying the natural environment or potentially worsening the situation of residents in other parts of the world (primarily the Global South). All this is to fulfil a desire for pleasure, convenience, or power and, on the other hand, the promise of prosperity, which requires economic growth powered by kinds of energy that are often derived from fossil fuels:

> Social participation in consumer societies […] depends to a large extent – also for the lower classes – on expressing identity, affiliation, lifestyle, and status through consumer goods and the symbolic language embedded in them. And modern welfare states basically function as growth states – across the entire political spectrum, the promise of welfare is based on growth raising the standard of living of poorer sections of the population and at the same time providing the financial means for welfare programmes via taxes. (Schmelzer et al. 2022: 102)

In this view, any change in energy use is significant for the social, political, and economic order. In a way, the rulers of European countries, the members of international organisations, and other representatives of the political class seem to have no choice but to maintain that the current status quo can be preserved. The changes from combustion-engine cars to electric ones, or from plastic straws to paper ones, are essentially only aesthetic

and will not affect people's quality of life. Thus, the climate crisis is not perceived as an event that can disrupt the functioning of liberal democracy and capitalism. What exactly does the liberal viewpoint entail?

/// The Liberal Solution

The authors of a 2008 report titled *A Green New Deal*, in addressing the connection between the economic, climate, and energy crises, present views that some neoliberals have considered to be overly interventionist in regard to the economy. However, this programme, which was presented more than fifteen years ago, was one of the earliest contributions on the subject. Unfortunately, it lacked some essential details. It discusses halting temperature increases, reducing social inequalities, and decreasing energy demand, but it does not mention the material footprint or the North's subjugation of countries of the Global South. The report's authors optimistically assume that prosperity can be preserved through a return to Keynesian economics and an energy transition from fossil fuels to renewable energy sources. Thus, they point to a promising path for changes in the future (Elliot et al. 2008: 16–17, 35–40).

A more contemporary project that introduces actual changes is the European Green Deal, which was announced by the European Union in December 2019 and is currently being applied. It was presented as "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy" (European Commission 2019). Indeed, the importance of the economy and its competitiveness is emphasised in many sections of this document – disproportionately more often than the need to tax the wealthiest or the environmental costs of implementing renewable energy sources. Encouragements for private investors to fund "greener solutions" appear frequently, enabling the wealthiest to influence the changes and possibly shape them to achieve their own goals. It is even stated that "the private sector will be key to financing the green transition" (European Commission 2019). Therefore, it can be argued that the European Green Deal is not based on Keynesian economics, as the 2008 report was, but rather seeks to retain elements of the neoliberal order: faith in the self-regulation of the free market and the need for continuous investments to sustain the system.

The European Green Deal's avoidance of more progressive solutions is in line with the opinions of certain liberals who do not want to limit themselves in the face of climate change. They compare the sacrifices related to

environmental protection to an "ethics of constraints" that will ultimately do more harm than good – an uncertain and short-term solution at the cost of political polarisation and the possibility of introducing authoritarianism (Fücks 2023: 2). Instead, they propose turning to capitalist solutions, which means even more innovation and investment, even faster economic growth, and consequently the need for more energy to sustain it (Fücks 2015, 2023: 2–3; Norberg 2023). Ralf Fücks and Johan Norberg, who have been chosen to represent here the liberal stance on degrowth and climate change, may seem to differ at first glance: Fücks was a member of the German Green Party, which emphasised the role of the state in investing in infrastructure, while Norberg is a direct proponent of capitalism and is associated with the libertarian Cato Institute. However, they share key beliefs regarding economic growth and climate change.

First, they think that stopping economic growth is dangerous and unimaginable. Fücks writes that "in the face of a growing global population with all its needs, desires and ambitions, it is verging on escapism to dream of a postgrowth society" (Fücks 2015). Norberg echoes him in stating that degrowth "would be the worst thing we could do for the world" because it would surely lead to massive poverty and unemployment (Norberg 2023). In other words, the argument that these authors share is that rejecting growth would bring chaos and misery, and thus they adopt classic conservative arguments that can be applied to any change.

Second, liberals like Fücks and Norberg believe that solving the climate catastrophe is possible with the help of the free market, and indeed it is the only reasonable option. In this they resemble Friedrich Hayek, who stated that "capitalism as it exists today in consequence undeniably has many remediable defects that an intelligent policy of freedom ought to correct" (Hayek 1998: 136). When Fücks writes that "the combination of capitalism and democracy is an adaptive system" and the "ecological transformation of capitalism" is already underway, he does not differ much from Hayek (Fücks 2015). In other words, according to some liberals, intelligence, ingenuity, and resourcefulness will undoubtedly solve the climate crisis – just as previous challenges like slavery or colonialism were addressed. From this perspective, the climate crisis seems like another restriction on individual and market freedom, which liberals only reluctantly accept, if at all. The necessity is to look after one's own interests and self-development, not to take care of the planet and other people. The problem, according to liberals, is not the entire system – which over the centuries has led to countless wars, exploitation, slavery, and the subjugation of people, animals, and

things – but always individuals, their mistakes and imperfections. These can supposedly be corrected and perfected within the system. It could be said that all governments need to do is to train individuals to segregate waste and replace their current solutions and items with "green" alternatives.

Such a belief is tied to a third conviction characteristic of – and even essential to – these liberals: that economic growth can occur independently of nature's exploitation, or in other words, that GDP growth can be decoupled from the consumption of resources. A statement to this effect appears in the European Green Deal document (European Commission 2019), and Fücks makes similar suggestions in the "Modernizing Modernity" chapter of his book *Green Growth, Smart Growth* (Fücks 2015). Broad investment in green energy sources, such as photovoltaics, wind farms, or sometimes nuclear energy, is based on this assumption. It is believed that the system we live in can always be improved, for example, by finding other energy sources that will not harm the planet. Unfortunately, such an approach does not usually exclude the exploitation of people and other spheres of life – just as previously growth involved slavery, colonialism, or the use of fossil fuels (Dunlap 2018). If, as Hickel claims in reference to World Bank data, global agreement on the use of renewable energy sources could be reached, the problem would be the energy cost needed to build their entire infrastructure (Hickel 2020). Yes, perhaps in the future it will be possible to reduce coal and oil consumption to zero, but if we are still focused on profit in the meantime, wouldn't the environment be destroyed equally or even more than before by building infrastructure for renewable energy sources? Of course, this does not mean that we should not give up fossil fuels and focus on renewable energy, but the problem remains: how can change be introduced without worsening what we are trying to save?

The above summary indicates the response of many liberals and some European and global authorities to the problems mentioned earlier. Their attitude towards the unequal distribution of goods does not seem to have changed essentially since the Second World War, and in regard to taxation and public spending it has worsened with the growing popularity of neoliberalism. Henry C. Wallich summarised the situation in 1972: "Growth is a substitute for equality of income. As long as there is growth, there is hope, and that makes large income differentials tolerable" (Schmelzer et al. 2022: 46). The hope is for success, but also for prosperity and social advancement – without which, according to some liberals, a solid social structure built on the self-motivation to improve one's position is not possible. Success, in turn, requires its display to others – the surplus of things is a natural

consequence of such thinking. Needless to say, it is primarily the wealthiest and most privileged who benefit from growth – for them the lower status of others and their hope for social advancement are necessary to keep the status quo.

As has been stated, liberals want to solve the problems of expensive energy and rising temperatures by switching to renewable energy sources within the logic of capitalism. Thus, they try to eliminate fossil-fuel consumption while maintaining economic growth. Specific optimism is inherent in their worldview, and therefore the energy costs and material footprint of their approach, along with the potential social and infrastructural changes, are not always considered. Wind farms or nuclear power plants may require creating appropriate infrastructure and relocating large groups of people. Moreover, as energy sources, wind and sun power operate differently than coal or oil. In such cases, it is not possible simply to "add more" to maintain the energy level.

/// What if We Fail?

Five years have passed since the European Green Deal was introduced and some of its goals have already been achieved (e.g., waste organisation, carbon taxes), although the project has encountered additional difficulties in regard to energy and food prices, possible job losses, and the general attitude of the citizens in the member states. At the beginning of 2024, Europe saw massive farmers' protests, which were related not only to the war in Ukraine and the influx of Ukrainian grain, but primarily to the European Green Deal (Tanno & Liakos 2024). Some commentators believe the European Green Deal may have contributed to increased support for far-right political parties (Oltermann 2024). Such parties include Alternative for Germany and, in Poland, Confederation. These parties openly oppose the provisions of the European Green Deal and claim that climate change is not occurring or that it is not caused by humans (Bosak 2024; Alternative für Deutschland 2024). The European parliamentary elections in June 2024 confirmed the far right's popularity: far-right political parties achieved unprecedented results in many European countries (including France, Germany, and Poland). Many Europeans, particularly older citizens (including certain sceptical politicians), seem to share a similar opinion of the European Green Deal (Eurobarometer 2022). They do not want – or they are afraid – to accept scientific findings in this field. These

are additional problems that hinder optimism in regard to the possibility of an effective energy transition.

What possible consequences could an energy transition conducted by liberal enthusiasts such as Fücks or Norberg bring? Assuming the transition succeeds, it will likely maintain the belief that growth is infinite and that through it capitalism can solve manifold social and political problems. An attachment to – and belief in the universal validity of – prosperity do not allow for the consideration of alternatives. Capitalism thus becomes the only possible way of thinking about the world (Fisher 2009: 1–11). Maintaining faith in liberal democracy and capitalism, in turn, may lead to preserving the status quo, where inequalities may continue to grow over time, along with increasing capital income for the wealthiest, as happened along with the development of neoliberalism in the 1980s and 1990s (Piketty 2014: 244–270). If inequalities continue to grow, the wealthiest 10% will hold an increasing share of national and global capital and will create a globalised world elite able to travel freely and enjoy conveniences worldwide without restrictions, while the remaining 90% will become their wage-workers: cleaners, gardeners, nannies, doctors, drivers, etc., living in cheap, low-standard housing (Deneen 2018: 139–151). In this scenario, if global warming cannot be stopped in time, some geographical areas will likely end up underwater or become otherwise uninhabitable. Undoubtedly, the poorest will suffer the most. They will have to migrate to higher grounds – in the same way as migrants from the Middle East or Africa are currently trying to reach the European Union.

Perhaps the logic of capitalism poses the greatest challenge to solving the climate crisis, as it does not allow us to recognise issues that cannot be expressed in terms of GDP, self-interest, or clear definitions of what belongs to whom. There are economists who have taken note of the climate problem (Costanza 1992; Jackson 2021), but most economics textbooks still operate within the mainstream of classical liberalism, which favours profit and self-interest (Bińczyk 2023; Raworth 2017). Should caring for the elderly be a paid job? Is taking care of the planet a matter of self-interest? The current political status quo, which is based on capitalism, not only prevents consensus on these matters among the powers-that-be, workers in various industries, protesting youth, and the directors of the world's largest corporations, but also structurally obliges those participating in the system to passivity and conformity: "As individuals, we can do so little, and besides, it is convenient for us, so why should we make an effort to change anything?" Such a perspective, especially among politicians, prevents decisive action, whose

omission could lead not only to the flooding or drying of areas at risk, but also to cyclical heatwaves, difficulties accessing clean air and water, the emergence of currently unknown, deadly diseases, more frequent extreme weather events, mass migrations, hunger, the extinction of entire groups of plants and animals, armed conflicts, energy shortages, and many other dire consequences (WWF 2024; Figueres & Rivet-Carnac 2020; Klein 2019).

Will democracy be possible then? For many years, scholars have been saying that modern liberal democracies do not allow participation and that this has led to the decline of social capital, interpersonal bonds, and engagement in public affairs (Putnam 2000; Sowa 2019: 5–10). One of the most common ways to solve the problem is deliberative democracy (Willis et al. 2022). However, the inability to reach an agreement and develop a common position may lead to a situation in which it is easier and more convenient to delegate solving the climate crisis to international organisations without a democratic mandate. How can democracy be maintained when political parties may come to power that promise to solve the problem in exchange for the ability to suspend democratic principles, such as the separation of powers or term limits? Or that promise not to recognise the problem at all? How can democratic standards be preserved when necessary actions must be taken quickly and perhaps also in ways that are contrary to the convenience and habits of most citizens?

The above-mentioned problems may seem like a repetition of the anxieties of the 1920s and 1930s, when authoritarian regimes developed in many European countries, but the "affective relations" are entirely different (Deleuze & Guattari 2005: 208–231). Moreover, it is challenging to indicate exactly who was responsible for damaging the climate in the past. Blame would properly be widespread and extended in time, but the root of the problem is known – it is the desire for more wealth, power, and domination. We can only point to the entities that have most contributed to hindering changes related to the energy transition: according to many Europeans, the obstructors are corporations and energy companies (Chandèze et al. 2023). This leads us to following questions: if powerful economic entities are preventing an energy transition and the halting of climate warming, should the climate problem still be considered from the viewpoint of capitalism and the liberal state, which primarily focus on costs and benefits? Or would it be better to focus primarily on preserving life – in such a way that every element (human, plant, animal, and planet) is equally important, without a privileged position? Some people might say that such easy distinctions are too reductionist, and it is worth emphasising that the

European Green Deal is not essentially wrong and very far from degrowth ideas, apart from decoupling growth from resource consumption (Bińczyk 2023: 175–183). As many scholars from different perspectives have pointed out, it is growthism and the "business as usual" attitude regarding climate change that are the problems – in regard to these, our position should be unwavering (Hickel 2020; Jackson 2021; Bińczyk 2023: 119–140). Thinking about solving the climate problem in a way that does not lead (as in the liberal approach) to maintaining and perpetuating ideas that so easily divide the world into subordinate and dominating, beneficial and non-beneficial, is difficult. How can it even be done?

/// Post-Anthropocentrism

To answer at least some of the questions posed above, it is necessary to address the topic of political ontology, which is a field of research that can help us determine what exists, and within what structures, and how its organisation creates power relations between the elements (Bednarek 2014; Janik 2017: 10). Capitalism and liberal democracy seem to be founded on an anthropocentric view of the world. Thus, how might we understand power relations (such as ownership, the need for growth, or participation in democracy) if humans are not the privileged elements of the system? Would the issues described above still pertain in such a scenario?

In a book published in 2013, the philosopher Rosi Braidotti summarised a number of philosophical trends concerning humanism, materialism, and feminist and postcolonial studies, and pointed to a perspective she terms post-anthropocentrism (Braidotti 2013: 55–104). Braidotti associates this line of thinking with questions about understanding subjectivity after anthropocentrism (Braidotti 2013: 57–58).

Moving beyond anthropocentrism primarily means abandoning an understanding of the world in which humans as a species occupy a privileged position. Many epistemological projects of the seventeenth, eighteenth, and nineteenth centuries (including those mentioned earlier in this article) placed the white European male in a privileged position in regard to understanding, categorising, or appropriating the world. Changing this perspective has been possible at least since the seventeenth century (thanks to the philosophy of Baruch Spinoza), but only in the last few decades has an ontological turn (including in the social sciences) allowed it to happen (Nowak 2016; Kamiński 2022).

It is precisely this move beyond epistemology (in which the existence of a perceiving subject is necessary) to a flat ontology, based on the works of thinkers such as Spinoza, Deleuze, and Latour, that makes understanding the perspective of post-anthropocentrism possible. Braidotti describes her perspective as "vitalist materialism" and writes that

> The main idea is to overcome dialectical oppositions engendering non-dialectical understandings of materialism itself, as an alternative to the Hegelian scheme. The "Spinozist legacy" therefore consists in a very active concept of monism, which allowed these modern French philosophers [Althusser, Deleuze, Negri] to define matter as vital and self-organizing, thereby producing the staggering combination "vitalist materialism." (Braidotti 2013: 56)

How should this be understood? The ontological basis of such thinking can be associated with Spinoza's philosophy, in which power is the joint action of elements (*modes*) connected at the grassroots and is not understood as the hierarchical rule of rational humans over things, people, and the planet, or, as Hobbes described it, man's "present means, to obtain some future apparent Good" (Hobbes 1965: 41–42, 56, 66–70; Spinoza 1954: 47, 49, 137–138). For Spinoza, it is not humans, understood as subjects, that constitute the centre of the ontological order but substance, which is everything that exists, and every thing – every phenomenon, human, or animal – is its *mode*, a form of existence. In this way of thinking, power – the possibility of joint action – can only be achieved through connecting and assembling with other equal *modes*.

In regard to her project of vitalist materialism, Braidotti adds that, as a whole, it can be understood as radical immanence, in which the basic unit of consideration is not the individual, but the multitude viewed as a rhizome (Braidotti 2013: 56; Deleuze & Guattari 2005: 6–25). In this perspective, it becomes possible to assemble different forms of life, which Braidotti calls *zoe*, in contrast to the more defined *bios*: "*Zoe*-centered egalitarianism is, for me, the core of the post-anthropocentric turn: it is a materialist, secular, grounded, and unsentimental response to the opportunistic trans-species commodification of Life that is the logic of advanced capitalism" (Braidotti 2013: 60). Abandoning *bios* in favour of *zoe* is also connected with the idea of nomadism – formulating subjectivity that is always on the peripheries, has no defined characteristics, and thus how it acts is more important than how it is characterised (Braidotti 1994: 146–190; Deleuze & Guattari

2005: 351–423). Additionally, the nomad always stands in opposition to the state and capitalism, and dismantles its molar structures (Deleuze & Guattari 2005: 208–231).

To the rhizome analogy one can add the arguments of Latour, according to whom humans, animals, things, and phenomena can be connected in almost any way if the given assemblage works. It then turns out that expressions of power are "weaknesses," "entelechies," "monads," or more simply, "actants," which are relational and resolved within trials of strength and weakness (Latour 1993: 158–160). These trials are not about evolutionarily determining who is more powerful and who will survive, but rather about "an effort to select and organize good encounters, that is, encounters of modes that enter into composition with ours and inspire us with joyful passions" (Deleuze 1988: 55–56). It is these joyful passions that Deleuze mentions that determine how *modes* can assemble, cooperate, and build common grassroots power. Radical inclusivity is characteristic of this way of thinking: *modes* gain power only in joint action; thus few, isolated, and disagreeing elements will always remain weaker than the "joyful multitude."

Why is political ontology important in connection with climate change and the dominating liberal systems? If we assume that only self-interest, self-development, and seeking various ways to enrichment exist, it is indeed difficult to imagine a radically different world than the one we already know. These ontological boundaries also organise possible affective forms of involvement – if we are focused only on benefits for ourselves, then it is difficult to become a "joyful multitude." Instead, we may more regularly encounter the kind of passive emotions that are essential for liberal self-centredness and yet are often left unmentioned: doubt, jealousy, and suspicion.

Concepts involving common grassroots power and assemblages may evoke hope, but the abstract statements of political ontology are not yet ready-made solutions. How can Braidotti's philosophy, linked with the thoughts of Spinoza, Latour, and Deleuze, be translated into the issues of the energy transition, the climate crisis, and possible changes related to democracy and capitalism? What does energy become when we do not understand power as control over others, but as the grassroots joint action of a multitude? Inspired by vitalist materialism, can a different solution to the climate crisis be formulated than that presented by liberal Western politicians? How would democracy and social life be understood then? At least some of these questions can be answered using the concept of degrowth.

/// Degrowth: A Utopia or a Hope?

The idea of degrowth can be understood as a gradual or sudden departure from production and consumption (subordinated to economic growth) in favour of improving the lives of societies and protecting the planet on a global and local scale, now and in the long term. Some proponents add more democratic decision-making in regard to redistributing goods, drastic reducing of energy consumption, or ensuring social justice (Kallis et al. 2012; Schmelzer et al. 2022: 3, 191–193). Perhaps the most well-known scholar associated with this movement, Jason Hickel, adds that besides reducing energy consumption, it is also crucial to reduce the consumption of raw materials, which not only contribute to the release of carbon dioxide but also increase the material footprint (Hickel 2020). Thus, it can be said that proponents of the degrowth idea, in addition to addressing issues related to the climate crisis, often also point to solutions related to equality, social justice, and democratisation. Although the ideas of degrowth proponents vary, it is possible to distinguish their general stance from the liberal viewpoint. They oppose or are sceptical towards capitalism, seek new ways to organise communities without insisting on growth, and reject the privilege of the wealthiest. Obviously, there are multiple perspectives other than growth/degrowth – or even within this binary division – that could not be included in this article, as they would require a broader discussion, for example, Kate Raworth's work *Doughnut Economics* (2017) or Kohei Saito's idea of degrowth communism (2022).

What is the idea of degrowth in practice? How does protecting the planet relate to democratic demands? What does it mean for the contemporary understanding of democracy and capitalism? Hickel presented a series of proposals that aim to promote the well-being of broad groups, help mitigate global warming, and prevent the enrichment of the few. Among the most important are the nationalisation of public services (water and electricity, but also healthcare and education) to ensure sufficient and equal access for all; an end to the planned obsolescence of products; limiting advertising; shifting from exclusive ownership to more inclusive use; and restricting the activities of environmentally harmful industries (Hickel 2020). Other authors also point to the greater involvement of local communities in the common management of resources or decision-making. Solutions based on cooperativism, "communing," or various economies based on participation, solidarity, and democratisation, are already being introduced (Schmelzer et al. 2022: 215–224; Bollier & Helfrich 2019). Additionally,

issues of the fairer redistribution of goods and a basic income, democratically managed technologies, and international solidarity are emphasised (Schmelzer et al. 2022: 225–232, 244–249).

It is the broadly understood idea of democracy that constitutes the clearest common point between the idea of degrowth and the post-anthropocentric project (combining the philosophies of Braidotti, Spinoza, Deleuze, and Latour). Supporters of degrowth and other scholars working on similar concepts only sporadically refer to issues of political ontology (Richter 2019; Heikkurinen 2019; Demmer & Hummel 2017) and rarely combine the concepts of the above-mentioned authors (Fox 2023). It seems to me that democracy, understood as grassroots action – as a constant breaking down of distinctions between the governed and the governing, and simultaneously as a process that over time will assemble more elements – is a good reflection of the strategy of degrowth proponents. In both perspectives, what is most important are not individuals and their freedoms and privileges, but communities and their well-being and treatment, without the excluding divisions of culture/nature, human/non-human, or centre/periphery. This community consists of humans, animals, plants, technologies, and the balance connecting them, expressed in an understanding and compassionate way (Hickel 2020). For this reason, democracy – especially diverse and direct democracy – may be considered the best way for such systems to function (Spinoza 1958: 441–445; Latour 2004: 42, 69–71).

Supporters of degrowth therefore often understand democracy in a radical way – as democratising areas of life that have so far operated on other principles (e.g., capitalist ones). Hickel summarises this situation by stating that "if our struggle for a more ecological economy is to succeed, we must seek to expand democracy wherever possible" (Hickel 2020). Some scholars, who are not necessarily associated with degrowth ideas, describe this as an escape from the economy (Fournier 2008) or an attempt to create a post-capitalist politics (Mason 2016). Other analogous theories include those of an ecological economy (Costanza 1992) and economic democracy (Dahl 1985). A similar concept (although without direct references to degrowth) was also presented by a Polish sociologist, Jan Sowa, in the introduction to the collection *Solidarność 2.0., czyli demokracja jako forma życia*. In this short text, he notes that liberal democracies were an important step towards democratisation in their beginnings, but so far, they have constituted a compromise between the privileged class (once the aristocracy, now the political class) and the people. The development of technology, education,

and communication possibilities allows for another step forward in empowering and giving more agency to the people today (Sowa 2019: 5–39).

What unites these ideas is the belief that starting with local communities, decision-making should concern not only protection of the climate but also the redistribution of goods, ensuring a basic income, and a fairer division of labour. If we (the local community) do not do this, corporations, marketing firms, and other entities operating within the capitalist order will do so, while demanding payment and submission. However, the first step towards local decision-making should be made by those in power, not individuals (Klein 2019).

What are some examples of such local communities and their actions that reflect ideas of degrowth and democratisation? These groups differ around the world and emphasise various aspects of these ideas, from ecological sensitivity to cooperative action. Among the most notable groups are Socialist Self-Help Mühlheim (Sozialistische Selbsthilfe Mühlheim) in Germany, which works for "more humane, ecologically responsible urban policies" (Bollier & Helfrich 2015), and Cecosesola (Central Cooperativa de Servicios Sociales des Estado Lara) in Venezuela, in which healthcare, agriculture, and local trade are organised in a grassroots way (Cecosesola n.d.). Similar institutions operate in Catalonia under the Confederation of Cooperatives of Catalonia. They offer services such as agriculture, food distribution, or help with teaching, housing, and labour organising. All of the confederated cooperatives are set up in a democratic, transparent way, with attention to minority groups and a sustainable economy (COOPCAT n.d.).

These institutions grow over time, and some have been in operation for more than forty years – not for profit but for the well-being of the members of the community. Such organisations make it easier to use local products, which do not rely on global corporations and their trade routes. Democratic, joint decision-making on how to organise labour (and the distribution of food and services) helps avoid human and non-human exploitation and lessens inequalities.

A more rhizomatic approach to organising has been described in *The Mushroom at the End of the World*, in which Anna Tsing describes how the patterns in which the *matsutake* mushroom can grow are unpredictable and changing. Assemblages of *matsutake* gatherers, sellers, and the natural environment in Japan disrupt the operations of capitalism, forcing cooperation and empathy between these elements (Tsing 2015: 131–135). Perhaps it is not an intentional disruption, but the rhizomatic, entangled way in which

it happens is an important precedent in which local assemblages enable a more ecological and just organisation of human and non-human actants, independent of the growth principle.

As Matthias Schmelzer, Andrea Vetter, and Aaron Vansintjan write, "some see a potential for a degrowth economy in the combination of cooperative principles with digital platforms in order to counter the monopoly of commercial platform providers" (Schmelzer et al. 2022: 219). The use of IT systems in a way that goes beyond the logic of capitalism is a great hope for degrowth proponents and other left-wing thinkers, although today it is difficult to find "spaces" on the internet that have not been completely privatised and subordinated to profit (Świetlik et al. 2019: 183–204). The internet and the possibility of instant communication significantly increase the chances of the successful democratisation of public life, but using technology in an impartial and safe manner still poses a problem (Rehman 2019; Runciman 2018).

It can be stated, therefore, that the idea of degrowth is more than a utopia based on theoretical premises. Discussions of strategy, and of the capacity and scale at which degrowth should be implemented, have been taking place for more than a decade now (Barlow 2022: 74–76). Some theorists of this movement talk about "nowtopias," that is, projects in which solutions consistent with the idea of degrowth are implemented (Bollier & Helfrich 2019; Kallis et al. 2012; Petridis 2022) and become "emancipatory initiatives that not only *envision* but also *embody* an alternative model of societal organisation in practice" (Petridis 2022: 161).

According to Nathan Barlow, there is no consensus regarding state participation in applying degrowth ideas (Barlow 2022: 82–83). Panos Petridis argues that "the core of the 'degrowth' institutions that are envisioned will likely be derived from social movements and interstitial bottom-up solidarity economy initiatives that operate against the logic of capital" (Petridis 2022: 161). He suggests that a post-capitalist community would use the state in different ways than happens currently. Critics and sceptics may say that not everything can be achieved in a grassroots manner and without the participation of national governments, at least under current conditions. In their perspective, many proposals of degrowth can still be considered utopian – such as international solidarity or the implementation of this project on a larger scale. According to them, without the participation of the state it is difficult to organise the operation of power plants, communication, or other basic needs, or, to express the problem differently, it is difficult to manage them in a completely decentralised way. For example, it seems

that the modern state would be helpful in implementing projects such as basic income, which many degrowth proponents find valuable. Max Koch even argues that the state is necessary to achieve success for degrowth supporters, because "state and civil society are interconnected in myriad ways, that is, the internal structures and struggles within one are significantly co-produced by corresponding processes in the other" (Koch 2022).

Unfortunately, in Europe and in many wealthy countries elsewhere, numerous politicians still prefer to preserve economic growth and the capitalist order, and they rarely consider strategies not involving national states in their current form, probably due to their position of power. The President of the European Commission, Ursula von der Leyen, could state that "the European Green New Deal is our new growth strategy" (von der Leyen 2019) because for the leaders of Western countries it seems to be a more palatable strategy than stopping economic growth. The income of corporations and energy companies appears to be more important than understanding the situation in which citizens may have to live in the future. This situation translates into the indecisiveness of governments and politicians regarding the actual adaptation of their countries to climate change.

For this reason, many degrowth supporters would solve the problems presented at the beginning of this article (the unequal distribution of goods and material footprints, expensive fossil fuels, climate change) in a way that completely alters our understanding of democracy, capitalism, citizenship, and the management of energy, resources, and wealth. According to many degrowth supporters, democracy would cease to be merely "a toy for a wealthy elite" (Sowa 2019: 19), and its functioning would create not only the *impression* of participation and influence on decisions but *actual involvement* in local and perhaps national affairs. This would mean more direct democracy, without clear differences between citizens and their representatives, and without distinctions between citizens' rights and human rights. The democratisation of the economy would dismantle the neoliberal order, which favours the richest and promotes the growth of social, material, and geopolitical inequalities (Global South). It would also transform resource management into a universal provision of well-being, rather than a system for the exploitation of workers by those who own the capital. Of course, energy sources would still need to be renewable, but due to diminished demand they would produce less energy and be managed democratically, not privately, as is likely to happen in applying the liberal solution. The idea of infinite growth would seem inappropriate and absurd (Bińczyk 2023: 187–194), and every community would know how much resource

consumption and energy it would need. Democratic resource management also seems like a better way to reduce our material footprint, our carbon footprint, and ultimately global warming, because the goal is not profit but maintaining the life of the community, which consists not only of humans but also of non-human elements: animals, plants, raw materials, the entire infrastructure, and the planet as a whole. In this way of thinking, energy ceases to be a commodity or an instrument of power but becomes a basic good that is guaranteed to everyone and from which everyone can benefit within set limits (Schmelzer et al. 2022: 225–228). These and further concepts and resolutions have already been discussed by other scholars (Hickel 2020; Bińczyk 2023: 194–197).

/// Conclusion

In this article, I have attempted to show the possible problems with various liberal ideas on how to solve rising temperatures and energy consumption, and some of the greatest challenges in addressing the climate crisis within the framework of degrowth and post-anthropocentric thinking. In this short conclusion, I would like to summarise some of the most important problems in overcoming the current status quo: limitations in ontological imagination, lack of affective optimism, and governmental indecisiveness.

Governmental indecisiveness is often cited by respondents as the main obstacle to solving the climate crisis (Bailey 2023) and escaping the trap in which contemporary states find themselves, that is, the necessity of ensuring the well-being of their citizens while participating in the capitalist division of resources, energy, and other essential goods. How can Western governments apply the concept of degrowth when, since the end of the Second World War, one of the main arguments used by political parties to gain support has been the promise of continuous growth and a future where everything will constantly develop? How can a policy based on moderation and restraint rather than abundance and self-development be built?

The second significant constraint is the lack of affective optimism, that is, there seems to be a fear of cooperating, and doubt about the goodwill of other people. Neoliberalism has fostered and maintained pessimism and suspicion in regard to the actions of others, along with the belief that individual interests cannot be reconciled with the interests of other people (Hayek 1978: 71–84, 253–266). Hence, constructing cooperatives, democratising the economy, and organising demonstrations and strikes in opposition to the capitalist order requires courage at the level of rational

decision-making, and beyond this level – affective trust, and the ability to empathise. These are crucial in the post-anthropocentric project associated with the philosophies of Rosi Braidotti, Bruno Latour, Gilles Deleuze, and Felix Guattari.

The third challenge is related to the above: the lack of ontological imagination (Nowak 2016; Bińczyk 2023: 9–13, 132–136), which concerns the possibility of conceiving of the social order in a non-hierarchical, inclusive, and socially just manner. Centuries of European philosophy, science, and other fields have taught Europeans to treat humans (or rather white, educated men) as privileged subjects, and this privilege creates a difference, a distance from those who do not share the advantage. This difference condemns others to be treated as inferior, subordinate, and inhuman, and prevents a change in how relationships between humans, animals, plants, things, and the entire planet are perceived.

In this article, I have attempted to outline, both from a liberal standpoint and from the perspective of degrowth proponents, the most significant changes that solving the climate crisis could entail. The solutions imply changes in the functioning of entire societies: how resources and energy are provided and managed, how democracy works, and how capitalism is perceived. Many further details in regard to, for instance, maintaining growth in countries of the Global South, setting energy consumption limits, or the principles for exchanging resources and assets within a democratic economy, could not be included. My aim was to outline the difference between certain liberal and degrowth solutions, at the political and ontological levels, in the hope of expanding the present ontological imagination, introducing some optimism, and therefore contributing – even if only slightly – to solving the climate crisis.

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/// Abstract

The aim of this article is to consider the liberal perspective and the degrowth perspective on capitalism, the climate crisis, and energy consumption. According to proponents of capitalism, solving the climate crisis needs to be done in terms of "green growth." More radical thinkers argue that the problem is not the source of energy but rather that its consumption is subordinated to economic growth. Therefore, they propose changing the energy consumption strategy from a model aimed at infinite profit to one focused on ensuring universal well-being.

This article outlines selected basic socio-political issues related to moving away from economic growth and the possibilities for redefining the understanding of democracy. Abandoning the concept of economic growth also presents an opportunity for transformations within political ontology – the possibility of viewing society as a multitude without the privileged position of the human. The article thus also shows the similarities between ontological resolutions and the changes that need to occur in understanding the climate crisis, and thereby depicts the need for changes that are far more complex than merely making capitalism "greener."

Keywords:
degrowth, post-anthropocentrism, climate crisis, multitude, ontology, neoliberalism

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ENERGY ETHICS: THE (IM)PURITY OF RENEWABLE ENERGY SOURCES. AN ANALYSIS OF OFFSHORE WIND FARMS IN THE BALTIC SEA

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The burning of fossil fuels is a major cause of global warming. Thus, one proposed solution is a transformation of the energy system. However, this does not mean a simple switch from one source to another: the transformation must involve the entire socio-technical energy system. The way energy is produced determines the development of civilisation, and modern developed societies consume massive amounts of energy (Smil 2017: 6; Ritchie et al. 2020). Above all, a transformation of the energy system must take into account environmental issues. However, it is not only a question of greenhouse gas emissions and global warming but also of other environmental problems such as land consumption and loss of biodiversity, which are interrelated and mutually reinforcing (Caesar et al. 2024: 20). Six out of nine planetary boundaries have been crossed,[1] and climate change is just one of the interrelated processes (Richardson et al. 2023).

As alternatives to "dirty" and polluting fossil fuels, renewable energy sources (RES) are referred to as being "green" and "clean." However, they are not without environmental impacts: examples of potential ethical and environmental issues involve the impact on local ecosystems, the materials

[1] Importantly, these boundaries set the limits within which humanity can safely operate, so it is an anthropocentric indicator of life support.

used to create RES, how they are sourced, and so forth. In relation to a transformation of the energy system, these require further investigation.

In this article, I will look at the ethical and environmental issues associated with offshore wind farms. As a case study, I will use those being developed in the Baltic Sea on the Polish coast. Given that they are one of the first elements in transforming the Polish energy system at the national level, they can help to illustrate ethically problematic issues and to identify the most vulnerable points and the actors most likely to be affected. The main concept through which I conduct my analysis is the concept of "impurity" proposed by Alexis Shotwell (2016). The aim of this paper is to answer the following research questions: is ethical energy production possible? Can RES, such as offshore wind farms, be this kind of ethical energy? What environmental problems are associated with this kind of energy production?

I will begin by indicating the theoretical framework, which consists of findings from the field of energy humanities and concepts developed within critical posthumanism and feminist new materialism. The next section introduces the central concept, which is that of Shotwell's "impurity." This is followed by an analysis of RES, using the impurity concept to outline the ethical issues that RES raise. In the last part of the article, I will analyse the offshore wind farms being built on the Polish coast. The analysis consists of two parts: a technical description of the farms, including environmental conditions, and a proper ethical analysis.

/// Engaged Humanities

This section introduces the energy humanities and concepts drawn from the field of critical posthumanism and feminist new materialism. These provide a theoretical framework for my further analysis of the impurity of RES.

Energy Humanities

A new research subdiscipline has been developing over the course of the past two decades: energy humanities. It is based on recognition of the fundamental importance of fossil fuels to modern civilisations (Szeman 2007; Szeman & Boyer 2017; see also Mitchell 2011; Malm 2016). The term "petrocultures" was coined to describe cultures built on fossil fuels and dependent on unfettered access to them (Wilson et al. 2017). The moment of reflec-

tion on petrocultures is also marked by their imminent end. As the authors of the anthology *Petrocultures: Oil, Politics, Culture* point out,

> Oil transformed life over the century in which we came to depend on it; the looming threat of its absence from our lives means that it will transform us again, from people who are at home and comfortable in the petrocultures we have devised for ourselves to people who will have to shape ourselves to fit contexts and landscapes we can barely imagine, even if we need to do so – and quickly. (Wilson et al. 2017: 3)

Analyses in the new research field aim to gain a deeper understanding of societies' dependence on fossil fuels, both in terms of energy and petroleum products and of dependence on their consumption. This approach is driven by the necessity for change – a shift away from burning fossil fuels is required due to a warming climate. Although there is scientific consensus on the subject, the global consumption of fossil-fuel energy is not declining (Ritchie et al. 2020). As resistance to a move away from fossil fuels grows, so too does an understanding of the need to examine the social relationship with fossil fuels.[2] The complexity of this social relationship is described by another term from the field of energy humanities, "petromelancholy," which signifies a feeling of longing for the peak of petroculture (LeMenager 2014: 102), when access to fossil fuel was not a problem or even an object of reflection: it was cheap and within easy reach. The oil-based culture was both invisible and omnipresent.

Gerry Canavan draws parallels between fossil-fuel dependence and substance addiction as it is defined in the fourth and fifth editions of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV and DSM-V). His starting point is the phrase "oil dependence" used by US presidents:

> Barack Obama in 2010 announces that "now is the moment" to "seize control of our own destiny" back from the oil on which we depend; George W. Bush in 2006 promises to "make our dependence on Middle Eastern oil a thing of the past"; his father in 1992 asserts "there is no security for the United States in further depend-

[2] There is no room in this article to analyse this issue in detail, but it can be pointed out that some of the main actors responsible for staying with fossil fuels are the oil companies, and that their lobbying efforts have blocked the shift away from fossil fuels both at the level of legislation and of public support (see Oreskes & Conway 2010).

> ence on foreign oil"; and so on, all the way back to Richard Nixon, who swore that by 1980 "the United States will not be dependent on any other country for the energy we need" (Stewart 2010). The repeated word dependence suggests an intriguing medicalization of the material conditions of oil capitalism. (Canavan 2017: 25)

DSM-IV uses the term "substance dependence" (in DSM-V, the phenomenon appears as "addiction"), which is defined as "a maladaptive pattern of substance use, leading to clinically significant impairment or distress" (American Psychiatric Association 2000: 197, cited after Canavan 2017: 25). Canavan, referring to literary representations of oil prosperity, highlights the dangers of substance overdose: "in the delirium of abundance made possible by oil there is always the possibility that one might consume too much" (2017: 25). He concludes that the social relationship with oil meets seven diagnostic criteria for dependence (Canavan 2017: 25–27).

In this view, the transition to RES can be interpreted as an element of healing, a recovery from addiction, where the transformation of the energy system provides the promise of a better, healthier future, without pollution, extractivism, and environmental damage. However, the excess in which people had previously lost themselves does not concern fossil fuels alone, but – above all – the degree of energy consumption in general (which has been made possible by fossil fuels). The development of RES only adds to the ever-increasing consumption (Ritchie et al. 2020). We are not just dependent on fossil fuels, but on access to energy in general. The mere development of RES as an additional energy source in no way solves the planetary crisis (nor the dependence on fossil-fuel energy, whose consumption is constantly increasing).

Theoretical Framework

In the following section, I will explain the theoretical assumptions on which the further ethical analysis of the environmental problems associated with the production of energy from wind farms in the Baltic Sea will be based.

One of the key concepts in this connection is naturoculture, which was introduced by Donna Haraway (2008). The concept stems from a feminist critique and rejection of thinking in dualistic divisions such as culture/nature, man/woman, or human/animal, as these have served to prioritise the human as superior and to uphold humans' dominion over nature (Braidotti 2013). The separation of the concepts of nature and culture emphasises the

false separation of humans (who belong within this division to the realm of culture) from the realm of nature. Haraway points not only to the merging of these two spheres but also to the multiplicity of different naturocultures.

Consequently, by rejecting anthropocentrism, nonhuman entities, such as animals, plants, or even ecosystems, are recognised as objects of ethical concern, the agency of both human and nonhuman entities is acknowledged, and the human being ceases to be regarded as the model and basic unit of reference. Moreover, the inclusion of nonhuman entities in ethical considerations is linked to the recognition of the interdependence of living beings and their environment. This, in turn, places emphasis on the relationality and reciprocal influence between the different entities: what matters are the connections between the different organisms, the mutual influences, and how different organisms co-create their environment, which in turn co-creates them. Priority is given to an embodied perspective: the body is not understood here as closed, with clearly defined boundaries (as even our human body is inhabited by protists, fungi, and bacteria, without which it would be impossible to live) but permeates and is permeated by the environment, in line with the notion of transcorporeality proposed by Stacy Alaimo (2010: 15).

Last but not least, materiality is important in connection with the embodied perspective discussed above, and in the case of the renewables under analysis, in reference to the materials of the energy system infrastructure (including how particular materials were obtained) and the mutual, material influences and connections between infrastructure, ecosystems, and individual entities.

This framing allows us to look at ethical entanglements. Ethical issues are not understood here as separate problems but rather as existing simultaneously with the situations that co-produce them. It is therefore not possible to separate them from their context and to analyse them in isolation from their constituent activities, relations, and connections.

In line with the above description, I see energy systems as agential and with the potential to rematerialise reality due to the degree of dependence modern civilisations have on energy, its importance for global geopolitics, its impact on the environment at both the local and the planetary level, and everyday energy consumption practices.

In thinking about energy, I take a broad perspective, which includes the processes in our bodies:

> [T]he human body, like that of any other living organism, can be considered as an "energy converter" (Cottrell [1955] 2009, p. 35). This is a basic premise of modern biology: all living organisms absorb energy from their environment in order to build up and maintain their own physiological structure, and they release this energy in the form of waste or excrement. This process is called metabolism, and the various strategies which biological species pursue in order to keep their metabolism going define their relative position in the cycles of matter and energy that constitute the biosphere: plants use energy from solar radiation in order to convert water and carbon dioxide into sugars and other chemical compounds; the biomass resulting from this process is consumed by herbivores, which convert it into animal tissue, heat, and mechanical energy; their tissue in turn serves as food for carnivores. (Horn & Bergthaller 2020: 128–129)

The distinguishing element for humans in this process is their ability to satisfy their needs using sources of energy other than food (Horn & Bergthaller 2020: 129).

Based on the conceptual framework outlined above, the next section of the article will introduce the concept of (im)purity, which is the main category for further analysis.

/// Constitutive Impurity

RES are described as "green" and "clean," as a counterpoint to "dirty" and polluting fossil fuels. But how "clean" are they really, and – first of all – how should this term be understood? In this context, it is useful to refer to Shotwell's analogous concept of purity.[3] In her analysis of the concept, she combines an aesthetic category with an ethical one. In her book *Against Purity: Living Ethically in Compromised Times*, she starts her narration with the story of the soap in an airplane restroom. The soap as a product has a marketing context: it is a call to purity, cleanliness, nature, and innocence – but we cannot really buy any of these. Shotwell considers such desires as a kind of ethos, which we can

[3] Shotwell uses the term "pure," not "clean," but I argue that her considerations can still be applied to RES analysis, and the two concepts can be treated synonymously in this context.

> use to mark the beginning of the Anthropocene: roughly, the moment that humans worry that we have lost a natural state of purity or decide that purity is something we ought to pursue and defend. This ethos is the idea that we can access or recover a time and state before or without pollution, without impurity, before the fall from innocence, when the world at large *is truly beautiful*. (Shotwell 2016: 3)

This can create an image of an idealised, pure nature placed in opposition to (human) contaminated culture, which has become so powerful and far-reaching that it has overcome nature. In this way, the idea of having crossed a boundary arises – we (humanity) have gone too far in our endeavours to subordinate nature and need to go back to the point where we can start over. However, the concept of purity contains many paradoxes: it can also mean complete control over nature, sterility, and the elimination of what is perceived as "dirty" and "wild." Then culture, using the solutions provided by science (such as the ability to eliminate bacteria through antibiotics, sterilising/disinfecting agents, cleaning products, treatment of infectious diseases, etc.), indicates what is pure and right, and what is polluted and contaminated.

Shotwell warns against the kind of thinking that assumes a new beginning is possible – there is no fresh start, as we are part of "complex webs of suffering" (Shotwell 2016: 5). The reference is to both our historical baggage (histories of slavery, colonialism, genocide, and so forth) and to our present-day entanglement in ethical problems (such as food, clothes, or energy production). Shotwell views ethical problems through the web of interdependence in which we function and considers "impurity" to be the current ethical condition. Especially individual purity is unattainable: reality is too complex. Shotwell strongly criticises practices that give the illusion of achieving individual purity. Wealthy residents of the capitalist countries of the Global North are encouraged to practice purity – such as detoxifying their bodies through the use of appropriate cosmetics, treatments, and food products – with the primary aim of sustaining continued consumption. Shotwell criticises these practices as reinforcing separation and a lack of situatedness, and sustaining a vision of the individual as having clear boundaries.

> I argue against purism because it is one bad but common approach to devastation in all its forms. It is a common approach for anyone who attempts to meet and control a complex situation that is fun-

> damentally outside our control. […] Purism is a de-collectivizing, de-mobilizing, paradoxical politics of despair. (Shotwell 2016: 8–9)

She argues that classical ethical models, which place the individual moral agent at the centre of their theories, are unable to account for problems of such complexity. While there are, of course, situations where ethical dilemmas involve an individual decision, in the case of the Anthropocene epoch,[4] issues as basic as food or energy access involve a great level of complexity. Shotwell writes that

> To say that we live in compromised times is to say that although most people aim to *not* cause suffering, destruction, and death, simply by living, buying things, throwing things away, we implicate ourselves in terrible effects on ecosystems and beings both near and far away from us. We are inescapably entwined and entangled with others, even when we cannot track or directly perceive this entanglement. It is hard for us to examine our connection with *unbearable pasts* with which we might reckon better, our implication in *impossibly complex presents* through which we might craft different modes of response, and our aspirations for *different futures* toward which we might shape different worlds-yet-to-come. (Shotwell 2016: 8)

However, this doesn't mean that it is impossible to strive for ethical behaviour – there is still "the possibility of acting from where we are," with "complicity and compromise as a starting point for action" (Shotwell 2016: 4–5). The individual is not in a position to eliminate such complex problems. Hence, a collective response is necessary – although it too does not promise ethical purity. What we can do is to acknowledge this situation and our situatedness. Shotwell writes that the "world is partially shared, offers finite freedom, adequate abundance, modest meaning, and limited happiness. Partial, finite, adequate, modest, limited – and yet worth working on, with, and for" (Shotwell 2016: 5).

Nevertheless, the condition Shotwell writes about is not all that general and universal. Not every human being is equally immersed in the production of suffering as are, for example, the wealthy residents of the countries

[4] I use this category even though the Stratigraphic Commission rejected the proposal to adopt a new geological epoch under this name (see Witze 2024). Following Adam Izdebski (2023), I use this category to refer to the period of destabilisation of the planet's life-supporting systems.

of the Global North, who are responsible for higher energy consumption and higher levels of commodity consumption (although the level of entanglement also differs between individuals, depending, e.g., on lifestyle or access to goods).[5] On the other hand, there is a risk of creating the image of less privileged communities as being pure and innocent. I think Shotwell warns against it: purity is not a solution. The creation of categories and divisions between "clean" and "dirty" is precisely what Shotwell opposes.

/// The (Im)purity of Renewable Energy Sources

RES do not produce energy by burning fossil fuels, so they do not directly emit greenhouse gases – hence the term "clean," while "green" refers to inexhaustibility – because unlike fossil-fuel deposits, which are limited, RES use renewable energy from the sun or wind. However, this does not mean that they are devoid of environmental impact (every technology has an impact). In this section, I will conduct a preliminary analysis of the potential harm of RES, using the category of (im)purity.

The connection between purity, dirt, and morality was described by Mary Douglas in her anthropological study of religiosity, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*, from 1966. She wrote that "Dirt offends against order. Eliminating it is not a negative movement, but a positive effort to organise the environment" (Douglas [1966] 2001: 2). In the case of the energy transition, "dirty" is defined as that which is to be eliminated, which is linked to contamination, toxicity, and pollution. Shotwell, referring to Douglas's work, writes that "Purity practices – in ideology, in theory, and in practice – work to delineate an inside and an outside; they are practices of defining a 'we'" (Shotwell 2016: 13). Such divisions have ethical implications: the division between "clean" and "dirty" was one of the strategies sustaining colonialism and racism (see Fanon 1963; Ahmed 2004).

Zygmunt Bauman sees the practice of dividing the inside with its inhabitants and the outside with its waste (including human waste) as a pattern of how modernity and modernisation work:

[5] See United Nations' division of economies into developed economies, economies in transition, and developing economies (2014); also Ritchie et al. 2020. In accord with Shotwell's ideas, it is impossible to make a full ethical comparison and assessment of the "purity" of individuals, but undoubtedly a high degree of consumption is associated with greater involvement in unethical practices.

> The production of "human waste," or more correctly wasted humans (the "excessive" and "redundant," that is the population of those who either could not or were not wished to be recognized or allowed to stay), is an inevitable outcome of modernization, and an inseparable accompaniment of modernity. It is an inescapable side-effect of order-building (each order casts some parts of the extant population as "out of place," "unfit" or "undesirable") and of economic progress (that cannot proceed without degrading and devaluing the previously effective modes of "making a living" and therefore cannot but deprive their practitioners of their livelihood). […] The disposal of human waste produced in the "modernized" and still "modernizing" parts of the globe was the deepest meaning of colonization and imperialist conquests – both made possible, and in fact inevitable, by the power differential continuously reproduced by the stark inequality of "development" (euphemistically called "cultural lag"), resulting in turn from the confinement of the modern fashion of life to a "privileged" section of the planet. (Bauman 2004: 5–6)

Waste humans are not allowed to enjoy the benefits of modernisation: their place is with the rubbish. Bauman points out that the role assigned to them is to work with the waste of modernisation, which is something that members of the consumer society do not want to do themselves, for instance, collecting and disposing of rubbish:

> [T]he consumers are not willing to do the rubbish collectors' jobs themselves. After all, they have been groomed to enjoy things, not to suffer them. They have been educated to resent boredom, drudgery and tedious pastimes. They have been drilled to seek implements that do for them what they used to do themselves. They were tuned to the world of the ready-to-use and the world of instant satisfaction. […] With each successive triumph of consumerism, the need for rubbish collectors grows, and the numbers of people willing to join their ranks shrinks. (Bauman 2004: 59)

The global division between those who consume (and who litter) and those who clean up that litter is doing well, as "the majority of unmanaged and mismanaged plastic waste is found in the developing world stemming from imports from Organization for Economic Cooperation and

Development (OECD) countries" (Browning et al. 2021: 1). This division also applies to technology and access to it, including energy. The transformation of the energy system requires the extraction of minerals and metals, which are largely sourced from countries in the Global South (Church & Crawford 2018). In turn, the fruits of transformation serve to reduce emissions and sustain the well-being of the developed countries of the Global North (see European Commission n.d.).

The mining of the critical metals needed for the transformation of the energy system is problematic due to the rising social and environmental risks and harms. Moreover, the risks and harms will increase as mining is intensified to meet the growing demand for such metals (Church & Crawford 2018). The term "energy-extractives nexus" was coined to describe the complex relationship between energy production and extractivism (Bainton et al. 2021: 629), where "extractivism" can be defined as "a form of predatory appropriation of land and resources, embedded in global geographies of unequal ecological and value exchange" (Andreucci et al. 2023: 1). Historically, colonialism was based on the logic of extractivism (see Moore 2015). Currently, this logic is continued, hiding neocolonial power relations under the guise of the need for a transformation of the energy system. An example of such actions is the creation of "green sacrifice zones" (Zografos & Robbins 2020: 543), where the concepts of "sacrifice" and "greening" are juxtaposed: areas are sacrificed (i.e. environmentally destroyed and polluted) to metal and mineral extraction sites, which, however, do not benefit the residents of the places concerned.

Andreucci and co-authors argue thus that "the ongoing energy transition is premised upon an extractivist logic, linked to neo-colonial patterns of uneven development and the creation of sacrifice zones of mineral extraction in the global South" (Andreucci et al. 2023: 2). Instead of fossil-fuel extraction, for the transformation of the energy system there is new way of extracting, called "green extractivism," which turns out to be greenwashed colonial extractive capitalism. The paradox is that an environmentally destructive mode of extraction and accumulation, loaded with colonial legacies, is being promoted as a solution to the ecological and climate crisis (Andreucci et al. 2023: 3). Retaining the model of aggressive extractivism also begs the question of how renewable so-called RES are in reality (Dunlap 2018).

To summarise, behind the production of energy from RES are practices that we would not describe as "green" or "clean." What is "impure" and "dirty" is hidden and ignored: the discourse on renewable energy has

no place for human waste, exploitation, pollution, and environmental destruction. Responsibility is extended geographically, based on the colonial North/South divide, as well as in time: the slow violence continues also in the era of transformation towards green energy systems (Nixon 2011).

In the next part, I will continue my analysis based on the concept of "impurity" in relation to Polish wind farms in the Baltic Sea.

/// The Baltic Sea and Polish Wind Farms

This section of the article consists of two parts. The first contains a technical description of the development of wind farms: the environmental conditions in the Baltic Sea, the legal context, the identification of the entities responsible for the development of the individual farms, the materials used for the wind farms, and an analysis of the impact of the farms on the natural environment of the Baltic Sea. The second part contains an analysis of the concept of ethical impurity in relation to these offshore wind farms.

Polish wind farms were chosen as a case study for several reasons: first, because of the specificity of the Baltic Sea, which is located in the middle of Europe and is a naturocultural area affected by anthropogenic influence from all sides; second, the context is a local one for the author, who is a researcher from Poland; and third, because of the importance of offshore wind energy for the Polish energy transition (Ministerstwo Klimatu i Środowiska 2019: 62–66).

Polish Offshore Wind Farms: Technical Description

The Baltic Sea, due to its specific location and the consequent scale of anthropopression (it is surrounded by nine countries with high population density and lacks strong sea currents), faces a number of ecological problems. These include overfishing, excessive shipping, sunken chemical weapons, underwater noise, wrecks on the seabed, microplastic pollution due to abandoned fishing nets, and eutrophication, caused by excessive use of nutrients, most commonly phosphates and nitrates, which flow from fields into rivers and then into the sea. This results in so-called dead zones, deprived of oxygen. As a consequence of global warming, the Baltic Sea is getting warmer (Bergström & Haldin 2023). Therefore, the Baltic Sea can be seen as a local exemplification of global issues and as "a time machine to study consequences and mitigation of future coastal perturbations, due to its unique combination of an early history of multistressor disturbance

and ecosystem deterioration and early implementation of cross-border environmental management to address these problems" (Reusch et al. 2018).

From the perspective of Poland's transformation of its energy system, this is an important moment, when offshore wind-farm infrastructure is beginning to emerge in the Baltic and is changing the appearance, perception, and role of the Polish coast. To understand why Polish offshore farms are being built right now, it is necessary to refer to Polish legislation. The Renewable Energy Sources Act came into force in 2015. Among other things, it defines the principles and conditions for the production of energy from renewable sources, the principles for the implementation of the national action plan for energy from renewable sources, and the principles for international cooperation in the field of RES. The act also implements four directives of the European Parliament and of the Council (Dz.U. 2015 poz. 478). In December 2020, the Act on Promotion of Electricity Generation in Offshore Wind Farms was adopted (Dz.U. 2023 poz. 1385). The law was considered an important step in legal regulation and procedural and administrative improvements (Pyć 2024). It designates areas where offshore wind farms can be built: in the so-called Polish Exclusive Economic Zone of the Baltic Sea, in the area of the Slupsk Bank, the Central Bank, and the Odra Bank (see Fig. 1). The Act also sets out the rules and conditions for the provision of state financial support for electricity generated in offshore wind farms, the rules for the implementation of investments, the rules for the disposition of a set of equipment for power output, and the requirements for the construction, operation, and decommissioning of offshore wind farms.

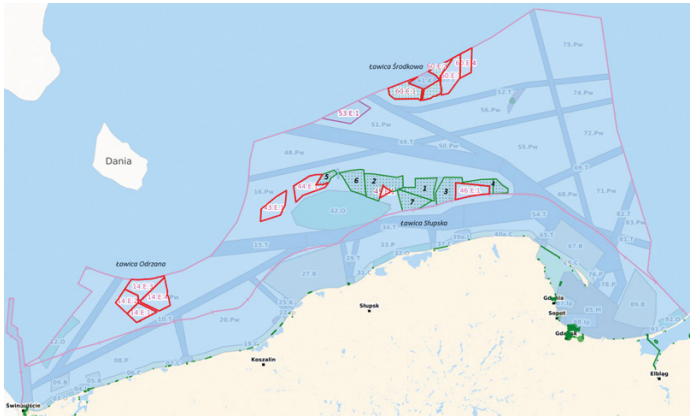

Figure 1. Map of Poland's planned offshore wind farms
Source: Morska Energetyka Wiatrowa. N.d. "Program rozwoju Morskich Farm Wiatrowych," https://www.gov.pl/web/morska-energetyka-wiatrowa/program-rozwoju-morskich-farm-wiatrowych, accessed: 12.07.2024.

The Act was followed in 2021 by the publication of the Energy Policy of Poland until 2040 (PEP2040). The document assumes that in 2030 there will be at least 23% of RES in Poland's gross final energy consumption.[6] Particular importance is attributed to offshore wind energy, prioritising the development of this source due to its high degree of operational stability and capacity utilisation. The document also points out that the development of this technology is important for the implementation of the European Green Deal. PEP2040 identifies three main pillars (*just transition, zero-emission energy system, good air quality*), composed of eight strategic objectives. Specific Objective 6 (second Pillar) is *the development of renewable energy sources* with Strategic Project 6: *implementation of offshore wind energy*. In addition to *offshore wind energy*, the second Pillar consists of *nuclear energy*, and *local and civic energy*. The development of offshore wind farms therefore occupies an important position in plans for the Polish energy sector in the coming years. The above-mentioned legal documents can be seen as an actor enabling further action in the energy transition process.

Seven offshore wind projects from the first phase of the support scheme are currently under construction.[7] The first energy output is scheduled for 2026, with a planned total installed capacity of up to 7,090 MW (phase I of support) and 11,457 MW (phase II of support), giving a total of 18.547 GW.

The construction of offshore wind farms is mainly the responsibility of Polish energy companies (PGE – Polska Grupa Energetyczna, Orlen, Tauron, Polenergia) cooperating with foreign companies more experienced in RES projects (the Danish company Orsted, the Canadian company Northland, and the Norwegian company Equinor), or international companies (Ocean Winds, an international company created on the initiative of EDP Renewables – a Portuguese concern; ENGIE – a French concern; and RWE Renewables – part of RWE concern, a German company).

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[6] The document also points to the continued use of fossil fuels (diversification of supply) and the development of a market for oil products and natural gas (referred to as "a bridge fuel"). The document further envisages the exploration of new natural gas deposits, including at the bottom of the Baltic Sea, and the implementation of nuclear energy.

[7] Out of the nineteen projects being implemented, seven are in the first phase of support (Baltica 3 by Elektrownia Wiatrowa Baltica 3; Baltica 2 by Elektrownia Wiatrowa Baltica 2; Baltic Power by Baltic Power; BC-Wind by C-Wind Polska; FEW Baltic II by Baltic Trade and Invest; MFW Baltyk II by MFW Baltyk II; MFW Baltyk III by MFW Baltyk III). The second phase of the support system includes as many as twelve more projects (Energa MFW 1 by Energa MFW 1; Energa MFW 2 by Energa MFW 2; Orlen Neptun 14.E.3 by Orlen Neptun III; Orlen Neptun 14.E.4 by Orlen Neptun IV; Baltica 7 by PGE Baltica 4; Baltica 9 by Elektrownia Wiatrowa Baltica 9; Baltica 2+ by Elektrownia Wiatrowa Baltica 2; Orlen Neptun 46.E.1 by Orlen Neptun VIII; MFW Baltyk I by MFW Baltyk I; Baltica 1 by Elektrownia Wiatrowa Baltica 1; Baltica 1+ by Elektrownia Wiatrowa Baltica 1; Baltica 5 by Elektrownia Wiatrowa Baltica 5). See Morska Energetyka Wiatrowa n.d.

In addition to the farms themselves, the infrastructure required to use them is also being built: an installation terminal is to be constructed in the port of Świnoujście, as are service terminals in Łeba, Ustka, and Darłowo (to serve the farms), as well as the connection infrastructure, that is, the cables connecting the windmills to the substations. So far, the only installation port (prepared for the construction of farms) has been the terminal in Ronne on Bornholm (Świsłowski 2024). The installation terminal in Świnoujście will be the second of its kind in the Baltic Sea and will also be able to serve foreign investments. Another such installation port is being built in Gdansk. This means building on land where there was originally water: the land is surrounded by a "mould" of steel, filled with sand or other substance, then the ground is consolidated until a platform is created from which turbines can be installed (MT 2024). The municipality of Choczewo is to play a key role – an electrical substation will be built there to bring power from the wind farms in the Baltic Sea to the rest of the country. The first Polish nuclear power station is also planned to be built there.

Wind turbines are to be purchased from companies such as Vestas and Siemens Gamesa (Świsłowski 2023). The wind turbines use steel and iron materials, aluminium and alloys, copper and alloys, polymer materials, glass/carbon composites, electronics/electrics, lubricants and fluids, according to the Vestas information brochure (Vestas 2024). The company also points to the use of rare earth elements: "rare earth elements in the magnets found in the towers of all new turbine models and in permanent-magnet generators in the older GridStreamer turbine models (i.e., the V112-3.0 MW and the 2.0 MW GridStreamer platform) and the EnVentus platform" (see Vestas.com).

Polish offshore wind farms will be located next to a Natura 2000 protected area, which aims to protect certain species, along with their habitats. The 2020 Act on the promotion of electricity generation in offshore wind farms mentions environmental conditions; the wind farm projects must also meet environmental protection requirements. More specific information can be found in PEP2040, where Annex 3 is entirely devoted to an environmental impact assessment in connection with the implementation of the Energy Policy of Poland until 2040. The document indicates that renewable energy is among the activities with the least negative impacts. However, offshore wind farms are listed as one of the main threats to natural habitats, and to plant and animal species (Ministerstwo Klimatu i Środowiska 2019: Annex 3, 112). According to the analysis, offshore wind farms will have a direct, possibly negative, short- and long-term impact

on biodiversity and animals (threat to habitats, especially of endangered grey seals and harbour porpoises, possible disturbance of animal species by noise and vibration emissions, and collisions of bats and birds with wind turbines); a long-term, possibly negative impact on the integrity of protected areas, land surface (disturbance of the seabed) and landscape (disturbance by "unfamiliar" elements); a possible negative impact on water (disturbance of seabed sediments and the possible release of pollutants deposited in them into the water); and a positive indirect and long-term impact on air, people, the climate, and natural resources (Ministerstwo Klimatu i Środowiska 2019: Annex 3, 141).

Recommendations include locating wind farms outside of valuable natural habitats, limiting the extent of construction work, avoiding locations on the flight paths of birds, and carrying out post-implementation monitoring to reduce negative impacts or introduce compensatory solutions.

Among the factors having a negative impact, the landscape was mentioned due to the placement of "unfamiliar" elements. Depending on meteorological conditions, the wind farms most probably will not be visible from land, as they will be at least 22 km from shore, but they will undoubtedly affect the image of the Baltic Sea and the Polish coast.

Polish Offshore Wind Farms: Ethical Analysis

To what extent can we consider the environmental impact of RES to be harmful, and if so, to whom?

In the case of wind farms on the Polish coast, environmental impact assessments indicate negative, direct impacts on animal habitats, noise and vibration problems, and collision risks for birds and bats.

From the perspective of potential negative impacts on people, the appearance of "unfamiliar" elements in the seascape is indicated. The farms should not be discernible from the shore most of the time (due to the distance), nor audible. These concerns about the image of the coast can be interpreted as parallel with the concern over things being thrown in the water, as in the case of the deliberate sinking of weapons. The water – in this case, the sea – is then treated as a large lifeless reservoir that can be used to store rubbish. In a way, it is a replication of the gesture of throwing "outside," beyond the accepted boundaries, that which is unwanted, dirty or contaminated. On the other hand, elements of RES infrastructure can be perceived positively, in terms of "clean" energy and a good relationship with the natural environment. These considerations open up new fields

of research on how the naturocultures of the Baltic Sea will be perceived when they contain RES infrastructure.

The documents analysed present the environment as manageable and in need of protection. The environment remains a resource (as with fossil fuels) – only it is "renewable." However, this term only refers to the source of energy (such as the sun or wind), not to the materials used to create the infrastructure necessary for energy production, for instance, wind turbines. This is not a problem in regard to individual turbines, but when issues of scale are taken into account, then we return to the problem of extractivism and the maintenance of neocolonial relations of power and exploitation: for example, nickel, which is used to make steel, is extracted in the largest quantities in Indonesia and the Philippines (see European Commission n.d.), while in terms of the largest importers, these are China, Japan, Norway, and the European Union, as primary importers, and as refinery importers: China, the European Union, the United States, and Japan. This leaves us with a division between those who extract and those who benefit from the fruits of so-called green technologies.

In the narrative on the environmental impact of offshore wind farms, there is no consideration or perspective on planetary water entanglements apart from one remark in the description of the environmental conditions of the Baltic Sea: "The Baltic Sea is an Inland Sea with relatively little water exchange with the world ocean, due to the straits it takes about 30 years for the water in the Baltic Sea to completely exchange. Therefore, its continuous monitoring is essential" (Ministerstwo Klimatu i Środowiska 2019: Annex 3, 69, own trans.). The Baltic Sea, with all its environmental problems, thus becomes a vulnerable object of constant monitoring, but this does not protect it from further elements of anthropopression.

In embracing the perspective of water connections, the Blue Humanities approach (Mentz 2022), which points to the importance of water for life on earth, becomes useful: as much as 70% of the Earth's surface is water. The human body is also comprised of about 60% water, so we are indeed, as Astrida Neimanis puts it, bodies of water, connected through the constant exchange of substance with other bodies of water, such as oceans, rivers, or glaciers (Neimanis 2017). Such a perspective allows us to move away from thinking of the Baltic Sea as a resource for tourism or industrial purposes. It encourages us to think about how water connects individual beings and ecosystems and how it sustains life.

The construction of Polish offshore wind farms follows the logic of business as usual – the largest Polish fuel companies, such as Orlen and

PGE, which are simultaneously involved in the extraction and trading of fossil fuels, are responsible for the construction of the farms. PGE owns the Bełchatów and Turów brown coal mines, the two largest lignite mines in Poland (Charkowska et al. 2025). The same companies that are responsible for emissions are thus becoming leaders and beneficiaries of the transformation to a "green" energy system. This breaks down the division between "bad" CO_2 emitters, who are responsible for emissions (the polluter pays principle), and "good," "green," "clean" energy from renewable sources. This ethically ambivalent situation sharpens the paradox of the "dirty" versus "clean" divide applied to energy sources. The implementation of RES projects also fuels the greenwashing practices of the aforementioned companies, which present themselves as leaders in the green transition. The image change is also taking place at the naming level: Orlen Neptun or PGE Baltica are meant to evoke associations with the sea – in the first case, with the water god of Roman mythology, in the second, with the historical name of the crater that was an independent continent until the end of the Ordovician period. Both names refer to culture and history and are therefore intended to be image-enhancing.

Offshore wind farms on the Polish coast are part of the logic of economic growth, which is written directly into PEP2040. The energy transition, in its current phase, is not accompanied by reflection on the need to reduce the consumption of raw materials, nor is the agenda of limiting growth reflected at the European Union level. Instead, the concept of sustainable development appears.

> The document [PEP2040] was drafted in accord with the country's principle of sustainable development. Sustainable development has been defined as social and economic development in which a process of integrating political, economic, and social activities takes place, while the natural balance and sustainability of basic natural processes are maintained in order to guarantee the possibility of satisfying the basic needs of particular communities or citizens, both for the present generation and for future generations. (Pyć 2024: xii; own trans.)

The aim, therefore, is development, but one which is set in a natural context and takes into account the need to preserve fundamental natural processes. It is, however, intended to serve people only – it is concerned with future generations, while currently living organisms are

relevant in this view only insofar as they sustain the conditions for human life. This is still an anthropocentric vision.

Given that the greater the scale of offshore wind farms, the greater their harmfulness, the question must be asked: is economic growth with ethical energy production possible? A full answer is beyond the scope of this text, but existing research indicates that "green growth," that is, economic growth that would not involve resource consumption and carbon emissions, is impossible (Hickel & Kallis 2020). The normative recommendation emerging from the analysis would therefore be to reduce energy consumption.

/// Towards Cleaner Energy

Is "clean," ethical energy production possible in the Anthropocene? As the analysis has shown, it is possible to move towards more ethical ways of energy production, but even RES such as offshore wind farms, which are considered to provide "clean" and "green" energy, involve environmental problems. The complexity of both human and nonhuman, technological, economic, political, and ecosystemic planetary interconnections makes it impossible to avoid entanglement in suffering, destruction, and death. I agree with Maria Puig de la Bellacasa, who sees "interdependency as the ontological state in which humans and countless other beings unavoidably live" (Bellacasa 2017: 4). When it comes to energy production, it is not only the mode of production that matters, but also the question of scale. Reducing energy consumption seems inevitable on the road to more ethical energy production.

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/// Abstract

This article examines the ethical and environmental issues of offshore wind farms being developed on the Polish coast of the Baltic Sea. The main research questions are whether ethical energy production is possible,

whether renewable energy sources, such as offshore wind farms, serve as truly ethical energy sources, and what environmental problems are associated with their operation. The study applies Alexis Shotwell's concept of "impurity" and theoretical frameworks from the energy humanities, critical posthumanism, and feminist new materialism. The analysis reveals ethical paradoxes in renewable energy – while it does not directly emit greenhouse gases, its production and operation involve environmental burdens such as ecosystem disruption, resource extraction, and the reinforcement of neocolonial dependencies. The article highlights that achieving a more ethical energy production requires not only changing the source but also a reconsideration of energy consumption levels.

Keywords:
impurity, renewables, energy, Baltic Sea, offshore wind farms

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THE TAINTED SHADOW OF THE GREEN REVOLUTION: THE COBALT CONUNDRUM IN THE DEMOCRATIC REPUBLIC OF THE CONGO

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> Many point a finger of blame at the DRC [Democratic Republic of the Congo] and other poor countries for their poverty. Yet we don't seem to remember, or want to remember, that starting around 1870, King Leopold of Belgium created a slave colony in the Congo that lasted for around 40 years; and then the government of Belgium ran the colony for another 50 years. In 1961, after independence of the DRC, the CIA then assassinated the DRC's first popular leader, Patrice Lumumba, and installed a US-backed dictator, Mobutu Sese Seko, for roughly the next 30 years. And in recent years, Glencore and other multinational companies suck out the DRC's cobalt without paying a level of royalties and taxes. (Sachs 2021)

/// The Green Energy Revolution

The optimisation of energy (or raw material consumption) and the reduction of carbon dioxide are today – at a time of escalating concerns about anthropogenic climate change – economic concepts within the geopoliti-

cal mainstream (Yergin 2020; Gemenne 2021; Blanc 2023; Hulme 2023). The green energy revolution is heralded as a transformative movement towards clean, renewable sustainable energy and environmental protection. Central to this revolution is the idea of becoming totally independent from fossil fuels, and the adoption of eco-friendly technologies that reduce carbon emissions. However, the "dark side" of this green shift is that heavy reliance on critical minerals – particularly on cobalt, a metal extracted and processed in countries in the postcolonial world – is marred by significant ethical, social, political, and environmental challenges.

/// The Importance of Cobalt

Our species has been digging minerals from the ground practically since the beginning of its existence. When *homo sapiens* first appeared in Africa between 200,000 and 300,000 years ago, they immediately began digging for minerals to make tools. Stones, apart from being utilitarian, were often considered sacred. They were attributed the power of oracles and were used in religious rituals. They were considered a medium of transcendence. Mines became the portal between human territory and the realm of the gods. Nearly every mine in the premodern world was thought to be inhabited by some version of an earth spirit: a capricious creature, sometimes benevolent, but more often vengeful (Hunt 2018). Germanic miners, for example, whispered to each other about insidious elves, trolls, and kobolds. A Spanish thinker, Pedro de Valderrama (1550–1611), noted in 1617 that:

> The subterranean spirits are those who dwell in caverns and other recesses of the earth, where they kill or suffocate or render insane miners in search of precious metals. The Germans call them Kobolds. They are gnomes, dwarfs not over an ell in height, and they help in cutting stones, getting out metals, packing them in baskets and hauling to the surface. They laugh and whistle and perform a thousand tricks, but their services often redound to the injury and death of those whom they serve. They cut the ropes, break the ladders, cause the fall of rocks, send poisonous vapor; and you will see rich mines abandoned for the fear of them […]. It is they who cause earthquakes […]. They are not only the guardians of the mines, but of hidden treasures, which they allow no one to take. (Valderrama 1939: 474–475)

The term *kobold* gave its name to the metal cobalt (Greinert 2011: 10). This chemical element, with symbol Co and atomic number 27, is a critical component in lithium-ion batteries, which power everything from smartphones and laptops to electric vehicles (EVs) and renewable energy storage systems. Its properties enhance battery stability, energy density, and lifespan. Lithium-cobalt batteries are considered much more ecological than old lead-acid and nickel-cadmium batteries. Currently, a smartphone battery contains only 5 g to 10 g of refined cobalt, but a single EV battery can use up to 15,000 g (Lewicka 2007: 6–7; Fletcher 2011).

The EV sector is now by far the largest cobalt consumer – it currently accounts for 45% of total cobalt demand, with this share continuing to rise (Cobalt Institute 2024: 6). In addition, cobalt-based superalloys are also used in environments that require high strength and resistance to extreme temperatures and corrosion – these superalloys are critical in the aerospace and power generation industries (Wang 2006). Cobalt acts as an effective catalyst in several chemical reactions, particularly in the petrochemical and plastic industries. It is used in the synthesis of hydrocarbons and the production of polyester and other plastics (Olivetti et al. 2017). It can be added that cobalt-based blue pigments (cobalt blue) have been used since antiquity for jewellery and paints, and to impart a distinctive blue tint to glass (the oldest cobalt-coloured glass is from the eighteenth dynasty of Egypt, 1550–1292 BC) (Rehren 2003).

In May 2018, the US Department of the Interior, in coordination with other executive branch agencies, published a list of 35 critical minerals: it included cobalt (United States Department of the Interior 2018). In the twenty-first century, cobalt has become an extremely valuable metal. In June of 2024, the price of cobalt had decreased by 1,985 USD/T or 6.81% since the beginning of the year, according to trading on a contract for difference that tracks the benchmark market for this commodity. Historically, cobalt reached an all-time high of 95,250.00 USD/T in March of 2018 (Trading Economics 2024).

The Democratic Republic of the Congo (DRC) – one of the poorest countries in the world, with a long history of exploitation by foreigners, who exported rubber resin, ivory, and copper in the nineteenth and twentieth centuries (Hochschild 1998) – is home to over 60–70% of the world's cobalt reserves (4,000,000 tonnes). The country has suffered from a resource curse relating not only to cobalt but to a range of other minerals, including copper, uranium, tin, zinc, coltan, and diamonds (Davidson 2016: 32). The Katanga region (formerly Shaba province), particularly around the cities

of Kolwezi and Lubumbashi, is rich in cobalt, which is often found alongside copper deposits. This region has almost 40% of the global reserves of cobalt. Other African countries, such as Madagascar, Morocco, Zambia, and South Africa, also have cobalt deposits, but their contributions are significantly smaller compared to the DRC. Other significant producers of cobalt include Australia (1,500,000 tonnes), Indonesia (600,000 tonnes), Cuba (500,000 tonnes), the Philippines (260,000 tonnes), Russia (250,000 tonnes), and Canada (220,000 tonnes). In total, annual global cobalt production reaches 200,000 tonnes, with the DRC contributing just under 150,000 tonnes to the mix. The demand for cobalt is forecasted to more than double by 2030 to 400,000 tonnes (Kapusta 2006; Kalantzakos 2019: 8–9). It should be stressed that the cobalt economy, based on the extraction and only initial processing of the raw material, perpetuates the neocolonial logic of exporting low-processed goods from the so-called Third World to former colonial countries, as well as to other countries: India, Australia, and especially China, which currently has approximately 65% of the world's cobalt refining capacities (Deberdt & DiCarlo 2024). A significant proportion of DRC miners, who extract cobalt, have never seen EVs, and most users of EVs and mobile devices have never seen people working in Congolese cobalt mines. The radical energy transition planned by the European Union, including a total ban on registering cars powered by combustion engines, depends on cobalt supplies (Alves Dias et al. 2018). This once again turns the West's gaze to Congo, but China is competing with Europe and the United States for influence in the country. International corporations, such as the Chinese CMOC Group Limited and the Swiss Glencore, are the primary entities engaged in cobalt mining. It is worth emphasising the role that China plays in this sector of the neocolonial global economy. The economic and political dependence of the DRC on external entities results in limited opportunities for the development and implementation of the DRC's national interest. It can be said that China is winning the resource (cobalt) war with other countries (Gulley et al. 2018). Chinese firms (not solely CMOC Group Limited), because of their strong relationship with the DRC, now globally control almost all the cobalt refineries. In 2008, China and the DRC signed a controversial agreement to exchange mining concessions for infrastructure and development assistance. The Sino-Congolese mining company Sicomines (Sino Congolaise des Mines) was set up as a joint venture between Gécamines (a state-controlled corporation founded in 1966 and a successor to the Belgian Union Minière du Haut-Katanga) and a consortium of Chinese companies led by

Sinohydro and China Railway Engineering Corporation (Neema Byamungu 2022: 5–8). The Chinese quickly purchased fifteen of the DRC's top nineteen large-scale mines (LSM), which produce more than 80% of the world's refined cobalt. The largest cobalt refiner in the world, with a 20% market share, is Huayou Cobalt. Huayou is the owner of Congo DongFang Mining, one of the largest copper and cobalt mining companies operating in the DRC (Sinclair 2020).

/// The Democratic Republic of the Congo: Ground Zero

Cobalt mining represents a significant source of revenue for the DRC. It attracts substantial foreign ventures and contributes to the country's GDP. Certainly, it should contribute, though shady transactions are commonplace in the mining sector. The DRC has been judged to be, in many ways, a type of violent kleptocracy, in which the ruling regime and its networks of business partners and facilitators maintain control over some of the country's most valuable assets. Corporate governance lacks transparency, and there is endemic corruption (McFerson 2009; Matti 2010).

In the DRC, state institutions that should have control over the mining sector function poorly. The army, the Republican Guard, the paramilitary members of the Support and Supervision Service for Small-Scale Mining (Service d'Assistance et d'Encadrement de l'Exploitation Minière à Petite Echelle is a Congolese government agency), and different rebel groups control a number of mines and extract large amounts of revenue from them (Callaway 2018: 19). These entities are partly responsible for land conflicts, the exclusion of the indigenous people, widespread crime, and the almost total absence of the rule of law. The changes the DRC made to mining laws in 2002 and in 2018 attracted new investments in copper and cobalt projects. However, the economic benefits have been unevenly distributed. A considerable portion of the profits from cobalt mining still ends up with foreign corporations and local elites, while the majority of the population remains impoverished (Spittaels & Hilgert 2010: 177–178).

Perhaps the most pressing concern with cobalt mining in Africa is the human rights abuses associated with artisanal and small-scale mining (ASM), a kind of bootleg mining arousing associations with the preindustrial world as it is largely not mechanised: it relies frequently on hand tools and basic extraction methods. The DRC Chamber of Mines and the International Institute for Sustainable Development estimate that about 2 million Congolese are involved in ASM, while the global union IndustriALL

puts the number at more than 12 million (United States Department of Labor – Bureau of International Labor Affairs 2020: 427). According to an official from the environment department of the Ministry of Mines, artisanal extraction takes place in less than 1% of the DRC's mining area, whereas the head of an artisanal miners' cooperative claims that ASM contributes 80% of coltan production (Putzel & Kabuyaya 2011: 19–20). The importance of ASM was noticed by, among others, researchers from the Geneva Center for Business and Human Rights, who clearly stated that without ASM cobalt, traders will not be able to meet a global demand that is projected to multiply eightfold by 2026 and fourteen times its current levels in the next decade (Baumann & Cremer 2020: 1).

The topic of ASM entered the media discourse at the beginning of the twenty-first century. Alarming descriptions of the working conditions of miners have appeared regularly in newspapers such as *The Washington Post* and *The Financial Times*. The BBC, CNN, and Al Jazeera have made several videos on the topic. Amnesty International has published reports on the situation of cobalt miners in the DRC. The most comprehensive analysis of the system of ASM in the DRC is contained in *Cobalt Red: How the Blood of the Congo Powers Our Lives*, written by Siddhart Kara in 2023. Kara specialises in modern slavery (*Sex Trafficking: Inside the Business of Modern Slavery*, 2009; *Bonded Labor: Tackling the System of Slavery in South Asia*, 2012; *Modern Slavery: A Global Perspective*, 2017), and he adapted his methodology from slavery research to describe the ASM and LSM systems in Africa. Through a journalistic investigation, he gathered shocking testimonies from Congolese people and found that many individuals endure immense suffering and even die mining cobalt. He asserts that cobalt mining is the pinnacle of the slave plantation system.

According to the research conducted by Kara, the majority of miners in ASM work in extremely hazardous conditions. No one maps the excavations or conducts research drilling. Untrained workers dig tunnels, break rocks, and wash minerals with their bare hands. They earn 1–5 USD daily. Many Africans work in mines under the control of Lebanese, Chinese, or South Asian businessmen. There is little to no regulation. The workers lack basic protective gear and safety protocols. The risk of accidents, such as tunnel collapses, is high, leading to frequent injuries and fatalities.

Nevertheless, this illegal and quasi-legal sector is integrated with formal structures, involving miners (*creuseurs*), agents (*négociants*), trading houses (*comptoirs*), and government oversight agencies. The *comptoirs* purchase minerals from the local market and either process them to some degree or

sell them directly to LSM, factories, or industrial mining companies. Women and children are the main victims of this phenomenon, primarily because they are more involved in the informal, or "grey," economy. Women in ASM also face heightened risks of gender-based abuses like sexual violence and economic control (Amnesty International 2017; Kelly et al. 2014).

The mining process exposes the Congolese miners to toxic metals and dust. Metallic cobalt dust and sparingly soluble cobalt salts are classified as carcinogens. A powdered mixture of cobalt and tungsten causes lung diseases, bronchial asthma, and fibrosing alveolitis (Roto 1980; Morgan 1983; Domingo 1989). Scientists have noted high radioactivity levels in mining regions. The physical demands of mining, coupled with the lack of protective equipment, result in numerous health problems for thousands of Congolese.

Many miners work under conditions of forced labour; they are coerced by economic desperation, debt bondage, or threats of violence. These workers are often trapped in a cycle of exploitation, where they earn barely enough to survive, let alone pay off their debts or improve their living conditions. The lack of viable economic alternatives forces them to remain in these exploitative situations.

Human trafficking is another grim reality in the cobalt mining sector. Individuals, particularly from vulnerable communities, are lured by the promise of work and a better life, only to find themselves exploited and enslaved in the mines. They are often subjected to physical abuse, confinement, and threats against their families, leaving them with no means of escape.

Apart from the context of bonded labour and slave labour, it should be added that the volatile nature of the cobalt market means that many communities in the DRC are subject to global economic instability. Price fluctuations can lead to sudden drops in income, exacerbating poverty and insecurity. Traditional lifestyles and community structures are often displaced by mining operations (Bolay & Calvão 2022). Additionally, the lure of earning money from mining draws children out of school, perpetuating a cycle of poverty and lack of education. Social services, such as healthcare and education, are frequently neglected in mining areas, further entrenching poverty.

A further impact of mining is related to the ecological crisis in the DRC. Open-pit mining, which is common in the country, leads to deforestation, soil erosion, and contamination of water sources with heavy metals. The mining process, both in LSM and ASM, generates toxic waste that poses risks to local ecosystems and communities. The long-term environmental degradation threatens biodiversity and the health of residents in mining areas (Hund & Megevand 2013: 2–5, 44–45).

/// An Economy of Invisibility

The example of the exploitation of cobalt deposits in the DRC shows that the energy transformation benefits people other than those who bear its greatest costs. Those who perform the most dangerous and least paid work related to cobalt mining live in a completely different social reality than the users of electric cars (with opposite economic, legal, and technological conditions of existence) and are therefore invisible to them. Given that the labourers are primarily citizens of the DRC, the energy transformation presupposes an epistemological operation in which non-white labourers, including children, are removed from sight. Rich residents of wealthy cities, concerned about the purity of the air they breathe, cannot see poor people using simple hand tools to dig underground tunnels (Lennon 2020: 937).

Contrary to progressive slogans, the energy transformation is the realisation of a long-familiar Occidentalist idea of modernisation (Ajl 2021), which has been taken over by new actors in geopolitics, especially China. This idea assumes a story whose setting is at the centre of the world rather than at its periphery, but today the division into centre and periphery is not necessarily a division into the West and the rest of the world. Given the difference between the manual labour involved in cobalt mining in the DRC and the consumption of the corresponding goods and services by people with the economic resources to do so, it should be concluded that the distance between the two social realities (Smith 2022) is both spatial and historical – these are two different, though related, economic eras. From this point of view, whenever we talk about the energy revolution, we should keep in mind the territorial limitation of the concept.

Reports about cobalt mines in the DRC and photos that can be found on the Internet bring to mind the Manichean model of the relation between coloniser and colonised that Frantz Fanon presented in his classic book (Fanon 1963: 39). On the one hand, there is the world of the master, that is, the world of wealthy, healthy, physically, and morally clean people, and on the other hand, the world of the servant or even slave, that is, of miserable, dirty people.

/// The International Response and Corporate Responsibility

In 2007, the DRC became a signatory to the Extractive Industries Transparency Initiative (EITI), which requires that the details of mining contracts be made available for international scrutiny. The EITI multi-stakeholder

group, which includes government, business, and civil-society representatives, is supposed to require mining companies in Congo to publish their contracts as part of the EITI disclosure. So far, however, the impact of the EITI has been limited due to lack of implementation (ITIE–RDC 2023).

In 2022, the Inter-Ministerial Commission to Combat Child Labour in Mines and Artisanal Mining Sites launched the Child Labour Monitoring System. The Ministry of Labour of the DRC began recruiting for 2,000 labour inspectors and controllers, some of whom are to be trained to conduct inspections at mine sites. Furthermore, the ECG (Entreprise Générale du Cobalt) was meant to play a significant role in formalising the flows of cobalt and circumventing the Chinese trading houses. However, the effectiveness of these actions leaves much to be desired. The new laws are not respected due to political chaos and the activity of various rebel groups in the DRC. Numerous lucrative mining agreements are signed in opaque deals between unaccountable and unelected political leaders, mining companies, and other economic operators (Kippin 2008). Child labour, human trafficking, and exploitation are rampant in mining communities, and the response of the authorities to these problems has been de facto nonexistent.

Various international initiatives and organisations are working to improve conditions and eliminate child labour from the supply chain. A World Economic Forum (WEF) white paper in 2020 outlined the current state of artisanal cobalt mining in the DRC and offered recommendations to make the industry fair and safer. According to the WEF, the formalisation of ASM practices should be an essential step to address the widespread human rights problems that are prevalent at Congolese mining sites (World Economic Forum 2020).

Today the most important initiatives in regard to the cobalt economy are the Cobalt Institute (CI), the Responsible Cobalt Initiative (RCI), and the Fair Cobalt Alliance (FCA), which aim to promote responsible sourcing practices and improve the livelihoods of miners and their families. The Cobalt Institute, formed in 1982, is a trade association composed of producers, users, recyclers, and traders of cobalt. The Institute cooperates with the International Council on Mining and Metals (Cobalt Institute n.d.). The Responsible Cobalt Initiative was established in 2016 by the Chinese Chamber of Commerce for Metals, Minerals, and Chemicals Importers and Exporters, in collaboration with the Organisation for Economic Co-operation and Development. The Fair Cobalt Alliance was founded in 2020 by Fairphone, Signify, and Huayou Cobalt. The primary objectives of these three initiatives are to promote the sustainable and responsible

production and use of cobalt in all its forms, to promote cooperation between all stakeholders, especially on issues of human health, sustainability, and responsible sourcing, to eradicate child labour, to mitigate the environmental impact of cobalt mining, and to enhance transparency in the supply chain to ensure that cobalt is sourced responsibly.

In accord with the CI, RCI, and FCA postulates, major technology and automotive companies have pledged to source cobalt responsibly. Corporations like Apple, Tesla, and BMW have committed to ensuring their cobalt supply chains are free from child labour and human rights abuses. However, achieving this goal is challenging due to the complexity and opacity of the supply chain. Ensuring traceability in the chain is complex, and illegal mining and smuggling still remain significant problems.

Certainly, eliminating bonded labour and slave labour in cobalt mining requires a multifaceted approach (Diemel & Hilhorst 2019) and not solely corporate outsourcing of responsibility (Calvão et al. 2021). Strengthening regulations and improving enforcement are essential steps. Governments, particularly in the DRC, need to enhance their capacity to monitor and regulate mining activities, ensure compliance with labour laws, and provide social services to vulnerable communities.

Investment in education and alternative livelihoods is also crucial. By providing families with viable economic alternatives and ensuring children have access to quality education, the reliance on child labour can be reduced. Community development programmes that focus on health, education, and economic empowerment can create a sustainable pathway out of poverty for mining communities.

/// Conclusion: The Green Revolution Begins Locally

In 2012, a Canadian author, Andrew Nikiforuk, published *The Energy of Slaves: Oil and the New Servitude*. In this controversial book, Nikiforuk formulated the following thesis: the energy institution of slavery has shaped our careless use of fossil fuels (Mouhot 2011); currently, a moral revolution in our attitudes towards energy consumption needs to occur. According to Nikiforuk, the only way out is by reducing the demand for energy – a call as radical as abolition was two centuries ago.

Nikiforuk imagines a future where industrial people use 90% less energy than today. Such thinking has a slightly utopian tone, although it contains slogans attributed to radical supporters of the green revolution. In this kind of discourse, it is worth noting Nikiforuk's use of the slogans

"liberation" and "abolition of slavery." The first phase of this "emancipation" – assuming decarbonisation becomes real – could involve a thorough restructuring of the cobalt economy.

In this era of escalating climate change concerns, the green revolution promises – even in a less radical version than Nikiforuk proposes – a sustainable future, but the reliance on critical minerals casts a dark shadow over this vision. As the example of the Congolese cobalt mines shows, energy slavery is not just a metaphor with which to describe our relationship to the environment, it is a painfully concrete term – climate change, in requiring the search for energy technologies based on critical raw materials, is a new justification for enslaving people (Babie 2017: 39). Contrary to expectations, the fight against the anthropogenic causes of climate change has not led to a more equitable economy, without the exploitation of poor communities. The extraction of raw materials needed to produce batteries for electric vehicles reinforces phenomena well known from the past, including from Europe's colonisation of Africa (Neville 2020; Blaszkiewicz 2021). As organised labour protests in the DRC show, contemporary exploitation by multinational corporations is seen as an extension of colonisation, that is, the economic control of a less-developed country by rich countries, including former colonial ones (Rubbers 2009, 2010). This is both a spatial and temporal phenomenon, as it means not only the subjugation of entire societies to the consumption needs of the richest part of humanity, but also the stunted development of these nations, along with the effects on their future generations (Babie 2017: 52).

However, the situation in the DRC is not solely the consequence of the global race for raw materials (Vogel 2022). The new dimension of global inequality as a side effect of counteracting the effects of climate change calls into question the idea of a just energy transition. At the same time, it creates the need for legal regulations, which are at least as important as new technologies. "Climate change alters society in fundamental ways, entailing new forms of power, inequality and insecurity – together with new forms of cooperation and solidarity. Moreover, since national boundaries do not limit climate change, national responses are insufficient." (Beck et al. 2013: 2)

Addressing the ethical and environmental challenges of cobalt mining is imperative to ensure that the transition to renewable energy is truly sustainable and just. This transition should not come at the expense of human rights, including the rights of those involved in the manufacture of sustainable energy products. To ensure that the negative impacts of cobalt mining are minimised, comprehensive reforms are needed. The establishment

of effective recycling mechanisms (Church & Wuennenberg 2019) and the production of lithium-iron batteries could alleviate the pressure on mining activities and reduce the need for continuous extraction from vulnerable regions like the DRC. Ultimately, the transition to cleaner energy requires more than just technological advancements. Priorities should include improving governance and regulatory frameworks in the cobalt economy, investing in responsible community development, supporting miners' organisations, and promoting sustainable mining practices. Addressing these issues requires a coordinated effort from all the stakeholders: international corporations, Chinese and African governments, consumers, and – the most overlooked link in the chain – the producers (miners, who may have no idea of their place in the global cobalt production chain and may not even have seen an electric vehicle).

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/// Abstract

The aim of this article is to characterise the system of the cobalt economy. The introduction presents the importance of cobalt for the green energy revolution. The production chain and the role of the main entities that co-create it are described. Then, the functioning of cobalt mines in the Democratic Republic of the Congo – including both large mines managed by corporations and artisanal small-scale ones – is discussed. Attention is drawn to phenomena such as forced labour, bonded labour, slave labour, child labour, the situation of women, and violations of all health and safety

standards in mines. The article ends with an analysis of the effectiveness of international initiatives aimed at improving the situation of producers and implementing the idea of sustainable development.

Keywords:
green energy revolution, cobalt, Democratic Republic of the Congo, artisanal and small-scale mining, modern slavery, neocolonialism

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FUMELESS CITIES AND DEATH RAYS: AN ARCHAEOLOGY OF FANTASTIC ENERGY SOURCES IN POLISH SCIENCE FICTION OF THE INTERWAR PERIOD

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On 6 January 1939, the pages of the daily *Dzień Dobry!* carried the following headline: "The car of the future on the streets of Warsaw. *An electric devil* without petrol, oil, gearbox, or clutch" (Wr. L. 1939: 4).[1] While contemplating the Anthropocene, it is worth looking back and wondering what people in the prewar period thought the machines of the future would feed upon? How did they think energy would be consumed in the cities of the future, and, more importantly, are today's various media and pop-culture visions of the future in fact characterised by the unconscious reproduction of modernisation and modernist narratives of a hundred years ago? It should also be remembered that these practices of reproduction seem to have influenced the philosophy of longtermism, a recently popular trend in thinking about the future.

/// An Archaeology of Imaginary Futures, or Reading Science Fiction as a Method?

The issue of energy can be considered in various contexts and using various research approaches. Scholarly and popular-science studies can be consulted, or, as in the quote that begins the article, newspaper sources can be

[1] Unless stated otherwise, all translations are my own.

used to examine the press discourse on energy before 1939. In the following article, I have primarily looked at Polish science fiction.

It is worth noting, as Ruth Levitas does, that H.G. Wells considered the creation of utopias, and perhaps even science fiction, to be a practice belonging more to the social sciences than to fiction (Levitas 2013: xi). In turn, Fredric Jameson noticed that what utopias – and therefore utopian or dystopian science fiction – tell us about the most is the present in which they were created. He called this "shifting the discussion of Utopia from content to representation as such" (Jameson 2007: xiii), and said that science fiction often differs from fantasy simply in that it carefully highlights the economic properties of its past and future (Jameson 2007: 60). It is not surprising that the topic of energy and its new sources is quite frequently discussed in science fiction.

In my reflections on the history of Polish science fiction, I have long proceeded from the assumption that science fiction most often presents imaginary futures (Barbrook 2007). These futures not only mirror social trends and the common notions of a given era, but they take an active part in marking out future realities and imagining where culture (and not solely technical culture) should go. They remain in a constant relationship or tension between the past, the present, and the future.

I have described the exploration of science fiction in search of imaginary futures – in this case concerning energy sources – as an archaeology. I therefore feel obliged to explain that the term is not so much – or not only – a reference to the title of Fredric Jameson's famous book but that it is rather a reference to Siegfried Zielinski's concept of media archaeology (Szydłowski & Zielinski 2014) and to the methods of archaeology as an academic discipline based largely on reconstructing social life from incomplete material remains, and (in my opinion) on speculative thinking. The aim of archaeology is not only to formulate problems and analyse them, but also (or rather) to discover and describe the layers of material remains of the past. Similarly, my goal is to describe what is hidden within the common, collective imagination of the past and the future – elements that may have been forgotten or are overlooked but that are still influential, resonant, and capable of building bridges between present and historical social imaginaries. This approach explains the variety of topics in this paper and the frequently descriptive nature of my argumentation, which seeks to provide a comprehensive cultural context.

For me, Polish science-fiction narratives from before 1939 are a reservoir of overlooked imaginary futures and can tell us a great deal about

both the present and the past. Like many other such futures, these are part of the social imaginary. As Charles Taylor writes, this term refers to the set of ways, practices, and knowledge in which "people imagine their social existence, how they fit together with others, how things go on between them and their fellows" (Taylor 2004: 23). However, as he clearly points out, such an idea of social reality is "often not expressed in theoretical terms, but is carried in images, stories, and legends" (Taylor 2004: 23). Perhaps this is why science fiction can be simultaneously appreciated and disregarded, as some scholars in the social sciences and cultural studies do. For example, Kazimierz Krzysztofek considers science-fiction creators to be the only ones capable of extrapolating trends and somehow predicting the future, because unlike academics, they are "intuitionists," that is, they operate on the outskirts of theory – they practice imagining the future and otherness without being limited by the methodology of their scientific discipline. However, Krzysztofek is at once obliged to emphasise that "there is a problem with science fiction, however, [in] that it often spins too fantastic visions (the proverbial flying cars, the curability of all possible diseases)" (Krzysztofek 2018: 25). For some scholars, science fiction turns out to be too far removed from both theory and real life.

Science-fiction writers, however, may influence the reality of academic disciplines (especially, as Krzysztofek writes, hard science), and they and their works may create the social imaginary of their era, which includes its imaginary future.

Science-fiction writers are an essential component of this imaginary precisely because they are people intensively engaged in the practices of its expression and transformation. Their intuition aligns with what humanists and scholars of cultural studies refer to as "anthropological imagination." This ability allows them to perceive cultural contexts and navigate the social imaginary in a way that, according to Charles Taylor, transcends traditional scientific methods. As John Tresch writes of Poe in his book *The Reason for the Darkness of the Night: Edgar Allan Poe and the Forging of American Science*: "His work embodies its defining tensions: between popular diffusion and elite control, between empathy and detachment, between inspired enthusiasm and icy materialism" (Tresch 2021: 17). I mention this book because it is not just another biography of Poe but is an attempt to define the relationship between the modern, positivist sciences emerging in the USA and the realms of fantasy and science fiction. Tresch emphasises the intricate connections, mutual influences, and often-overlooked aspects of this relationship. For example, many writers and journalists, including

Poe, wrote scientific treatises, and scientists once believed in theories now deemed highly unscientific (Haska & Stachowicz 2019). Interestingly, scientific meetings and lectures often took place in the same venues and at the same time as performances by magicians, spiritualists, and trained animals (Forajter 2014; Tresch 2021: 9–10). In the next century, science in both Europe and the United States appeared to have reached an entirely different stage of development, characterised by institutionalisation and established funding principles. However, this advancement was accompanied by strong echoes of nineteenth-century practices; meta-psychological congresses were convened at the University of Warsaw, university researchers authored science-fiction novels, and science popularisers envisioned the future of science (Haska & Stachowicz 2019). The extensive relations between practising science and creating science fiction remain strong.

It is very easy to illustrate the important role played by science fiction in the social imaginary by referring to English-language literature, but it is much more difficult to answer the questions of whether there were Polish equivalents, whether these works resonated in Poland at the time of their publication, and whether Polish readers could become familiar with certain visions of the future. However, this article does not aim to show the deep mutual entanglements between the science fiction of various countries. I will focus instead on selected visions of the energy sources of the future, and in the above paragraph I have only tried to point out that science fiction is not pure, escapist entertainment, and that contact with it is not "innocent." In turning to selected examples of Polish science fiction, I will try to refer to the broader background of popular science discussions on energy, and to the ideas and works of those times that are not necessarily Polish. We can examine energy sources through various lenses: lighting, transportation, industry, agriculture, and household operations. I will primarily look at literature featuring utopian depictions of future cities. These texts frequently contain lengthy passages dedicated not only to "miraculous inventions," modern gadgets, and the speculative future of science, but they also attempt to describe energy acquisition systems in future societies. Furthermore, it is important to note that the examples discussed below do not encompass the full range of ideas posited in regard to alternative energy sources by Polish science-fiction writers of the interwar period.

/// Coal and "Four Sweaty Horses": Why Were New Sources of Energy Sought?

I will begin my search for imaginary alternative energy sources by outlining a nonfictional urban context. The energy problems of a large interwar city were similar to those of today: high demand, pollution from unbalanced consumption, and the need for lighting. However, it must be clearly stated that these problems occurred in a different context. The "modern city" of that era was not the same as today's "smart city"; it was full of innumerable chimneys and smoke. It is not surprising that discussions about pollution first appeared on such a scale in the context of urban development. It was also then that the search for the energy sources of the future and ways to reduce the emission of harmful smoke began (Crane 2023).

Today, fossil fuels are presented as a source of pollution, to which alternatives should be sought. Combustion engines, coal-fired power plants, and boiler rooms are seen as sources of smog, stench, and other kinds of pollution. They are contrasted with electricity drawn from renewable energy sources, nuclear power, and geothermal heating. Let us imagine, or perhaps recall from historical films and books, that during the interwar period and earlier the problem of "clean" energy sources looked a bit different and was often closer, especially in Poland, to those that plagued the inhabitants of populated and industrialised areas in the nineteenth century (Orłowski 2018: 20–25). Draft animals were still a serious source of both energy and pollution. The large number of horses in cities caused a form of pollution (through their manure and its odour) that has now practically disappeared from imaginings of a "polluted city."

From this perspective, energy sources that seem harmful today were once regarded as innovative, alternative, and, as we might say today, "ecological," in the sense of being less burdensome for nature and humanity. Cars with internal combustion engines (and even steam locomotives) were perceived as machines that were "cleaner" than horses and that freed cities from the ubiquitous stench of horse droppings. Meanwhile, there were not many cars in Poland, and moreover, there was a problem with passable roads (Newman 2021: 47). This is how the scientist, writer, and populariser Bruno Winawer saw Polish backwardness. He wrote a column about the progress of the automobile in the United States in comparison to a trip to the outskirts of Warsaw: "In the meantime, four sweaty horses are pulling us through the woods at a speed of eight kilometres per century" (Winawer 1927: 64).

The energy sources of the future were therefore supposed to solve a problem that had plagued the most industrialised regions of the world for a long time but that was named only at the beginning of the twentieth century – smog. In the British Empire, the famous "London specialty," its "pea soup" – a thick, smelly, and poisonous mixture of smoke and fog – became part of the emerging pop culture in the second half of the nineteenth century. Smog was a serious ecological problem for the capital of the empire, which was at the same time the most populous and most industrialised metropolis of the West. No wonder that descriptions of poison fog and fumes were important elements of those English fantasy stories and novels that today we would describe as post-apocalyptic or catastrophic, including William Delisle Hay's famous book of 1880, *The Doom of the Great City, Being the Narrative of a Survivor, Written A.D. 1942*. The poisonous fog also appeared in other developing cities, although not as spectacularly (due to geographical or other conditions). For example, in 1873, a "fog" that was thick enough to cause carriages to collide was observed in Warsaw. In 1905, Dr Henry Antoine Des Voeux, a member of the London Coal Smoke Association, introduced the term "smog," which was shortly picked up by the press. Smog and smoke were caused not only by industrial plants, power plants, and combined heat and power plants, which were often located close to housing estates in industrial districts (in Warsaw, the Powiśle Power Plant was located just a few hundred metres from a main street, Krakowskie Przedmieście), but also due to the lack of central heating, and due to the lighting of rooms and streets. Additionally, gas was not yet widely used for cooking. During this time, households relied on various kinds of furnaces that burned not only coal but also a range of other available fuels, many of which were more harmful. For this reason, coal could be considered both as a modern energy source and a troublesome one. Properly processed coal was supposed to be a solution to pollution problems. Coking coal in particular, which was popularly known as coke, was thought to be a remedy for the smoke and smog plaguing large cities, and attention was drawn primarily to its "smokelessness." The British authorities recommended switching to coke as part of the fight against pollution after the Great Smog of London in 1952. It is no wonder then that Ritchie Calder, a populariser of science who was also read in Poland in the 1930s, predicted that Great Britain would use domestic coal deposits for the next 500 years (Calder 1936: 91), and if properly processed and obtained in a modern (automated) way, coal could be the fuel of the future. In Poland, even unprocessed coal became a symbol of progress and

a brighter future. During the interwar period, discussions of coal focused less on pollution and more on modernity and the ambition to build a contemporary, industrialised nation. Despite a truly significant civilisational leap and ongoing economic development, Poland was a country whose official (propaganda) image was largely based on envisioned progress and imagined power – I call it an "imaginary Poland" (Haska & Stachowicz 2015). For context, in the interwar years, Germany produced eleven times more electricity than Poland did (Orłowski 2018: 26). The greatness of the port of Gdynia, which has been celebrated in Polish culture, was also built on coal. After the English miners' strike in 1926, "by the second half of the 1930s, Gdynia ranked first among all Baltic ports in terms of the number of goods trans-shipped. However, this achievement was primarily due to the coal trade, which accounted for 82% of all transshipments in 1932" (Szczerski 2010: 209).

/// A City without Smoke

Did Polish science fiction take note of the problem of pollution from fossil fuels before 1939?

The threat of smog was problematised, spread, and became part of the Western social imaginary (among other means, thanks to the extremely popular works of Sir Arthur Conan Doyle, which were also published in Polish). Modernity seemed closely associated with smoke and industrialisation, but in the future, science was to help overcome these difficulties, including through universal electrification and finding alternative energy sources. In Polish science fiction as well, the cities of the future were free from smoke. In the novel *Ludzie elektryczni* [Electric People] by J. Kruk (the pen name of Edmund Krüger), which was first published in 1912 and reprinted several times after 1918, Poles establish a futuristic city called Elektropolis in the Sahara Desert. The city is described as free from air pollution: "In this city, there are also many industrial plants, many factories… But nowhere can you see the towering chimneys that disfigure the landscape and spread smoke and soot around…" (Kruk 1912: 119). However, this was not a city of the kind that dominates visions of the future then and now:

> A huge, powerful city, with hundreds of houses scattered everywhere, with factory buildings, with industrial plants. But this city is also strange. The houses in it do not stand clustered together,

> one next to the other; they are separated by gardens, full of greenery, full of plants. […] And these houses are not huge tenement houses, not those "skyscrapers," rising high into the air, defying all hygiene requirements, serving as breeding grounds for diseases, anthills, swarming with human throngs. (Kruk 1912: 117)

In terms of architecture, it resembles more the colonial idea of an oasis of the future than it does Dubai, which is considered a futuristic city today. A similar city of the future is Warsaw of the twenty-second century in Stefan Barszczewski's novel *Czandu*, which I have written about many times and which I believe is a model example of the interpenetration of science fiction with the modernisation thinking of the Second Polish Republic (Stachowicz 2021). The new Warsaw has been built on the ruins of the old one, which had not been destroyed during a war, but rebuilt like Paris during the Second Empire, in accord with modernist ideas close to those we find, for example, in *Wiadomości Literackie* magazine. "Only the venerable market square of the Old Town, the former Royal Castle, and here and there a historical building that did not interfere with the implementation of the regulatory plan survived" (Barszczewski 1925: 25). This plan has turned Warsaw into a huge garden city without a "system of monstrous skyscrapers of the sky" (Barszczewski 1925: 25). This was not what made the city so unique, though. "What was most striking in the new city, however, was the transparency of the atmosphere, the lack of smoke and soot, and the absence of the chimneys so characteristic of old buildings" (Barszczewski 1925: 26).

/// The Untapped Energy of the Future

The reason of course was the power of electricity, which we find in the title of the novel *Electric People* and the name of the city of the future, Elektropolis – a city to which the journey itself becomes a journey to another era. "Through the streets of the city, running in a straight line, the light cars of the electric tram move quietly, without a murmur… The same line, but used for transporting loads, connects the city with the nearest station of the railway, going to Algiers" (Kruk 1912: 118). The railway is here already a representative of the departing vision of modernity: the age of steam and iron. Lightness, silence, and electricity are the future.

Electricity, although known for years, still belonged (as today) to the imagined future, as can best be seen in the writings of interwar popularisers of science:

> What does the future of electricity look like? We answer: the future and electricity are the same. Progress, especially that made since the beginning of this century – the introduction of telephones, the transmission of energy without the use of wires, X-rays, artificial solar lighting, etc. – make it almost impossible to set any limits to further progress. (Calder 1936: 87)[2]

The fictional inventor Halicz explains his city to newcomers in a similar spirit. "Everything you will see here, gentlemen," he said, "owes its movement, its life, to this mysterious and hitherto insufficiently known and unexploited force that is electricity. This city serves as proof of its power and strength, and, for this reason, it is called Elektropolis – the electric city" (Kruk 1912: 127).

Such cities use electricity, the energy of the future, but in a special way because it is not based on the old sources. Finally, in the future, it will be possible to say with relief that "the age of hard coal and wood as fuel has irrevocably passed. Electricity has taken over omnipotently, providing heat and the driving force in industrial plants, and spreading the exchange of thoughts and images of events throughout the world, and its source was not black, stinking, smoking coal, extracted with hard work from the depths of the earth" (Barszczewski 1925: 26).

Perhaps we should therefore talk about alternative energy sources that involved transforming and evolving existing methods of obtaining energy – for instance, about the development of combustion engines, the exploitation of fossil fuels, and other methods that populated visions of the future and appeared in popular-science publications, scientific and technical experiments, and the pages of science fiction.

There is no smoke in the future city because "clean electric energy" in today's sense has taken over and is produced in ways that at the time seemed futuristic but were not impossible. It was a kind of hard science fiction, where the development of existing technologies was explored and anticipated. In *Czandu*, the source of clean electrical energy is "white coal – water" (Barszczewski 1925: 26). "The practical exploitation of the enormous power of sea and ocean tides, as well as of waterfalls and mountain streams, provided more than enough electric current to heat all the houses and run all the railways and workshops in the world" (Barszczewski 1925: 26). In *Czandu*, the dimension of the energy revolution is, if not global, then at least encompassing the region that is today called the Global North. In

[2] Translated from the Polish translation of the English original.

this novel, the effects of the energy revolution are not environmentally neutral, but the price of progress is supposed to be low:

> Although as a result of the intensive exploitation of this force of nature, the beautiful views of Schaffhausen, Giessbach, Staubach, Tivoli, Feveroera, Imatra, Niagara, Juansectlan, Victoria, Iguassu and so on, which were so enchanting for our romantic ancestors, ceased to exist, what did this immaterial loss mean in comparison with the material benefits, in comparison with the relief of human work, the facilitation of human life, the disappearance of those dirty coal trains circulating day and night on all railway tracks, polluting all countries, and unnecessarily consuming so much space and effort? (Barszczewski 1925: 27)

On the other hand, in Elektropolis, energy is drawn in a way that is more mysterious and less hostile to the surroundings:

> A strange building rises in the middle of the city. It is a tower, a lofty tower, wide at the base, at the top of which countless wires shoot up towards the sky. In this tower, a man, the mighty ruler of the city, has enclosed the tamed power with which he performs these miracles… It is the heart, brain, and strength of the city. […] This tower, as you can see, serves as the main reservoir of electricity… Special devices, with the help of long wires shooting up towards the sky, catch it from the clouds, from the airwaves, bring it down to the ground and bind it in special accumulators. The power I have in this tower is capable of wiping out half of humanity from the face of the earth with a mad hurricane. But it is not for warlike and murderous purposes that I imprison it. On the contrary, its task is to build and to awaken new life. It is from it that the currents spread, moving all the machines of the city's numerous industrial plants; it supplies power for the railways and trams; it heats and lights all the houses in the city. (Kruk 1912: 119–128)

Another idea for the future energy source was the sun. Solar energy is used by mysterious inventions in Mieczysław Smolarski's novel *Miasto światłości* [City of Light; 1924]:

> Within the few pages of this book, only a part of the knowledge that later enchanted even more powerful forces into the Tower of Silence has been revealed. The most eminent and boldest of our scientists proved then that light can do work. In the time of our unaware ancestors, it was only capable of transporting an imperceptible cell. After all, you know the theory that life came to Earth from the Sun in this way. In the time of our fathers, following Nell's instructions, it was not only possible to use light for miraculous, incredible visual phenomena but attempts were also made to move machines with it. (Smolarski 1988: 178)

Solar energy also appears, though very marginally, in Antoni Marczyński's novel *Rok 1947* [Year 1947; 1926]. This book describes the New York of the future as a metropolis where everything has simply become bigger, higher, more automated, and subject to "aviation" (there are various landing pads on the roofs and balconies of skyscrapers, which reminds us of Fritz Lang's *Metropolis* and David Butler's later film *Just Imagine*). In this gigantic city, solar energy has also been harnessed:

> On other roofs, gigantic lenses were placed. These were solar condensers. The problem of utilising the titanic thermal energy of the sun, which had been troubling the minds of inventors for centuries, has finally been solved and the life-giving golden rays have been harnessed for laborious daily work. (Marczyński 1926, no. 200: 3)

The city is the place where the energy of the future is to be used. Even if it is a garden city or a city in the desert, the imagined future does not include any sort of village, which, in the Polish imagination, as in Winawer's feuilletons, is a fantastic symbol of technological backwardness. Although the action in Stefan Wałdyka's very niche novel of 1936, *Tajemnica zamku kurzętnickiego* [The Secret of Kurzętnicki Castle], takes place in the provinces – where the super-modern base of a criminal organisation is hidden in the ruins of a Bond-type castle – the inhabitants of the area are shown as being superstitious and easy to deceive.

/// Rays of the "Radium Age"

The sun rays in science-fiction novels, and the quote from Calder's book in which he mentions X-rays and electricity transmitted without a cable,

bring us to pop-culture ideas of the future that were very characteristic of the first forty years of the twentieth century – rays and wireless communication. Joshua Glenn proposed a new periodisation of science fiction by introducing the term "Radium Age." He recognised that Marie Skłodowska-Curie's discovery of radioactivity had been a crucial milestone in the development of science fiction and the popular scientific imagination. Its influence lasted at least until the mid-1930s (Glenn 2022: 6). The Polish science-fiction works I have cited thus belong to the "Radium Age." It is no wonder that rays, radiation, and wireless transmission as future sources and methods of using energy appear often in Polish science fiction of that period.

Elektropolis has electricity transmitted remotely. In the description of the electric tower in the city centre, we read that

> from it, [are sent] those air currents which stir the surface of the earth and make it fertile… These currents move the ploughs and machines used to cultivate the land, move the pumps which systematically sprinkle all the fields with water from the wells… In Elektropolis, all the functions are performed by electricity, this overwhelming force – the task of people is only to make sure that it performs these functions properly. (Kruk 1912: 128–129)

The tower, the wirelessly transmitted electricity, and the lightning appearing in a later part of the novel evoke one of the most iconic "heroes of electricity" – Nicola Tesla. And indeed, the engineer Halicz leaves no illusions:

> "This is not my achievement," he said when he found himself among the guests, "these powerful electric rays were invented by an American electrical engineer, Tesla… I only perfected them and applied them practically… Allow me, gentlemen, to continue, and I will present to you the practical application of electricity, and the service it can provide to humanity…" (Kruk 1912: 130)

The electrical infrastructure depicted in the novel closely resembles the concept of wireless energy transmission that Tesla attempted to implement, albeit unsuccessfully, at his laboratory in Wardenclyffe (Carlson 2020). In both cases, the central component was a tower designed to transmit electrical energy wirelessly.

After World War I, Nicola Tesla himself was better known for ideas that had no practical application but fired up the imagination (Carlson 2020: 425). Transmitting electricity wirelessly became an obsession for the Croatian-Serbian-American inventor and even led him to have a serious nervous breakdown. The idea also permanently entered twentieth and even twenty-first century imaginings of the future. Although his most famous invention was the high-voltage coil – a visually spectacular device – Tesla also considered himself the true inventor of the radio. At the time, radio was not only a voice and telegraph communication technology. The purpose of his invention was to be something more – it was supposed to transmit energy without the use of cables. He worked on solutions that would make it possible for electricity produced in the United States to be received in Europe or, even better, directly in various types of vehicles. And since he actually also worked on remote-controlled vehicles, he could tempt potential investors and journalists with the vision of total electrification. According to Tesla, the future world would have no room for combustion engines, and this idea continues to have an impact even today.

The concept of wireless energy transfer evolved into the idea of "death rays." Of course, the vision of an energy weapon that was not projectile but based on rays, electricity, or radioactive elements dates back to the nineteenth century (Hecht 2019: 11). Nevertheless, the idea became exceptionally popular after the spread of radio and radioactivity – it seems that tabloid journalists did not fully distinguish one from the other, as the scientist and writer Bruno Winawer pointed out (Winawer 1927: 72). Not only Tesla but also various inventors gained international attention with death rays. For example, in 1913, the Italian engineer Giulio Ulivi announced the discovery of invisible "F-rays" with very destructive capabilities. Later, in 1924, the English engineer and inventor Harry Grindell Matthews claimed to have invented a device that could transmit electrical energy wirelessly over a distance. He asserted that it could destroy entire armies and their machinery. However, both inventions eventually turned out to be frauds. Tesla, though, announced a similar discovery of his own, called "Teloforce," which was also referred to by journalists as "Peace Rays." He presented his version in a series of interviews with New York newspapers and magazines in July 1934 (Hecht 2019: 23–25). The whole world was fascinated by it. As we can read in the August 1934 issue (no. 225) of the Polish newspaper *Nowy Czas*, 77-year-old Dr Nicola Tesla "announced the invention of death rays that would make any war impossible, because the current, raised to 50 million volts, could destroy a fleet of 10,000 aircraft from

a distance of 400 kilometres" (p. 4). After being perfected, the invention was to be presented at the Disarmament Conference in Geneva and used exclusively for peaceful purposes. In reality, it remained in the realm of legend and became fodder for science fiction and sensation-seeking media. Tesla maintained until his death that the invention existed. However, as his biographers report, after his death neither physical traces of the device were found nor technical diagrams among his documents (Hecht 2019: 27).

Death rays settled into the fantastic imagination for good. In Polish science fiction, we can find them, for example, in *Year 1947*. Marczyński used Matthews's idea here.

> Every fortress, every warship was equipped with Wood's apparatus, excellently improved. In 1937, this great American inventor drew the right fruits from the brilliant discoveries of Hertz and Marconi. Wood's apparatus emitted electromagnetic waves capable of disabling every combustion engine from a distance of twelve kilometres. This caused all cars, motorboats, and aeroplanes to stop immediately. As a result, Wood's rays were seen as a great benefit to humanity. (Marczyński 1926, no. 200: 3)

Today, deadly rays in art have become rather like the halos of previous eras. They are simple, universally understandable – some would say kitschy – and primarily visual signifiers of science-fiction aesthetics – signifiers that are probably not even associated with changes in thinking about energy transmission. Think, for instance, of the lightsabre in *Star Wars*, or of laser cannons and phasers in *Star Trek*, and so forth. No one expects science-fiction creators to explain how rays and energy work (frequently without any additional material-mechanical component). On the other hand, in today's "language of science fiction" we can hear an echo of the interwar fashion for rays and the terminological ambiguity that emerged in the move from the exact and technical sciences to the language of everyday life – that is, to popularising narratives and the language of the future. The "rays" might be solar, artificial, radio, or radioactive, but few people considered whether it was possible or necessary to distinguish them.

This notion is well illustrated by Bruno Winawer, a Polish scientist, columnist, and writer who valued science fiction as a literary genre. But he also placed science journalism on the side of cheap fantasy. He wrote in one of his columns that

> There are, unfortunately, other contemporary fantasy writers, much less educated, who believe in the omnipotence of science and technology – journalists. […] They understand that anything can happen in this field. That is why they release printed nonsense that takes flight and sometimes lives for half a year. I have noticed that these reporters have a certain system and are most eager to make discoveries in the field of optics. For a time, rays that ignite gunpowder from a distance and blow up mines and ammunition depots were very fashionable. Another time, light waves that could blind an entire enemy army shot out of the printed page. (Winawer 1927: 72)

Winawer seemed to be perfectly aware of the boundary between scientific fashion, the generating of various fantasies, and scientific speculation, though what was and wasn't fantasy perhaps only seemed so to him, since this boundary was not perceived, for instance, by the legendary inventor Nicola Tesla. Winawer undoubtedly noticed the existence of a pop-culture fashion that he seemed to be opposing but that he simultaneously helped create, as will be explored below.

/// Not Rays but Radiation

Contemporarily, radioactivity is more likely to be thought of as an energy source rather than as deadly rays. Power drawn from radioactive elements still seemed attractive in the interwar period, though even then they were recognised as being dangerous (Moore 2019). However, the so-called "radium madness" had already passed, and nuclear weapons were practically not yet imagined. The weapons of mass destruction were supposed to come from gas and rays; an atomic bomb was not considered. Imagination often failed. Calder saw no practical application in attempts to "split the atom." "What may come of all this, no one knows today" (Calder 1936: 113). The basic repertoire of fantasy and press sensation also did not include the idea of radiation as a source of heat that could replace steam boilers and combustion engines. A certain doubt about the usefulness of radioactive elements, as well as an attempt to sum up the Radium Era, can be found in the novel *Radium* by the Austrian writer Rudolf Brunngraber (1936, published in Poland around 1938). Brunngraber aimed to achieve something similar to Émile Zola's naturalist works. *Radium* was to present a social panorama of the "radium madness": from the discovery of radium

and polonium, through attempts at the practical application of radioactivity, to dashed hopes and the discovery of the harmfulness of radiation.

References to radioactivity and atomic energy also appeared in Polish science fiction of the time. The motif of "taming the atom" appears in *City of Light*, although only in the form of a legend. By narrating his story from the perspective of a fallen civilisation of the distant future, the writer could touch upon themes of futuristic energy without having to explain the details:

> However, it was said that the spirit was the famous inventor Paul Nell, who had once saved the city during the war raging around it and had discovered hitherto untamed forces of nature, either by releasing the energy hidden among atoms or by being able to oppose in experimentation the rotational motion of the Earth, through which, if he wanted, he could provoke a terrible clash capable of destroying the entire globe. (Smolarski 1988: 135)

The motif of radioactivity and the sun as a source of light that could largely solve the energy problems of cities was used very interestingly in Winawer's novel *Doktor Przybram*. The author, who was known for concealing quite interesting analyses of the difficult fates of scientists in his science-fiction works, treated scientific speculation equally seriously. In the narrative, the eponymous character, Dr Przybram, tries to discover a substance that could ignite an energy revolution and provide affordable light for every home and street. This fictional breakthrough references well-established phenomena of luminescence and radioluminescence, the latter of which was a controversial yet hopeful concept at the time of the novel's publication in 1924 (Moore 2019). Dr Przybram successfully searches for a way to create safe "cold light": "If we find something certain – in my manuscripts: 'radiator X' – we will immediately create new particle resonators; we will be able to change any load of useless plaster into a miraculous substance that will absorb and store solar energy during the day, and then ignite spontaneously at night and shine with a bright cold flame" (Winawer 1924: 16). Winawer was more focused on the social consequences of the appearance of "the greatest invention of the century" than on a vision of technological change. He seemed, though, to have no illusions that it would be a solely positive discovery. In the novel, light energy, which is widely available and potentially cheap or even free, quickly becomes the subject of

commercial speculation, media attention, and international conflicts, and even contributes to unemployment among painters. A reader might sense that, in the era of startups and digital capitalism, Winawer's ideas are still extremely relevant, but this is a topic for a completely different paper.

Another Polish interwar writer, Leonard Życki-Małachowski, took up the issue of alternative energy sources in an interesting way in his 1935 story *Władca Grenlandii* [The Ruler of Greenland], in which an unemployed engineer, Antoni Drzewica, goes to the Pieniny Mountains to visit Stefan, an old school friend and currently a forester. The action takes place in an unspecified future, in which "travel was mostly by plane or, to closer places, by monorails, moving at great speed" (Życki-Małachowski 1986: 326). Stefan discovers that the local parish chronicle contains the story of Kacper Mocarny, a companion of the famous Hetman Czarnecki and an adventurer who travelled to Greenland. Towards the end of his life, Kacper had settled in the Pieniny Mountains and engaged in research, for which the local priest had considered him to be a satanic alchemist. According to the chronicle, Kacper disappeared one day, and the locals still thought the valley where he had lived was haunted: "Various lights and flames appear on the mountain, which is true, as I desire eternal salvation" (Życki-Małachowski 1986: 332). Drzewica claims that Kacper was a pioneer of modern research and that the legends told of scientific experiments. He is convinced that apart from his numerous hunting trophies, Kacper must have brought back treasures of value to science from his polar expeditions. Drzewica discovers a cave in which a message from Kacper (encouraging experiments) and his treasure are hidden:

> After a few powerful blows, the lid popped off and inside the box a dark stone and a glass tube filled with whitish powder could be seen. […] Another strange phenomenon caught their attention. Something was shining from inside the cave. They put out their lamps and saw that a strange light was coming from the table.
> "This stone is shining," whispered the forester, as if confiding a great secret to someone.
> The engineer was already approaching the table and taking the stone in his hand.
> "And it's warm…" he added, handing it to his friend.
> "So, is it some kind of radioactive substance?" (Życki-Małachowski 1986: 337)

Drzewica calls the new element "casprolite." It "works" on a similar principle to "nellite." It also produces heat and moves in space – it lifts itself towards the source of light:

> Our accumulator charges itself, lifts itself towards the source of energy, that is, towards the sun, and is again pulled towards the earth by the opposite pole, giving it its power at the same time. You see that this tiny amount moves the machine. If, in the polar regions, this new element is really found in large quantities, and if it were within human power to extract it from there – if it could be chemically shaped like this sample – then we would have an inexhaustible source of energy for the earth. We would only have to expose this new slave of the earth to sunlight and take its energy with our opposite poles. Yes, Mr Japanese! My invention is not suitable for war, but on the other hand – what colossal possibilities would finding deposits of casprolite have for people! There would be no poor, abandoned, exploited people, because our machines would have plenty of energy for free. (Życki-Małachowski 1986: 340)

The engineer therefore goes to Greenland, where he mines casprolite and becomes a kind of ruler of the island:

> Intensive work reigned in Greenland. The unemployed from all over the world, who came here at the call of the engineer Drzewica, applied themselves to it as zealously as if through this zeal they were trying to erase the memory of years of forced inactivity. Two large balls of casprolite – one in the north and the other in the south of the island – provided inexhaustible amounts of energy, which was used by heating machines, melting ice. The earth was already covered with beautiful green grass and young shoots of freshly planted forests. New settlements were emerging rapidly, like mushrooms after rain. Fields were prepared for cultivation, cattle breeding was introduced, and the extraction of immense mineral wealth began. In a word, in all fields there was tireless activity. And on everyone's lips there was only his name, that of the ruler and guardian – the engineer Drzewica. (Życki-Małachowski 1986: 348)

Despite the work's noble slogans and anti-capitalist message at the end – "Let them remember that the machine was created for people, not

people for the machine, and let them act in such a way as to contribute to the happiness of HUMANITY" (Życki-Małachowski 1986: 348) – the story is deeply rooted in colonial discourse, bringing to mind the famous anecdote about Polish diplomats who asked in 1938 at the League of Nations whether they could count on a colonial mandate, even if only in Antarctica.

/// Conclusion: "Disconnecting" Electricity from Its Sources – The Border of Utopia?

The above brief overview of the past's imaginary future energy sources leads in my opinion to several quite important conclusions.

First, the energy futures and alternatives considered today are still rooted in the imagined futures that entered social imaginaries before 1939.

Since the second half of the nineteenth century, the energy of the future has primarily been considered to be electricity, and – in a sense – it is still so today, and alternative methods of producing it are similar (Stasik 2018: 164; Smil 2022: 199). Why? I can only speculate, but electricity gained futuristic significance as it became more independent of fossil fuels and simple mechanisation, which were its origins. Electricity had the potential to be the most "alienated" energy – the most different from everyday life in the age of coal and steam. Vaclav Smil, a researcher and kind of historian of energy, emphasises that electricity was impressive because it required (it still requires) an enormously complicated and extensive infrastructure – a "whole new system" (Smil 2022: 199) – in order to operate. Moreover, the system was based on an "invisible" and dangerous "current," about which not everything was yet known, which could be called "pure science fiction" (Smil 2022: 199), and which was similar to the ghosts of spiritualists and the rays in stories about mad inventors and aliens. Through this elusiveness, electric energy gained a dimension that was finally fulfilled in the silence and "post-electricity" aspect of the digital machine. The noise, heat, and smokiness of the industrial era was finally to give way to the silence and transparency of the new electricity and then to what was called electronics. This division was aptly described several decades later by Alvin Toffler:

> The old symbols of technology are even more misleading today, when the most advanced technological processes are carried out far from assembly lines or open hearths. Indeed, in electronics, in space technology, in most of the new industries, relative silence and clean surroundings are characteristic – even sometimes es-

> sential. And the assembly line – the organization of armies of men to carry out simple repetitive functions – is an anachronism. It is time for our symbols of technology to change – to catch up with the quickening changes in technology, itself. (Toffler 1970: 25)

Electricity was therefore supposed to liberate humanity from the traditional industrialisation of the Industrial Revolution, and thus also from steam, fire, coal, and gears. It was also supposed to involve the liberation of workers from the drudgery of industrial work: an energy revolution that would give everyone a chance by removing hard physical labour and providing electrical energy. We can find such an "energy-based" future in Antoni Lange's *Miranda*, in which perfection is achieved by people transformed through energy into astral bodies: "Each of us is his own aeroplane; he is his own telephone and telegraph; we can communicate with each other at a distance in thought and word; we can even see each other at a distance. We have created a machine of machines that handles all our affairs in a simple and precise way" (Lange 1924: 91). In the twenty-first century as well, the idea can be found that such a state of affairs will exist in the future (Krzysztofek 2018: 34).

In the science-fiction landscape, this division between the filth of industrialisation and the sterility of life for people of the future, as well as its superficiality, was aptly captured by Thea von Harbou and Fritz Lang in their famous novel and film *Metropolis* (1925/1927), which depicted a clean, electric city of the future with dirty, traditionally "machine" undergrounds inhabited by the proletariat. In this case, there was no miraculous future source of clean energy – instead, the filth and hardship of industrial work were just hidden. The remoteness of electricity allowed its dirty sources to be kept out of sight of those who used it. A similar if less legible symbolism can be found in Smolarski's *City of Light*. The post-apocalyptic world is the remains of an industrial civilisation, and the city represents the highest level of post-industrial technology – with electricity and rays (energy) being generated without the participation of the city's inhabitants and out of their sight. Finally, however, it turns out that without a human component – without human work and knowledge – the city will not be able to survive.

The metaphor of separation and concealment is still incredibly relevant today and appeared in an updated form in the mid-1990s in *The Matrix* by the Wachowskis and in "The Californian Ideology," an influential essay by Richard Barbrook and Andy Cameron. The promise of alternative, unlimited, and automated energy sources being available in such a manner that

electricity and electronics could ultimately become new materiality (apparent immateriality) is still being replaced by distancing and neocolonialism. From the global perspective, electricity is still dirty and still old-mechanical. Energy acquisition becomes distant or remote work, performed far away, often beyond the borders of clean, electric civilisation – in mines and nuclear power plants. Let's not forget that these are steam power plants, where the energy of burning coal has been replaced by the energy of radioactivity (Barbrook & Cameron 1995). Researchers and popularisers of changes in the field of energy consumption (Smil 2022), as well as critics of digital capitalism (Zuboff 2019; Zygmuntowski 2020), are still writing in a similar tone today.

Second, Polish science fiction (but not it alone) created visions of a future without nuclear energy, or at least not the kind of nuclear energy that we have today. As I have pointed out, the interwar imagining of the use of energy drawn from radioactive materials, which were considered dangerous at the end of the Radium Age, did not match the reality of the postwar Atomic Age. In interwar science fiction, there are no reactors as a basic source of electrical energy, and there are also no fears about the terrifying energy of a nuclear explosion. There is no atomic apocalypse. Even in *City of Light*, there is only a legend, and the weapons of mass destruction are death rays and poison gases. Today, the darkness of Atomic Age imaginings can be disenchanted by showing that atomic energy is not as terrible as popular culture paints it, and that atomic energy is the only reasonable alternative to a climate catastrophe. The pop-culture history of nuclear energy shows what a significant influence science fiction can have on shaping the social imaginary (Weart 1991). More importantly for the present argument, however, a look at pre-1939 science fiction allows us to see that it is possible to imagine different futures and different energy solutions beyond the nuclear alternative, and that before the Second World War there was a set of possibilities and untapped variants that may still provide inspiration if not the complete answer.

Third, this leads us to questions about today's vision for the future, and to the longtermism mentioned at the beginning of this paper. How should we look towards the future? Is it worth studying the future by reaching back into the past?

Has belief in a future composed of the Internet, the cloud, the virtual reality of digital networks, and the dominance of artificial intelligence covered up the fact that under this digital layer, the old vision of the future from a hundred years ago is still present? This can be seen when we

descend to the sphere of energy and its sources, and at the same time when we consider how unpredictable the distant future is.

Thinking about the future, about alternative energy sources, and about the long-term effects of energy transformations, requires not only looking extremely far into the future but also being aware that this type of practice is the same as that which produces science fiction utopias or dystopias and is nothing new (Bowler 2017). That is why it is so important to look back – not to look for retrotopias there (Bauman 2017) but to discover forgotten imaginary futures in fragments of the past, on the assumption that "the past is not an unchanging set of facts that we are only supposed to recall as written in history books, but an infinite set of possibilities" (Szydłowski & Zielinski 2014: 235).

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/// **Abstract**

The paper reviews the most important, in the author's opinion, visions of alternative and futuristic ways of producing energy in Polish science-fiction literature before 1939: from electricity generated by hydroelectric turbines through solar rays to radioactivity. The author wonders whether such ideas of energy transformations are still relevant and whether various kinds of pop-cultural visions of the future from the twenty-first century are characterised by unconscious reproduction of modernisation and modernist narratives from a hundred years ago. The theoretical framework of this paper draws upon Richard Barbrook's concepts of imaginary futures and Charles Taylor's social imaginaries, as well as Siegfried Zielinski's concept of media archaeology.

Keywords:
energy sources, Polish science fiction, interwar period, Radium Age, imaginary futures

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RELATIONAL SOCIOLOGY PERSPECTIVES

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DO SOCIAL RELATIONS "HAVE" TIME? A CRITICAL-REALIST RELATIONAL PERSPECTIVE ON SOCIAL TIME*

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/// Introduction

This essay briefly explores how a critical-realist (CR) perspective might approach the concept of social time. Such an approach is inherently shaped by the core socio-ontological principles of CR and the epistemological frameworks for knowledge acquisition established within its meta-theoretical tradition. Given the extensive scholarship on these topics, including numerous excellent books and articles, I will not delve deeply into them here. Instead, I will concentrate on what I consider most crucial to my argument: the notion that social relations possess emergent properties distinct from those of their constituent parts. In other words, the reality of social relations is qualitatively different from the reality of the individual entities comprising them, such as persons or social roles. Elżbieta Hałas and Pierpaolo Donati (2017) describe this emergent dimension of social relations as "relationality as such."

A CR approach to social time must consider how time is experienced by individuals and how humans attribute meaning to their actions. For analytical purposes, this approach distinguishes between two dimensions

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of time: its meaningfulness (Hałas 2013), which I term "the biographical temporality of the self," and the temporality associated with relationality, which I refer to as "relationality's social time." This essay focuses exclusively on the latter dimension.

In other words, a CR approach to social time seeks to explore the proposition that "social time is an emergent property of relationality as such." In the next sections I first examine the assertion that "social time is an emergent property" and then I draw on Margaret Archer's concept of situational logics to analyse the notion of "relationality as such." Finally, I illustrate these theoretical insights with examples of a CR approach to social time.

/// Social Time as an Emergent Property of Relationality

By saying that social time is an emergent property of something, critical realists mean that this "something" is social entities which are emergent. From a philosophical standpoint, emergence suggests that the world around us is populated of entities composed of parts whose configuration gives rise to specific properties. According to this perspective, the properties of an emergent entity are:

- relational: emergent properties result from prior relations among the parts;
- novel: these properties cannot be predicted based solely on the attributes of individual components, which often arise as unintended consequences;
- autonomous: emergent properties are irreducible to their component parts, as they possess a degree of independence;
- holistic: these properties are not merely an aggregate of the parts but form a cohesive whole beyond their sum (Mumford 1998: 31–40).

Another idea following from this view concerns the fact that emergent properties have the power to do things. The philosophical background of this idea is "dispositional realism" (Mumford 1998), according to which dispositions are the properties one ascribes to social objects (persons, institutions) to act in specific ways under specific conditions. By knowing properties, one knows what a social entity might do in a particular situation. According to Stephen Mumford (1998: 56), dispositions conceived of as ascribed properties are causally efficacious. Causally efficacious means, for example, that if teachers in a "democratic" school are happier than those who work in a "bureaucratic" school, then the outcome (happiness,

well-being) is owed to a specific property that the relations in a democratic school, as such, possess. This means that the relations in this school have the property of giving rise to this outcome.

/// The Emergent Properties of Situational Logics

Given that social relations do not exist in a social vacuum, relational properties such as strains/tensions/contradictions and compatibilities characterise the structural and cultural context in which people live and in which strains and compatibilities may be necessary and internal or contingent. If these two possibilities of the relational properties are cross-tabulated, then four situational logics can be created in which specific strategic actions can be deployed within the structural and cultural contexts.

Regarding the structural contexts, when necessary and internal complementary relations permeate the systemic structure of an institution, that is, when its vested interests are mutually reinforcing, then social integration prevails. Since everyone has something to lose from possible disruptions, this situation entails a logic of *protection*, meaning that social groups interact so as to protect these interests. When the vested interests within an institution or between them come into conflict because it cannot be otherwise (i.e., necessarily), then the most likely course of action for those who face these internal contradictions is *compromise*. Compared to the situational logic of protection, the situational logic of compromise is an inverted way of promoting the vested interests of those involved (Archer 1995).

However, in cases where institutional interests are insecure or liable to vanish because of the openness of society, that is, cases in which contradictions are contingent (as in cases of war), then the situational logic of *elimination* shapes strategic action. Finally, when vested interests are shaped in such a way that they are complementary and contingent, then people face the situational logic of *opportunism*. In this situational logic, innovation and creativity are defining features of the courses of action taken by social groups (Archer 1995).

In a similar way, the culture's emergent properties give rise to various situational logics. When complementarity characterises two cultural items, then social groups are trying to protect and *systematise* them because everyone receives an ideational gain from this situation. Contrarily, when two cultural items are incompatible, then constraining contradictions come to the fore. The members of two different political factions of a party will promote ideational items for the sake of *unifying* its political ideology (Archer 1988).

The question arises as to what social groups do when they face these situations. For Archer, whether social agents will act in an orderly or conflictual manner depends on whether the social distribution of power and interests aligns with the situational logic of the cultural system. Archer describes various possibilities of social action in relation to protection (necessary compatibilities) and correction (constraining contradiction).

In regard to correction, when the strategy of preserving unification fails, then competitive contradiction starts to take shape. In such cases, social agents are trying to eliminate contradictions, and *cleavage* is likely to emerge. Finally, in situations where compatibility is contingent, social groups (e.g., newcomers in a scientific field) have the opportunity to elaborate new and creative cultural items, and a new *specialisation* is possible (Archer 1988).

Following this brief outline of Archer's explanatory framework, my focus will now be on whether distinct forms of social time correspond to each of the situational logics. The task remaining is to articulate the specific variations of social time that arise uniquely from these different situational logics.

/// The Varieties of Social Time in Connection with Situational Logics

Having clarified Archer's theory on situational logics, I would now like to present how these four logics give rise to particular varieties of social time, and I will provide examples to illustrate my point. Let's start with the situational logic of *protection* and imagine how the social roles of school inspectors and school principals are interconnected in an educational system. These two groups are concerned about protecting the school hierarchy, because it is the hierarchy as such that promotes the vested interests of both groups. The beliefs of the school principals about education complement those of the school inspectors and in that sense the ideational position of both groups systematises educational policy. In regard to *compromise*, new social coalitions are created in political parties that support alternative political ideologies and whose interests contradict each other. However, they have to compromise on their varying interests because undermining the political party as such would be disastrous.

In the situational logics of protection and compromise, social time tends to manifest in cyclical forms, where past, present, and future merge into a perceived continuity. Additionally, time in these contexts may be

experienced as delayed, indicating a temporality that awaits activation, or as enduring, reflecting a slowed, extended duration. In the relationship between principals and inspectors, social time often seems to be held back – to experience delays in progression. This slowing of time is primarily due to the complementary ideational alignment of maintaining the school hierarchy, which is deeply embedded in the structural and cultural frameworks governing interactions. These three varieties of social time might be seen as the emergent properties of the morphostatic situations that characterise the structural and cultural contexts of protection and correction.

As far as *elimination* is concerned, if the eligibility criteria for entering the teaching profession change – for example, to allow those who have had two years of training in special education to become primary school teachers – then both groups (primary school teachers as insiders / those with two-year training as outsiders) have an interest in eliminating each other. Finally, in regard to *opportunism*, newcomers to a scientific field have vested interests in innovating and being creative because otherwise their scientific trajectory is in danger.

In contrast to morphostatic situations, morphogenetic situations like elimination and opportunism are related to contingent complementarity and competitive contradiction. The varieties of social time related to these situations concern what Georges Gurvitch calls deceptive time, erratic time, or explosive time, which are all shaped by contingency and uncertainty (Gurvitch 1964: 45–52). Deceptive time means that behind the appearance of a long-duration phenomenon, unexpected crises may evolve and discontinuities between the past and present may emerge, while erratic time (time of irregular pulsations between the appearance and disappearance of rhythms) is "the time of uncertainty par excellence" where contingency prevails. In this way, what matters is only the present and not the past or the future. Finally, when discontinuity and contingency are maximised due to acts of collective creation that intervene in social reality, then time is explosive. For example, in the competitive dynamic between current primary school teachers and prospective special-education instructors, time may exhibit the characteristics of deceptive or erratic temporality, reflecting the uncertainty and instability inherent in such a competitive relationship.

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DISCUSSING BOOKS

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THE ALTERNATIVES WE DESPERATELY NEED

EWA BIŃCZYK, *USPOŁECZNIANIE ANTROPOCENU. EKOWERWA I EKOLOGIZOWANIE EKONOMII*

Andrzej Frelek

A year-end summary of climate change in 2024 would not be uplifting. The global mean temperature for the span of January to September 2024 reached 1.54°C, making 2024 the first year to surpass the 1.5°C guideline of the 2016 Paris Agreement (WMO 2024a: 1), a threshold already mourned in various media outlets. Extreme weather events occurred all over the world, striking the Global South disproportionately heavily yet again. Severe flooding in East Africa killed hundreds and affected close to one million people; the region buckled under a rainy season amplified by El Niño and exacerbated by Cyclones Hidaya and Ialy. Record-breaking heatwaves rolled through Asia – from Lebanon to the Philippines – and caused numerous fatalities, with heat indexes soaring above 50°C. Wildfires hit Chile in February, burning 64,326 hectares, killing 134 people, and destroying thousands of homes (Pearce & Ware 2024; UNICEF 2024). The Global North was not spared either. Hurricanes and storms swept through the southern United States, causing widespread floods, wind damage, and severely disrupting power infrastructure. In the first nine months of 2024, wildfires ravaged 370,000 hectares of European forests, and – right after the hottest summer on record – the continent was hit with severe floods. The latter were particularly devastating in Central Europe, where two million people were affected in September alone, and in the Spanish region of Valencia, where flash floods killed 230 people. One weather station in

Spain recorded 491 l/m² of rainfall – the equivalent of a year's worth – in eight hours (EEA 2024; WMO 2024b). Finally, as I write this review, catastrophic wildfires are raging in California.

One might think that the constantly rising temperatures and the steadily growing proliferation of extreme weather events would cause increasing social alarm and spur the ruling class to much-needed action. Well, one would be wrong. Emissions from fossil fuels increased yet again with the projected figure for 2024 estimated at 41.6 billion tonnes of emitted CO_2 (GCB 2024). Environmentally harmful subsidies reached $2.6 trillion, including continued subsidies to fossil capital that continues to roll in profits (Koplow & Steenblik 2024) while keeping to its plans to pursue further upstream investments (Milman & Lakhani 2024; Malm & Carton 2024). State repressions of climate activists are considerably on the rise, especially in the United Kingdom and Australia (Berglund et. al. 2024), and COP 29 turned out to be yet another lip-service failure, as testified to by the attendance of over 1,700 oil and gas lobbyists (KBPO 2024). At the rate of current policies, we are on track to reach 3.1°C of warming by 2100 (UNEP 2024: xvii). This is a course set for ecological and social catastrophe, and our ruling class is firmly choosing to ignore it.

It is not easy to write on climate change within a society that seems hellbent on its own destruction. As bad news keeps rolling in, the allure of despair grows ever more attractive to many of us. In some places this sentiment will only be strengthened by widespread repression, which can cause those pursuing such work to feel as if they were becoming psychotic, as if this enormous socio-natural problem were merely a fantasy. Poland is, in my opinion, one such place. Here the discourse on climate change exists mostly symbolically – the problem seems largely unconcerning to the media and politicians. This is reflected by the absolute inactivity of the new coalition government, which has failed to fulfil any of its environmental pledges (Józefiak 2024); by the widespread outbursts of public figures directed at the – extremely non-radical – actions of the Polish wing of the Last Generation, which have been variously deemed to be "hooliganism" or "climate hysteria" (a real example of the irony of projection) (Jurowski 2024); by the obstinacy of mainstream Polish economists who have spoken against the existence of physical barriers to economic growth (Bińczyk 2023: 226); and by the stranger-than-fiction declaration of a war on beavers made by the prime minister, Donald Tusk, who deemed the animals to be the culprits behind the severe flooding this autumn (Körömi 2024). It takes resilience to attempt to make a dent here, to shift this discursive

field towards a debate on possible solutions to the problem and analyses of its social nature.

In my estimation these are precisely the stakes of Ewa Bińczyk's 2023 book, *Uspołecznianie antropocenu. Ekowerwa i ekologizowanie ekonomii*. While her previous work – *Epoka człowieka. Retoryka i marazm antropocenu* – focused on an analysis of the various forms of rhetoric present in discourses on climate change, *Uspołecznianie antropocenu* demands a "decisive socialisation of the debate on the planetary environmental crisis" (Bińczyk 2023: 11)[1] and turns to an overview of the ways in which our society can be remade, and why that is necessary to safekeep human and non-human lives. I understand that the author's most important goal here is to open up a discursive field for social debate on the necessary "complex of deep, pro-environmental, socio-cultural changes to the logic and foundations of the management of human life on planet Earth" by providing Polish readers with an "accessible and attractive" introduction to the "'grammar' of the ecological economics of prosperity" (Bińczyk 2023: 14, 15). The metaphor of grammar is indeed apt here, insofar as the book introduces the readers to what, in the face of the prevalent status quo, amounts to a wholly different language in which to think of socio-economic change aiming to address both environmental and social issues.

This is certainly a laudable goal, insofar as ecological economics function within the wider Polish discursive field only on its very outskirts, while many living here associate pro-environmental changes with anything but prosperity: they are often seen as synonymous with painful sacrifices, with austerity, and a lowered standard of living. While this form of anxiety can be said to be misled, it is also not unfounded in a semi-peripheral country where, in 2023, 6.6% of the population lived in severe poverty and 46% found themselves below the social minimum (Szarfenberg 2024: 13). Moreover, after the brutal process of economic transformation carried out in the 1990s – which was simultaneously the process of dismantling any opposition to neoliberal dogma and its concomitant order of desires – the social imaginary of prosperity in Poland is firmly attached to the capitalist fantasy of a self-made bourgeois, who lives in a mansion and is surrounded by expensive commodities. Many here hold to this fantasy desperately, even now, when it is falling apart in the face of the cost-of-living crisis, the housing bubble driven by speculation, and rising poverty. But they are also just holding onto their living standards, which they always feel on the verge of losing – an experience unfortunately shared by many here.

[1] Unless stated otherwise, all translations are my own.

By firmly linking ecological economics to alternative forms of prosperity, Bińczyk offers a very attractive way for Poles to approach the issue of a socio-economic, pro-environmental transformation. She introduces her readers to a different economic rationality, in which prosperity does not need to be predicated on collecting ever more commodities, nor on self-interest and the brutality of competition. Prosperity could mean free time, freedom of self-expression and self-realisation, actual democratic practices, and redistributive policies that guarantee a life of dignity to all members of our societies. But most importantly, at this moment, it could mean freedom from a historical trajectory that promises planetary catastrophe.

The introduction to this rationality plays out in three parts. Part 1, "Arranging Survival," is devoted entirely to presenting various strains of ecological economics, including those closer to the economic mainstream and those firmly outside it. Part 2, "Safekeeping the Future," analyses the social status of the future, both conceptually and in regard to concrete challenges ahead and possibilities. Part 3, "Ecoverve and the Boycott of Torpor," concludes the volume with an argument for maintaining ambitious thinking about moving beyond the stagnation of the status quo, and looks at the possibility of future tipping points – moments ripe with potential for social change and shifts in the social status quo. Bińczyk considers these within the context of the COVID-19 pandemic and the Russian invasion of Ukraine. She also includes a very personal annex in the form of a letter to future generations, placed immediately after the summary. I will revisit the annex later. For now, let's discuss each of the three parts of the volume, as there is a lot to unpack here, and Bińczyk's writing deserves close attention.

Bińczyk opens "Arranging Survival" with a chapter that serves as a general introduction to the grammar of ecological economics. She describes the field as a "transdisciplinary discipline that encompasses the social sciences, knowledge from the humanities, and natural sciences," and its point of departure for rethinking economics is the acceptance of the "existence of limits to economic growth" (Bińczyk 2023: 26, 27). These limits are, of course, physical, and stem from the assertion that the human economy is predicated on the non-human biosphere, which cannot be exploited without impacting its capacity for regeneration. The various strains of ecological economics – described by Bińczyk as belonging to a "post-growth" school of thought – are therefore critical not of any single measure of growth but rather of the fetishism of the "idea of infinite economic growth on a finite planet" (Bińczyk 2023: 31, 32). It is important to clarify that this critique targets an idea of growth that is, in essence,

a blind, continuous accumulation of profit that does not take into account whether growth comes from weapons manufacturing or the production of low-quality commodities destined for the landfill a month after purchase. What ecological economists demand is therefore the "limitation of growth in chosen areas, such as resource use, energy consumption, water usage, the destruction of habitats of other life forms, land use, or population," coupled with an increase in growth in "the quality and longevity of human life, social justice, safety for all members of society, the quality of the environment, human welfare, and literacy" (Bińczyk 2023: 38). An ecologically stable society would still develop, make new inventions, and build its infrastructure, but its growth should occur where it improves the quality of human and non-human life, not where it serves destruction and profit. Especially since, as Bińczyk points out, it is impossible to decouple an ever-increasing accumulation of profit from the increasing exploitation of the planet, particularly in terms of CO_2 emissions. Decoupling emissions from economic growth in absolute terms has not been achieved, and in relative terms, it is often just a "fiction of measurements" (Bińczyk 2023: 41).

What we need in the Anthropocene can therefore be found in "new types of [economic] reflection," based on a "new 'grammar' that takes into account planetary limitations, a new pro-climate dictionary, one full of verve and justice" (Bińczyk 2023: 42). We must depart from "narrations of austerity […] and the continuation of the accumulation of wealth by the privileged." As Bińczyk states, "we will not be saved by green growth or the rhetoric of decoupling growth from planetary destruction," both of which primarily serve the continuation of the status quo (Bińczyk 2023: 43). The economic and political status quo has failed – miserably. It is time to move away from it and try something different, because only a qualitative shift in social metabolism can stop this crisis and improve the quality of human life and the welfare of our shared environment. This general introduction is well-reasoned, comprehensive, and clearly presents the stakes of the debate. Moreover, it is refreshing to see such an intervention in the Polish discourse: one that clearly speaks out against ecological austerity – or any austerity policies for that matter – and the practices of placing environmental guilt on individual citizens.

The five chapters that follow present something akin to a small atlas of alternatives. Bińczyk reaches into various strains of ecological economics – encompassing different periods and disciplines, including economics proper, philosophy, science and technology studies, and sociology – to further sketch out the discipline. Readers are introduced to the thought of

Tim Jackson, Kate Raworth, Herbert Marcuse, Jonathan Symons, and Alf Hornborg, with supporting figures invoked at various points. This provides a diverse look at how different thinkers conceptualise alternatives to our present social metabolism and critique various aspects of the status quo. We move from Jackson's critique of "growthism ideology" and his call for a "symbiotic balance" within a flow economy, through Raworth's donut economics, centred on the understanding of economics not as a "science of getting richer, but of the Greek *oikos*," that is, a science of conscious economic management of our economies; Marcuse's late eco-socialist critique of capitalism, in which "ecological issues reveal the internal contradictions of the status quo," which Bińczyk presents in tandem with Jason W. Moore's Marxist critique of capitalism's reliance on cheap nature; Symon's eco-modernist approach, centred on low-emissions technologies and state intervention; and we end with Hornborg's anthropological critique of the function of money and technologies in contemporary economies, and his approach to a "metabolic correction" based on an alternative to existing technological and monetary infrastructures (Bińczyk 2023: 47, 51, 55, 74, 90, 112).

In line with Bińczyk's reliance on linguistic concepts, this is a diverse dictionary that readers can use to understand various approaches to critiquing the philosophical, ideological, political, and economic underpinnings of the social nature of our environmental crisis. Moreover, we are presented here with a wealth of already conceptualised alternatives. Against the obstinacy of the ruling class, it becomes clear that we do have choices and that there are different ways of approaching and actually addressing our current predicament. And none of them rely on austerity measures aimed at the average citizen, nor on denying developing countries the right to raise their standards of living. This is also, to underscore my previous points, important in local terms, as many of these authors and their alternative politico-economic proposals are not well known – or at all known – in Poland, and thus the introduction is very valuable in terms of the Polish discursive field. However, there are drawbacks to this approach, two of which should be noted here. First, while "post-growth" and "ecological economics" are useful umbrella terms for discussing these various authors, they can at times make differing ideas less distinct. While the authors' goals are often similar, they would certainly not subscribe to certain of their interlocutors' proposals: Marcuse's eco-socialism, for example, is wildly incompatible with Symon's eco-modernism, due to the former's reliance on a Marxian critique of political economy and his heavy criticism of capitalism's use of technology, while Hornborg came into direct conflict with

Moore due to divergent stances on political economy and post-humanism (Moore 2000; Hornborg 2020). These are not mere differences in detail, but rather philosophical and political conflicts of considerable substance. Second, the author as a subject disappears to some degree in this gallery of figures, and even though points of criticism and affirmation are raised, we do not really know which ways of getting there, so to speak, Bińczyk would prefer. I must admit that, after the introductory critique of techno-fixes and green growth, I was surprised to see Symon discussed here, as his ideas – and especially his affirmative stance on geoengineering – do not really diverge from those heard from representatives of the ruling class. I understand that these issues are partly related to accessibility and the desire to avoid the charge of didacticism, but they remain present, and I would even go so far as to say that a lack of guidance as to what we should choose could lead to confusion among readers who are not well acquainted with the problems of some of the presented approaches. Even so, the value of the first part of *Uspołecznianie antropocenu* remains high, and it is likely that every reader will find something compelling in this atlas of alternatives.

Here we transition to Part 2, which feels a bit like waking up from a somewhat pleasant dream to brutal reality. Part 2, "Safekeeping the Future," opens with a fundamental question: is what is happening not calling into question our entire ingrained imaginary connected with the concept of linear progress? Is it not impacting our "contemporary reflection about the future?" (Bińczyk 2023: 120). As Bińczyk states, the "[p]aradox of the Anthropocene is based on the fact that the results of humanity's drive to dominate and control are spinning out of control" and that our "hyperagency" also serves as a "testament to our multidimensional helplessness and impotence" (Bińczyk 2023: 21). The task here is to think beyond those barriers, to "expose, from a philosophical perspective, the possible shapes of the relationship of humanity to the future in the age of the Anthropocene" (Bińczyk 2023: 26). The author moves to interrogate various discourses surrounding the Anthropocene, investigating how the reality of loss – and the possibility of a future – are being repressed through rhetoric and political inaction. She is right to observe that every year of inaction only "paralyses" and strengthens what she calls the "torpor of the Anthropocene" – our state of "inertia and stupor" (Bińczyk 2023: 129). By destroying Earth's biosphere – ravaging species, polluting, and pushing ever more emissions into the atmosphere – we are destroying our own future, which is inextricably tied to it. Without a stable climate, there is no human society, only a fall into barbarism. The author is therefore right

to criticise the strategy of pursuing business as usual, which she describes as a "guarantee of civilisational collapse" (Bińczyk 2023: 130). With a catastrophe on the horizon, our ruling class is beholden to the "Drill, baby, drill" imperative, even if it does not state it aloud or proclaims the contrary while handing out permits. The necessity of transforming the "energetic, economic, and political" status quo is constantly repressed in discourse and practice, and "[w]e are unable to open up to alternative solutions" – in a "sense we have already lost the future by placing our bets on an endless repetition of the present" (Bińczyk 2023: 131, 133).

For Bińczyk, our imaginaries focus only on copies of the present, whether as images of its continuation or its collapse. Moreover, we fetishise the catastrophe, clinging to the belief that it is already too late to act, and we are – unconsciously – enamoured with the apocalypse. This is a poorly chosen object of desire, and we need to wake up to the fact that it is not too late. As Andreas Malm and Wim Carton powerfully argued recently, it will not be too late at 1.5°C, 1.75°C, or 2.0°C (Malm & Carton 2024). The goals and forms of the struggle will need to adapt, but it will, and has to, continue. It is, after all, not just about stopping the crisis, but also about protecting human and non-human lifeforms from its effects. This will not be possible without confronting the "historical and political processes" that are inseparable from the "degradation of the environment, which follows from the pursuit of economic growth and unequal distribution of resources" (Bińczyk 2023: 136). For that, we must open up to "hope and belief in the possibility of a future," to solutions that seem unimaginable from "the vantage point of the dominating paradigm of a pro-market pursuit of profit," and to the possibility of a "good Anthropocene" that is not based on technofixes (Bińczyk 2023: 137, 138). Bińczyk forcefully argues that what we need, here and now, are constructive, transdisciplinary projects that address the crisis by building alternative forms of social existence within the failing present.

The rest of Part 2 of *Uspołecznianie antropocenu* is dedicated to an overview of three such projects and their promises. First, the author reflects on the role of the academic community in the Anthropocene. She rightly argues that scholarly reflection on the climate crisis should be transdisciplinary and that academia can play a crucial role in addressing our predicament: it can "locate catalysts for change and for social tipping points as humanity moves towards green deals and decarbonisation" (Bińczyk 2023: 142). Thus, Bińczyk rightly asserts that the most important "axiological challenge" for academia is to "undertake a transdisciplinary reflection on

the potential conditions for mass agency, taking into account the planet's metabolism, the agency of non-human factors, and technological infrastructures" – to seek "concepts that could strengthen an eco-utopian impulse – what I call ecoverve" (Bińczyk 2023: 158). Both academic practices and theories must be rebuilt in response to the climate crisis, and the commodification of universities and knowledge must be challenged. This is a much-needed reflection on the role academics can play in stopping the crisis. There is a need for education that confronts wider society with the facts of the crisis by disseminating science-based knowledge, combating disinformation, and building hope by insisting on the viability of alternative forms of social existence.

Bińczyk then moves on to a chapter on planetary social thought, which serves as an example of alternative academic practices and extends the introductory discussion on ecological economics. Here, the author introduces a mode of thinking that "understands social formations as geosocial formations and history as geohistory," revealing the feedbacks between social changes and reorganisations of the planet's system (Bińczyk 2023: 165). She builds on this methodological approach to show how ecological economics understands human society as grounded in the planet's conditions. The claim that "selective degrowth" is necessary to "achieve economic restraint and stabilise the metabolism of a given society" can therefore be shown to stem from a transdisciplinary assessment of the natural boundaries to human economies (Bińczyk 2023: 172, 171). This is followed by an overview of degrowth policy recommendations, which helpfully introduce readers to ways in which the broader concepts of this approach can be translated into concrete proposals. While this chapter does, in some respects, repeat points made in Part 1, it nonetheless provides a useful introduction to how a different mode of thinking about the relationship between human society and nature leads to positing the necessity of a radical transformation of our socio-economic systems.

The third reflection on alternatives, which concludes Part 2, is perhaps the most concrete. In Chapter 10, Bińczyk analyses the European Green Deal (EGD), approved in 2020, and asks whether the EU could play the role of an avant-garde in climate-change adaptation and socio-economic transformation. She turns from the postulates of various experts to consider six areas – from decarbonisation to a departure from infinite economic growth – and to show that, hey, they translate into the reality of the EGD. This is a helpful overview of the document and delves into many of its details, showing how economic changes, environmental

regulations, international integration, and democratic inclusion can and should be linked together to create a unified programme to confront the crisis on various fronts. Bińczyk does not attempt to present the EGD as perfect, but as a large step in the right direction, a reason to be optimistic.

However, I believe that this optimism might be misplaced. In my view, the EGD does not conform to the author's own call for "uncompromising novelty and the courage to create a dictionary of a new rationality" (Bińczyk 2023: 181). Various researchers have pointed out that the EGD continues to follow the same economic rationality that led us to our current predicament, and that it is premised on uneven exchange, market-driven technological innovation, non-existent carbon-removal technologies, and hydrogen promoted by the fossil-fuel lobby, as well as on carbon trading (Čavoški 2022; Almeida et al. 2023; Balanyá 2020). Additionally, the plan for net neutrality by 2050 is far too modest, and it was weakened due to pressures from Exxon Mobil, as Bińczyk herself notes (Bińczyk 2023: 191). That is not to say that the EGD should be discarded entirely; it should still be seen as a positive development, but it must also be criticised for what it is: capitalist climate governance.

While I understand why Bińczyk chose to focus on the EU and the EGD – since the Polish readership can readily relate to the issue – I would argue that a much stronger candidate for being the avant-garde of climate-change adaptation, especially in reducing emissions through renewable energy, is China. This is not to champion its politics, but it is quite noteworthy that this single country has developed renewable energy so rapidly that it is set to account for 60% of global capacity by 2030, achieving its goals years ahead of schedule and with a projection that its emissions will soon become negative (IEA 2024; Willige 2024). Brett Christophers has outlined very well why we could learn more from China's efforts than from any other country (Christophers 2024a). Yes, China's renewable expansion is not a multidimensional plan addressing all aspects of the climate and environmental crisis – no mistake here – but if other countries followed its rapid action to reduce emissions, perhaps we would not be in as dire a state as we are. Therefore, I find this particular chapter a tad problematic, even if I understand the reasoning behind it.

Let us now turn to Part 3 of *Uspołecznianie antropocenu*, which consists of shorter, impassioned chapters that clearly articulate the stakes of our present situation and argue forcefully for the necessity of pursuing radical alternatives to capitalist climate governance. Bińczyk begins the first chapter with a thought experiment, asking readers to imagine a future defined

by "ecoverve in the economy or biobalance in resource management [*gospodarowaniu*]" (Bińczyk 2023: 187). She invites us to view our situation from the perspective of a possible future, where the "times of increasingly difficult relations between man and nature," driven by "the pursuit of profit and economic growth," seem absurd (Bińczyk 2023: 188). In this way, she leads us towards her concept of ecoverve, which she defines as "a system of radical, constructive proposals aimed at restoring lost ecosystems, creating resilient economies with guaranteed basic income, and ensuring a just distribution of resources," coupled with a "decisive boycott of the torpor of the Anthropocene" (Bińczyk 2023: 188). This is what we could call "ecoreason," an alternative rationality aimed at protection and reconstruction.

Here the author raises two crucial questions: is survival profitable? Is it rational? Given the actions of capitalists and politicians, which are guiding us towards the worst-case scenario, we must ask, "[w]hat is truly reasonable, and what is stupidity and irrationality?" (Bińczyk 2023: 191). Bińczyk is correct on this point, which echoes the Frankfurt School's critique of capitalist rationality. The dominant rationality is profoundly broken and must be demolished and rebuilt if we are to move beyond the obsession with business as usual – the "unhealthy blindness" that represses everything that does not conform to the profit motive. What follows is a vigorous criticism of business as usual, which links ecological and social devastation. Bińczyk supports her argument with concrete data and strengthens it further by juxtaposing business as usual with the rationality of ecoverve, which underscores the leading question of what is truly rational.

The title of Chapter 12 makes the importance of Bińczyk's leading argument clear: "Without Turning Ambitious Dreams into Reality, There Will Be No Future" (Bińczyk 2023: 199). In this chapter, the author follows the reasoning of the previous one, and attempts to answer an implied question: is all this not too ambitious? The answer is yes, what ecological economics proposes is indeed very ambitious. But these "ambitious social changes need to happen," as it is "highly unlikely that the current capitalist, free-market socio-economic context will allow us to implement the necessary decarbonising reforms" (Bińczyk 2023: 202). This social context must be radically transformed, as "the spectrum of necessary reforms […] seems uniquely wide" (Bińczyk 2023: 202). Bińczyk points out that we've already seen such a transformation in the shift to a Keynesian consensus during the so-called golden age of capitalism. Thus, ambitious and wide reforms are possible – they have just been blocked by an impossibly inert status quo, which fails to recognise that, without change, we risk ending not only an

era of immense economic progress but also the era of planetary stability. Without this stability, we may not be able to retain what we call civilisation (Bińczyk 2023: 202). This is a brief chapter, but its impassioned call to reason is well worth hearing. On the other hand, there is a certain problem inherent in its line of reasoning, to which I will return later.

The next two chapters point to two situations from recent history where the possibility of change briefly became tangible. Chapter 13 offers a short analysis of what occurred during the Covid-19 pandemic. When the pandemic struck, it suddenly became clear that what had seemed impossible – any change in the functioning of our socio-economic system – was, in fact, "possible, and even relatively easy to accomplish" (Bińczyk 2023: 205). It was possible to implement quarantine, put societies and economies into hibernation – to put "business as usual, at last, on hold, even if only for a brief moment" (Bińczyk 2023: 205). Bińczyk acknowledges that this is not to say that no one suffered. However, she highlights several significant occurrences, such as the temporary nationalisation of hospitals or the implementation of redistributive policies. Bińczyk points here also to something that could be even more important: perhaps the shared experience of pain could allow us to shake off our torpor and recognise the need for "economies that prioritise resilience over the pursuit of GDP growth," since crises like pandemics have a global and universal reach (Bińczyk 2023: 207).

However, this possibility was complicated by the class conflict that played out during the pandemic: some were able to work from their mansions, while others risked their health working in hospitals, factories, or grocery stores – often becoming infected and dying from a lack of care, as the public health service was not able to keep up after decades of budget cuts. It is crucial to recognise that the "free market does not protect our lives and health" – it only protects the lives of some, while others are left to witness their loved ones being buried in mass graves, as occurred even in the Global North during the pandemic (Bińczyk 2023: 209). When the worst of the Covid-19 pandemic passed, we returned to the "normal" we knew, as if nothing had happened. Nevertheless, during the pandemic, there was a palpable, shared sense that what we have does not work. For Bińczyk, this represents a crucial possibility: a moment when, instead of going back to the status quo, we may choose to redefine what "normal" means.

Chapter 14 offers another approach to this problem as the author, together with doctoral students from her seminar, considers social change in relation to the Russian invasion of Ukraine. Bińczyk reflects here on the concept of social tipping points – an "accumulation of changes, processes,

and events that cause the system to suddenly and irreversibly enter a new state" – and proposes that Putin's war can be seen as an event that "discredits the system based on fossil fuels and inequality" (Bińczyk 2023: 217). She highlights contemporary Russia as an example of a state rooted solely in resource extraction, enabling it to grow economically without regard for the well-being of its society (which is undeniably true). The economic benefits of this extractivist model flow primarily to the elites, while the broader population is relegated to the role of a cheap, impoverished labour force.

For Bińczyk, the global solidarity in opposing Russia's aggression and the care shown to those fleeing Ukraine reveals the potential for a "spiritual tipping point." She suggests that we may also witness here a "cultural tipping point" in the growing discreditation of Russian oligarchs and the support for sanctioning them (Bińczyk 2023: 219). This distaste for the corrupt super-rich, she argues, could catalyse broader social change that extends to those within our own countries who profit from the suffering of others – those who, for example, continue to invest in fossil fuel extraction.

Moreover, the author observes, the war in Ukraine has forced various European politicians to admit that dependence on Russian fossil fuels was not a wise strategy, and has pushed Europe to pursue decarbonisation as a means of achieving energy independence. In spite of the monstrosity of the war, the pandemic, and the torpor that has held society in its grip, Bińczyk contends that such moments of crisis could potentially become the social tipping points needed to provoke wider and deeper changes in our socio-economic system. The main body of the book thus ends with an attempt to maintain optimism, however minimal, in the face of our current crises – an optimism we must cultivate if we are to move forward.

I think this is a courageous argument to make, and to a degree, I find myself in agreement with the author. The shared sense of existential pain – the flash of recognition that this system does not work for us – is, in fact, important to social change. As Adorno argued in his lecture on progress, the naked appearance of domination can spur a reaction to it, a need to be free from it that occurs dialectically in response to a crisis of legitimacy of the status quo (Adorno 2005). The climate crisis itself could be, in my opinion, an occurrence that could force resistance into existence, as it is forcibly making clear the damage that an unrestricted domination of nature is doing both to the biosphere and to us. But, as Ståle Holgersen recently argued very persuasively, we should be very careful in treating moments of more immediate, direct, short-term crises as moments of possibility if no alternative policy to stop them is prepared beforehand

(Holgersen 2024). Without such a prepared answer, there is only pain during immediate disasters, as capitalism offsets the costs onto the poorest and most vulnerable, while being only as flexible as it needs to be to allow the economic status quo to survive, and buying time to solve the crisis on its own terms. The possibility of empathy birthed by the pain of the pandemic evaporated as politicians and business owners forced the working class back to their workplaces while the virus was still raging – openly stating that some would have to be sacrificed for the good of the economy or the nation – and when pharmaceutical corporations refused to release their vaccine patents, effectively putting profit over countless lives in the Global South. Similarly, the solidarity with Ukraine fractured very quickly as the global far-right did not wait long to align itself with Russia's interests, and the hard anti-immigrant rhetoric of the far right started to target Ukrainian refugees. For all the talk of EU officials, it turns out that dependence on Russian fossil fuels did not end either, as Europe is presently importing gas from Russia at record levels (Niranjan 2025). Nothing changed fundamentally, and our society seems to be worse off now than it was before either the pandemic or the war, with all the contradictions stitched shut in the most dangerous ways. This does not take away from very real moments of on-the-ground solidarity during those crises, but it shows that they can be swallowed by systemic inertia. Thus, I agree with Bińczyk's argument, but I think it has to be supplemented with the statement that we should not expect immediate crises and pain to bring an alternative into existence by themselves: an alternative has to be present beforehand, and a movement has to forcefully assert that this crisis can be solved on terms not dictated by the status quo. Ecological economics should thus be politically ready both to help stop the next immediate crisis and to resolve it on terms in line with their proposals. Now, before I move towards the end, I want to remark briefly on the annex to the book.

The annex itself takes a form that is rarely encountered in writing of this sort. It is titled "A Letter to Those Born on 5 October 2021: About How Magical Was the Time in a Garden in Bory Tucholskie, while the Planet's Systems Were Becoming Destabilised," and takes the form of a diaristic letter to future generations. What I find particularly compelling in Bińczyk's writing here, and in the inclusion of this piece in the book, is the attempt to connect the academic and the personal, the affective and the scholarly. The author describes her and her partner's stay in the Polish countryside during the pandemic years of 2020 and 2021, month by month, detailing its hardships as well as the beauty of reconnecting with

nature and of being included in the small community of her village. Yet, all these experiences are coloured by the impossibility of disconnecting from what is happening globally, by wondering "how to save your generation [that of those born in 2021] from the barbarism of growing inequalities. Is that even possible?" (Bińczyk 2023: 231). Bińczyk very honestly testifies to her emotional states, to the feeling that it is impossible to watch yet another piece of bad news on TV – to see, for instance, the charred remains of animals that died during a wildfire – and to the despair felt when hearing of the continuous climate inaction.

All the beauties she discovered in her new life in the countryside are real. They show how reconnecting with nature can feel, regardless of the problems and hardships. But again, they pale in comparison to the state she finds herself in when she comes to the point of writing the letter we are reading, when she closes this brief annex with the following words: "To those who will be born in a few months. I write with a pang in my heart. Because of the world we are preparing for you" (Bińczyk 2023: 233). This annex might be brief, but it reveals the reality of the affective experience of those of us who work in any field related to climate change. The honesty of abandoning the academic, dispassionate stance to allow a very real expression of despair is almost shocking, and it underscores the stakes of this debate, the very real feelings of dread felt when thinking about the future, as well as the affective labour required to prevent oneself from being consumed by despair. I truly believe that we, as academics, should allow ourselves more of these moments in our writing. Our situation is not one that calls for dispassion and impersonality, no matter how much our institutions and inherited standards might demand it.

Now, before concluding, I want to offer a point of sympathetic criticism. While the atlas of alternative ways of approaching the problem of climate and environmental crises presented by Bińczyk is indeed broad, there is a certain gap within the field she demarcates. Namely, and I admit to a certain bias on my part since I work within this particular approach, I was somewhat surprised to observe a lack of deeper engagement with the eco-Marxist critique of capitalism, which has been very productive since the 1960s. While we are indeed introduced to the theories of Moore and Marcuse – I am not including Hornborg in this tradition, as he views himself only tangentially related to it at best, and is deeply critical of the basic tenets of eco-socialist theory (Hornborg 2019) – they are presented without a discussion of how these two thinkers analyse the structural impossibility of moving beyond the blind domination of nature under

capitalism, and why they see it as a necessity to move to a wholly different social synthesis.

I view this lack as a problem, because in my eyes the book leaves unexamined a critical question: is it possible to address the planetary environmental crisis within the social framework of capitalism? Bińczyk is surely deeply critical of capitalism and criticises it at various points throughout the book, especially when she analyses the status quo. She even refers to concepts produced within the Marxist tradition, such as fossil fuel capitalism (Bińczyk 2023: 102), or points out the connection between class, wealth accumulation, and climate change (Bińczyk 2023: 214). Yet, she often resorts to the ambivalent statement that we need a "radical corrective to capitalism," and, as we have seen, refers to Keynesian reforms when writing of the real possibility of implementing an alternative social system (Bińczyk 2023: 158). Thus, I want to ask: Is this a corrective in the sense of a replacement, or of an attempt to repair the current system? Are the alternatives found in ecological economics meant to create a new social system, or an eco-conscious capitalism?

I do not rule out the possibility that an entirely new social system could come into existence on the basis of the reforms proposed by ecological economics. But I view the answer to these questions as important for two reasons. First, there is the aforementioned issue of the structural conditions that drive ecological devastation under capitalism. As many scholars have shown, growth is an expression of the deeper social structures of the capitalist mode of production and its imperative of value accumulation. It is highly questionable whether this system is even capable of functioning without growth, or whether that would be desirable in the first place (Postone 1993; Blauwhof 2012; Holgersen 2024). This does not mean that nature could only be dominated under capitalism, but that there are structural reasons for this domination – ones that would be very hard, if not impossible, to transcend within the system, given how entrenched they have become (Saito 2023; Pineault 2022; Hanieh 2024). These structural issues also affect other aspects of environmental politics, such as the much-too-slow development of renewable energy capacity in Western countries, which is driven by considerations of profitability (Christophers 2024b), or the continued investment in fossil-fuel extractivism, motivated by the high- profit rates in this sector (Malm & Carton 2024). After the fossil-fuel profit boom of recent years, all lip service to green energy and divestment evaporated, and investment groups and banks are again pouring money into the fossil-fuel industry, often under the guise of funds with ESG labels (Inman 2023).

By not delving into higher levels of abstraction in their analyses of political economy, ecological economists often miss the structural reasons driving such occurrences. On the other hand, if the author disagrees with those analyses, it would be helpful to learn the reasons for this as well.

Second, at this point it seems moot to discuss ecological transformation without addressing class power. What must be discussed is the class warfare from above, waged by capital against ecological transformation. The lobbying, financing of climate denialism and far-right politicians, greenwashing, and targeting of activists are not expressions of ignorance, but of naked class self-interest. Capitalists can profit from devastating the Earth, and they can profit from the devastation itself because adaptation and rebuilding efforts will represent new opportunities for investment and expansion. Is it short-sighted? Yes. But it is still profit, and more than likely, those driven by it will not be the ones to die from dehydration or wet-bulb temperatures, at least not for a long time. What is profitable will be pursued and defended, which has severe implications for green politics. Consider this, for example: can we imagine fossil capital simply swallowing the fact of stranded assets if we were to ban fossil fuels as soon as it is actually necessary? As Malm and Carton point out, such a ban would represent losses in high trillions for the sector, and it is highly unlikely that those involved would accept the deprivation amicably (Malm & Carton 2024). The change must be forced through by a popular movement and, most likely, by the state, and it will not happen without disposing with the central considerations of the capitalist economy. Moreover, to effectively resist counter-strategies and force through change, states would need to be profoundly disconnected from the capitalist class, to which they are currently absurdly closely tied. By abstracting from class power, ecological economists miss the fact that we are already in the midst of a class war as regards ecology, though it is being waged primarily from one side. While I understand the tactical reasons for focusing on the existing positive programmes of alternatives, I must admit that, in my view, by not incorporating the above considerations, we miss the reasons why those programmes are not being implemented, or why they are being implemented only partially and symbolically, without interfering with the status quo.

While the above considerations may be a point of contention for me, or rather reasons to engage in a well-intentioned polemical dialogue, I would not hesitate to recommend *Uspołecznianie antropocenu* widely. It is a well-written book that represents years of valuable transdisciplinary research, which

was expertly used to explore a wide range of considerations related to the gravest issue human civilisation has ever faced. Bińczyk skilfully builds links between philosophy, economics, and the social and natural sciences. Her arguments are easy to follow, convincing, and well-structured, and her honest and passionate tone ensures that there is no trace of condescension or aloofness in the book. Moreover, it is worth noting that while my review may seem exhaustive, it is far from that in reality. There is a wealth of interesting concepts and arguments within the book that I could not analyse due to considerations of space, and these are aspects that future readers of the book will have to discover for themselves.

Furthermore, precisely because of the book's breadth, its transdisciplinary nature, and Bińczyk's style of writing, *Uspołecznianie antropocenu* serves as an excellent, multidimensional introduction to the topic of ecological economics and the idea of an alternative to capitalist rationality. Regardless of one's background, it is not possible to come away from this volume without having learned something new or having had one's established views challenged. I also find it highly valuable that this is a book that can easily be recommended to both academics and general readers. It is neither too shallow for specialists nor alienating to lay readers. It reflects Bińczyk's own call for academia to step beyond its traditional boundaries and reach beyond discussions with other experts without losing its theoretical ambitions. For this reason, it is also, as I remarked above, a much-needed intervention in the Polish discursive field. Against both local and global torpor and inertia, Bińczyk makes a very convincing, multifaceted argument for not treating anti-growth environmental politics as "utopias" or "science fiction" but as "programmes that are firmly empirically grounded and brutally realistic" (Bińczyk 2023: 225) – programmes that we can have and that we desperately need, if we are to address social and environmental crises that are spinning out of control.

To return to the linguistic metaphor and in reference to Bińczyk's closing words, I find the book to be a successful attempt at building a "new dictionary" that can counteract various knee-jerk reactions in the public sphere and help in turn to "build a path for ecoverve and a peaceful, just arranging of survival" (Bińczyk 2023: 226). I hope that we will see more writing like this on the environment and society in Poland, as it is desperately needed.

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FRAMING CONFLICTS OF EUROPEAN ENERGY TRANSITIONS AND THE RESCALING OF POLISH EXPERTISE

ALEKSANDRA LIS, *CLIMATE AND ENERGY POLITICS IN POLAND: DEBATING CARBON DIOXIDE AND SHALE GAS*

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Aleksandra Lis's book *Climate and Energy Politics in Poland: Debating Carbon Dioxide and Shale Gas* offers a nuanced analysis of Poland's post-accession energy transition processes from a science and technology study (STS) perspective. Lis draws from Sheila Jasanoff's (2004) approach of analysing co-productions – the social dynamics that influence the understanding and governing of new entities, such as new technologies or resources. Unlike many STS studies, which compare cross-nationally emerging entities to grasp different social values and meaning-makings, Lis focuses here on Poland and compares two key debates of the early to mid-2010s: first, Poland's attempts to adapt the European Climate Change and Energy Package 2020 to its national context (2008–2009) by seeking country- and sector-specific adjustments for carbon dioxide within the European Trading System (ETS); and second, the shale gas debate (2011–2016), when Poland pursued the technological advancement of hydraulic fracturing despite critical voices from many other European countries.

Across four chapters, Lis examines the tensions between EU climate and energy initiatives and Poland's domestic priorities for economic prosperity. Through her case studies, she highlights the challenges of aligning

national interests in affordable energy with European demands for solidarity and shared climate goals, and shows the complexities of the negotiations over what common "European" goals mean. Her analysis is underpinned by an impressive amount of empirical data, including nearly 200 interviews conducted in five different research projects, primarily with Central and Eastern European (CEE) stakeholders in Poland and Brussels, as well as participant observation at over thirty climate, energy, and shale-gas-related events across Europe. Although Lis does not specify how she triangulated the data, she supplemented her own collected data with published interviews conducted by the political scientist Grzegorz Makuch (2014), along with systematic document and media analyses.

Illustrating her points with the statements of her interviewees, Lis persuades the reader that it is "not only" key historical moments – such as the systemic change in 1989 and the European Union accession in 2004 – that are central to Poland's transitions, but that "profound transitions, though less celebrated and publicized, also occur due to the emergence of objects that demand new interpretation and reorganise relations between different actors" (Lis 2020: 105). What makes Lis's proposition particularly valuable is that it highlights the analytical perspective on objectification – how newly implemented entities, such as carbon dioxide and shale gas, reshape knowledge productions and governance structures on the local, national, and EU level.

A particularly intriguing aspect of Lis's analysis is her discussion of aspects of Europeanisation and (de-)Orientalisation. She illustrates how Poland's engagement with climate and energy policies is shaped by both external pressures and self-positioning strategies. For example, in Chapter 1, "New Energy Objects and the (De-)Orientalisation of Poland," Lis addresses the central question of who still has the right to economic growth in times of climate change, and this sets up her exploration of the "development discourse" in reference to Arturo Escobar (1995). She traces the discourse back to the 1997 Kyoto negotiations, where CEE countries such as Poland were designated "economies in transition" (EIT) (Escobar 1995: 8). This status reinforced narratives of developmental lag and the Orientalisation of Eastern Europe. Politicians and business actors have since used the status to demand solidarity in their development pathways – a practice Lis identifies as being central in post-accession Poland, including in its climate and energy policies. What is primarily problematised here is the capacity of new EU member states of the CEE region to acknowledge their positions:

> [I]t is important to consider whether CEE actors have the capacity to produce knowledge about themselves and how this can be made politically efficient for their own interests. These questions involve reflecting on the processes of rescaling CEE states, which struggle to find a relevant scale for their own politics around climate and energy issues. However, it is also important to consider whether, in an interconnected world, when faced with the global challenge of climate change and with low knowledge-production capacities, they are capable of defining the scale of their action on their own. (Lis 2020: 15)

What comes through in the last sentence of the quote is Lis's repeated questioning of whether, against the backdrop of urgent countermeasures against climate change and the need for international solidarity, Polish politicians and economic actors are also strategically using self-Orientalising narratives to gain leeway in connection with emissions reductions, as Lis describes in her first case study in Chapter 2, "The Production of Expertise, Scaling, and Carbon Dioxide in Poland."

Here, Lis describes the European framing conflicts over the ETS design, which co-produced multiple, politicised categories of carbon dioxide: "free and priced carbon dioxide, Polish carbon dioxide, European carbon dioxide, future carbon dioxide from German investments in Poland, carbon dioxide fleeing outside of Europe together with European growth, etc." (Lis 2020: 47). As Lis highlights, these categories were highly political, tied to conflicting scales of national and European priorities, and implying different visions for development. However, the production of these categories also showed that within European structures of governance, the state's capacity to produce expertise and define its economic and political interests is distributed across a network of actors who span national borders. For example, Polish state actors enhanced their understanding of the ETS reform and the future position of Polish power-sector companies once they engaged in conversations with experts from various industry associations and state officials from other EU member states. This is what Lis calls "frame alignment" (2020: 112), that is, in this case, the Polish actors understood the existing policy infrastructures and negotiated in a way that can be seen as an amalgamation of ideas coming from German power-sector corporations, European industry associations, and other CEE governments – all filtered through the interest of Poland's coal-based electricity-producing sector (Lis 2020: 59–60).

Given these findings, there might be some doubts concerning the concept of "self-Orientalisation" mentioned above. Framing post-socialist states as engaged in self-Orientalisation may implicitly suggest that their engagement with climate politics – on a European or even global scale – is primarily reactive rather than co-productive. Especially when referring to Escobar and his academic work about different visions of development, it may be more productive to analyse these dynamics through concepts such as strategic self-positioning or negotiated Europeanisation. Lis discusses the latter term in depth in her last chapter, arguing for a flat rather than top-down perspective on Europeanisation. Considering the debates in post-colonial studies, which have only just begun to address the role of CEE countries systematically (Grzechnik 2019), and in order to better understand Poland's urge for energy sovereignty and differing notions of development, it would have been valuable to place more emphasis on Poland's socialist legacy and its influence on current energy debates.

Poland's socialist legacy is equally important for understanding Lis's second case study, in Chapter 3, "The Production of Expertise, Scaling, and Shale Gas in Poland."

In the early 2010s, Poland was considered a leading candidate for shale gas development based on American resource (over-)estimations. Poland wanted to attract foreign investments in order to align its energy security goals with its economic diversification, and to that end it sought to simplify its regulatory processes. Lis demonstrates how Poland actively lobbied for a European regulation in favour of shale gas extraction, framing such a regulation (and particularly Donald Tusk's proposition for an Energy Union) as a common EU response to energy security issues. Despite mostly sceptical or even critical voices from other member states, such as France, Bulgaria, and Germany, Poland sought to convince the EU that, considering the earlier conflicts between Ukraine and Russia, the extraction of unconventional gas was crucial in order to be less dependent on Russian gas imports and gain stronger energy independence. Aside from these geopolitical framings, Poland also shaped the production of scientific knowledge about fracking risks. For instance, the Polish Geological Institute conducted baseline environmental studies at seven sites, producing region-specific data for risk assessment – unlike other European countries, which relied mainly on US data. This empirical foundation not only bolstered Poland's domestic regulatory efforts but also informed the European Commission's broader assessments, elevating Poland's expertise within European discussions. Lis argues convincingly that the establishment of

the European Science and Technology Network on Unconventional Hydrocarbon Extraction (UH Network) by the Joint Research Centre in 2015 served as a "scaling mechanism" of Polish expertise. By integrating Polish research into EU-level policy dialogues, the network exemplified how shale gas became a multiscalar object, bridging local, national, and global dimensions (Lis 2020: 64, 77–80). Although low investment and ineffective regulatory reform meant that Poland's shale gas initiative was never realised on a commercial scale, this case shows how new expert knowledge recalibrated regulatory structures, for instance, through the discussion of environmental impact assessments specific to shale gas.

On that note, Lis's case studies are inspiring in regard to adopting a long-term perspective on objectification and scaling processes – not only concerning energy entities but also for the residual effects of these energy entities. Lis illustrates this convincingly in Chapter 4, "Co-Production of Sociopolitical Orders: Energy Objects, Publics, and the State," where she mentions the problematisation of post-fracking waste. This issue has been highlighted in the EU context, particularly by Polish hydrogeological experts. However, it had limited political resonance in Poland and only gained broader attention later, through European meta-studies developed during the post-exploration phase of shale gas extraction. This example transports Lis's findings into current debates in the field of STS; the issue concerns the visibility and invisibility of energy residues as a byproduct of modern industrial activates (cf. Boudia et al. 2021). In this way, the focus not only narrows to carbon dioxide as a so-called residue of the fossil fuel industry but broadens the perspective on our chemical environments and the long-term impacts of extractive industries. In light of recent events, particularly the Russian–Ukrainian war, EU sanctions, and the subsequent rise in US energy exports to Europe, the relevance of shale gas and hydraulic fracturing technology has acquired new dimensions. As the United States solidifies its position as a dominant exporter of natural gas and oil through its fracking activities, the interplay between the extraction of unconventional fossil fuels and global CO_2 reduction goals will continue to be an important issue.

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SHALE GAS: A REVOLUTION THAT DID NOT HAPPEN

ANNA SZOŁUCHA, *GAZ ŁUPKOWY W POLSCE. HISTORIA, MAGIA, PROTEST*

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Anna Szołucha's book *Gaz łupkowy w Polsce. Historia, magia, protest* [Shale Gas in Poland: History, Magic, Protest] centres on shale gas fever – the public response to the potential presence of deposits of unconventional hydrocarbons, or so-called shale gas, in Poland in the period 2008–2018. Preliminary drilling did not confirm the presence of gas in the pores and fractures of rocks at a depth that would allow its (profitable) exploitation with the currently available technologies. However, the question of "What if it were there?" was answered. The scientific community, politicians, authorities at various levels of government, representatives of business, media, and industry, and residents of potential mining areas, all responded with an intensification of political activity, including the formation of coalitions, alliances, collaborations, and various forms of resistance. The book's narrative thus revolves around conferences, study visits, lawsuits, changes to the law, protests, administrative promotions, and diplomatic actions.

The book also contains a kind of "overture": a history of the activities of individuals associated with the later exploration period, demonstrating how exposure to the ideas of unconventional hydrocarbon extraction occurs. The path leads through the United States: political, agricultural, and business contacts are formed that make it possible to imagine sources of revenue (buying or selling plots of land, concessions), new career paths (new

fuel, the reshuffling of current geopolitical alignments, the raised profile of geology as a science with the backing of the state), and political strategies (energy security, technological partnerships). Interestingly, this path has also proven useful for the resistance to the extraction trajectory – it provided important contacts and sources of eyewitness experience to farmers. Most attention and space in the book are devoted to the more-than-year-long blockade of Chevron's exploration activities in Żurawlów, a small village in Zamość County, and the community that emerged around this protest.

The author of the book, Anna Szołucha, is an anthropologist who has devoted much of her attention within the field of energy studies to researching the impact of geological exploration, investment, and shale gas extraction itself on communities not only in Poland but also and especially in the United Kingdom. Her interdisciplinary background blends anthropology, political ecology, and critical social theory, allowing her to examine how extractive industries interact with local communities, grassroots activism, and broader socio-political structures. Her research is especially relevant in the context of Poland and the United Kingdom, where shale gas exploration has been promoted as a means of achieving energy security and economic growth, often in the face of strong public opposition. Szołucha's work critically analyses how extractive industries and governments deploy narratives of development and technological progress while overlooking the social and environmental concerns of affected communities.

In studying shale gas extraction in the United Kingdom, Szołucha employed ethnographic fieldwork, interviews, and participant observation to document the experiences, resistance strategies, and everyday lives of people impacted by fracking. By elaborating on the impact of extraction zones on local communities, her research fed into advocacy and policy work (Short & Szołucha 2019). In Poland, through interviews, site visits, and document analyses, she reconstructed how communities negotiated the uncertainty and risks associated with shale gas exploration. In both cases her ethnographic work shows that communities, through their activities in this regard, found creative ways of reinvigorating local democracy. Direct action, protests, and collaborative learning are responses – against all odds – to disillusionment with democratic procedures, which are easily breached on the central (governmental) and corporate level. *Shale Gas in Poland: History, Magic, Protest* focuses on storytelling and ethnography without engaging in theoretical academic debates. It is an example of engaged anthropology, which seeks to empower social movements, preserve their memory, and make science useful.

The book's narrative is built along the dramatic axis of the "enchantment" and "disenchantment" of shale gas, to which some actors were subject (e.g., politicians, research institutions, and to some extent, local governments), and which others resisted, as did the residents of Żurawlów. The author suggests that magic is not just a metaphor but an anthropological analytical figure, or – in her functional view – a social mechanism that by default serves to uphold political legitimacy in the face of uncertainty related to a new energy source. The mechanism allows the processes of concession and exploration to be orchestrated "as if" the idealised future associated with the energy source were a fact. Szołucha's analysis follows the chronology of events and leads her to the conclusion that "shale gas enchanted and disappointed in ways that, in retrospect, are difficult to explain with rational arguments" (Szołucha 2021: 11).[1]

Szołucha describes "enchantment" in two ways: first, by pointing out the megalomaniac rhetoric in media, political, and scientific coverage; and second, by journalistically tracing the movements of the main actors in the field of politics, at the intersection of diplomacy and science. She concludes that the performative establishment of a vision of Poland's future in a new geostrategic position, in which it would be a technological partner of the United States, while at the same time being a country with energy sovereignty, consisted, first, in accepting the estimation of gas resources as a fact creating that future, and second, in adopting an attitude conducive to the realisation of the "*raison d'état*" thus understood. Actions that went beyond people's specialisations were thus legitimised: geologists made recommendations on how to deal with residents; politicians made promises using (estimated) data. They also went beyond the letter of the law.

Here are some examples of shale gas enchantment described in the book's first two chapters, which the author devotes to central institutions: the political community and the scientific community of geologists. In 2010, representatives of the Ministry of Foreign Affairs wrote a report on a conference held by an organisation lobbying for the introduction of American technological and legislative endeavours for shale gas extraction, during which representatives of extraction companies spoke of the industry's lack of harm to the environment. They legitimised this opinion on the authority of the public administration, without citing their source – and thus created a document that served Polish diplomacy as a guideline in talks with investors (Szołucha 2021: 41), the media, and stakeholders. Geological services, in cooperation with businesses capable of financing

[1] Unless stated otherwise, all translations are my own.

extremely expensive exploration wells, saw opportunities for scientific and technological development, while locating the actual possibilities of gas extraction in the future, where new technologies would supposedly overcome the existing limitations. This is why, for example, the geological services went beyond their competence in order to "soothe" public emotions, and adopted the interests of mining companies in regard to secrecy of information. Furthermore, as the author reveals, even though forecasts had not confirmed the presence of gigantic resources (already in 2012) and the drilling had so far not provided any tangible scientific benefit (there were problems with the samples, as revealed by the Supreme Audit Office) the state funded the Blue Gas programme at the National Centre for Research and Development, with the aim of developing and commercialising innovative technologies related to shale gas extraction.

The material contained in the second part of the book is different. First of all, it is extremely rich in quotations from interviews conducted after the events described above had already taken place, that is, after the formation of opposition to the gas extraction project and the subsequent 400-day protest by a group of farmers from Żurawlów who demanded a halt to prospecting in their fields (which ended in 2014). The author describes in detail the forums where – in addition to the direct blockade – a conflict played out between the state and local governments intent on securing cooperation with corporations, which were perceived as serious partners, and the community, which was learning to build connections and coalitions, and recognising that it had a right to say "no." Szołucha writes that the residents of Żurawlów "did not agree that economics and geological considerations should determine whether a mining industry would develop in their area" (Szołucha 2021: 84). The activities of the residents, who were not even by law party to the proceedings, included questioning the ambiguities connected with granting a concession to Chevron, heightened vigilance over decisions of the local authorities, barging into meetings at various levels, proceedings before the European Commission and the Court of Justice of the European Union challenging the direction of legal changes in the interests of the mining lobby, and finally, obtaining the support of anarchist circles and environmental associations.

In her introduction, Szołucha speaks of how her study of shale gas fever has provided a "frank, sometimes embarrassing and funny, and sometimes uplifting picture of ourselves and our approach to issues that are identified as those of state interest, and therefore – of interest to all of us" (Szołucha 2021:14), but it is especially with reference to the farmers,

the villagers who challenged the "shale Eldorado," that we get such an image. Although interviews with officials and scholars also form part of the research material, Szołucha reconstructs the central events mainly by analysing documents and establishing a chronology of events. Locality, on the other hand, is embodied, the tactics used by the farmers are surprising and unpredictable, and the emerging alliances have the dimension of human relationships that transcend social divisions – this is how they are described by the author, who dedicates the book's final chapter, titled "Disenchanting Gas in Żurawlów," to the performativity of protest.

Long quotes from the interviews allow the author not only to reconstruct the course of events, but also to capture the temperature of emotions, and the nature of the language and the drama surrounding the events. Participants of the protest, by sharing their reflections with the author and recalling important facts from the history of the protest, co-created a kind of "archive for the future." This phrase, which was coined by Macarena Gómez-Barris, initially referred to artistic practices of resistance to the cleansing of areas affected by colonial-extractivist projects (Gómez-Barris 2017: 133). It fits well with the chapters that describe the actions of the residents. An "archive for the future" is an extremely valuable resource for creating an alternative environmental history – one not to be found on government websites, the occupychevron.tumblr.com blog, or in existing social science studies of would-be shale gas extraction in Poland.

Unlike in earlier publications on shale gas, the author abstracts from the materiality of this resource: the ways it is explored and extracted, which give rise to the organisation of specific forms of "social" work that extend far beyond geological features on the one hand, and economic issues of profits from extraction on the other. In the case of shale gas, its designation as an "unconventional" resource, and the unpredictability and uncertainty associated with it, "has been useful as a material determinant of the special status of shale gas in law, the planning process, and political debate. It served to dis-embed exploration from the social and the political" (Szołucha 2019: 2). The exclusion of the local community from decision-making processes regarding gas extraction in the context of the extractive industry is not surprising. What is puzzling in this context, however, is the characterisation of anticipatory extraction policies as justified by the magical power of shale gas.

Would uncertainty have been more difficult to turn into a tool of power if it had been stripped of the huge quantity of projections of Poland as a "shale giant" with "energy security" – phantasmagorias that allowed

civil society and other futures than those associated with the state mining complex and corporate interests to be disregarded? In the first chapter, titled "Shale Diplomacy," the author draws attention to the specific temporality of the exploration process. Exploration decisions were made before any data about the resources had been made available. In 2007, when the mayor of the municipality of Grabowiec consented to grant an exploration license, the actual amount of gas obtainable in a given area and the depth and nature of seismic and drilling work were unknown, and experience of the consequences of hydraulic fracturing in specific geological, social, and landscape conditions was nonexistent. The decision of the mayor, and the opinion of the Ministry of the Environment that "the planned activity […] does not constitute a project that could have a significant impact on the environment […] or a project for which an environmental impact report should be required" (Szołucha 2021: 22) are characterised by a degree of certainty that does not accord with the speculative nature of the investment.

As in the case of researchers working in science and technology studies and dealing with the would-be production of shale gas in Poland (cf. Stasik 2019; Lis & Stasik 2017), uncertainty is also a subject of investigation for Szołucha. However, her book asks different questions – not about who participates in the creation of facts about shale gas, but about the symbolic surplus of extraction infrastructures, which consolidate before the actual mines are built, in the form of mechanisms of authoritarian governance in the bosom of democracy. The book does rather well in documenting the processes by which uncertainty about the actual amount of gas and the possibility of extracting it turns into a tool for managing and mobilising support for its extraction. In the literature on pre-extraction exploration, there are records of what factors led to obtaining inflated estimates of resource availability. In the case of oil, "overestimated" volumes led to a more enthusiastic response from the administration, exploration companies, and investors, resulting in a specific kind of feedback loop: acceptance of inflated estimates, stimulation of investment, higher profits for extraction companies (Graf 2014: 141). The initial Cambridge Energy Research Associates report and the Energy Information Administration's estimate worked similarly. In contrast, the situation of uncertainty was interpreted differently by the residents of Żurawlów, as their actions revealed. They expressed their right to control their lives within a democratic reality – with unexpected consequences in the form of learning about both shale gas and the ways institutions work in practice, and also about the emotional cost of engaging in a prolonged protest.

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& Coltan, Oil Shale (2021, Kunstfest Weimar); editorial: *The Make Yourself at Home Guide to Warsaw* (2015, with R. Al Rajji and Monnik), *Artists' Initiatives, and Galleries* (2014, with A. Pindera and W. Szczupacka).

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ACTUALITY AND ITS DISCONTENTS: A CRITICAL REFLECTION ON MICHAEL MARDER'S *HEGEL'S ENERGY*

MICHAEL MARDER, *HEGEL'S ENERGY: A READING OF* THE PHENOMENOLOGY OF SPIRIT

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/// Introduction

Michael Marder's *Hegel's Energy: A Reading of* The Phenomenology of Spirit (2021) presents a bold reimagining of Hegelian dialectics and reframes energy as the ontological and material core of Spirit's unfolding. For Marder, energy is not merely a metaphor but the very process through which dialectics operates in actuality. This interpretation situates energy as the driving force of Hegel's system, simultaneously embodying, on the one hand, process (its verbal-subjective element), and on the other, product (its substantive aspect). Marder's concept of energy, however, reaches beyond the confines of Hegel's *Phenomenology*, addressing pressing socio-political and ecological crises. By critiquing modernity's extractive paradigms, which are rooted in the primacy of potentiality, Marder proposes a radical rethinking: a new energetic ontology of actuality that emphasises relationality, interdependence, and regeneration.

This review delves into Marder's ambitious project by examining two intertwined dimensions of his argument. First, it analyses his reframing of energy within Hegelian dialectics, particularly in relation to Catherine

Malabou's concept of plasticity, and uncovers key theoretical limitations in his perspective. Second, it explores the socio-political implications of his work, with a focus on ecological philosophy and his critique of extractivist ideology. It is worth mentioning that Marder is a very prolific author, and his credits include many books on plant philosophy and the environment (see, e.g., Marder 2013, 2014, 2015, 2017, 2023). By drawing on Hegelian speculative thought, this analysis underscores both the strengths and challenges inherent in Marder's approach and ultimately assesses its contribution to contemporary philosophical discourse and its significance in addressing the urgent crises of modernity.

/// The Energetic Core of Hegel's *Wirklichkeit*

Marder's *Hegel's Energy* posits that energy functions as the underlying mechanism driving Hegel's *Phenomenology of Spirit* – the fundamental principle that "speaks and dreams of nothing but energy, which oozes from its every sentence and formulation, albeit under a different name. That name is *Wirklichkeit* – 'actuality'" (Marder 2021: 6). Through this claim, Marder positions himself within a contemporary strand of Hegelian scholarship that interprets Hegel through Aristotelian frameworks (see, e.g., Ng 2020; de Laurentiis 2021), while simultaneously infusing this perspective with a poststructuralist twist.

Marder's Aristotelianism asserts that Spirit is neither mystical nor spiritual in a transcendent or metaphysical sense. Rather, Spirit is profoundly immanent – it is the world itself, unfolding in the immediate and dynamic process of its becoming. The concept of *Wirklichkeit* (actuality) occupies a central position in Hegel's system, grounding it in direct engagement with being itself rather than confining it to the reflective domains of knowledge or linguistic construction. This interpretation challenges the deflationist positions of thinkers like Brandom (2019) and Pinkard (1994), who privilege the epistemological and discursive dimensions of Hegel's philosophy. In contrast, Marder contends that *Wirklichkeit* is no abstraction, no mere reflection of human cognition, but the very substance of being's self-articulation – a system animated by the energies of life, labour, and contradiction.

Simultaneously, Marder's poststructuralist sensibilities infuse his interpretation with a distinctive methodological nuance. Employing a "symptomal reading" (Marder 2021: 6), he aims to expose energy as a force repressed within the textual unconscious of Hegel's *Phenomenology of Spirit*. This interpretative strategy positions energy as both absent and

omnipresent – an implicit dynamic permeating the work, veiled behind the guise of actuality. In this manner, Marder's reading itself mirrors the dialectical movement it seeks to reveal: energy emerges as both the overt content of Hegel's text and its latent undercurrent – a concealed force woven into its structure and rhythms, awaiting revelation.

For Marder, energy embodies a dual nature: it is both verbal-subjective and substantivised – simultaneously *working* and *work*. Hegel, Marder maintains, emerges as the first true philosopher of energy (2021: 14), employing this duality as the driving mechanism of dialectical progression. This energy oscillates between *being-at-work* (active, processual labour) and *being-in-the-work* (momentary stabilisation as determinate actuality). The realisation of Hegelian Spirit in its odyssey through the *Phenomenology* culminates in a dialectical synthesis: "Actualized spirit – energy fully energized and energizing – is a synergic ensemble which, presupposed by though not included in the point of departure, assembles under its umbrella, among other things, the synergy of movement and rest" (Marder 2021: 15). For Marder, energy amplifies as it assimilates relations and synergies into an integrated totality, and it is through this cumulative process that he envisions the Hegelian Absolute.

The trajectory of energy in Marder's book follows a markedly different path. In the first part, "Prolegomena to the Dialectics of Energy," Marder lays out his conceptual framework, a structure as intellectually ambitious as it is energetically dense. This section, enriched with references to an eclectic array of thinkers – from Aristotle and Kant to Nietzsche, Marx, and Bergson – functions as an experiment in forging a distinctive "energetical jargon." This innovative language enables Marder not only to reinterpret Hegel but also to offer an analytical lens for examining transitions and transformations in the contemporary world. At first, the reader is captivated by the craftsmanship and vitality of Marder's narrative, energised by the wide-ranging connections he weaves. However, as his foundational concept – energy as actuality, "*the recognition of being-at-work in being-in-the-work*" (Marder 2021: 117), and similar formulations – reappears incessantly through reframing and paraphrasing, the initial intrigue gradually gives way to a sense of disorientation and fatigue.

This sense of exhaustion intensifies in the second part, "*The Phenomenology of Spirit* and the Question of Energy: An Exegesis." Here, Marder applies his theory of energy to a meticulous rereading of Hegel's opus. While his exegetical rigour is evident, the repetitive nature of his method undermines its impact. Having already grasped Marder's conceptual toolkit,

the reader frequently predicts how each subsequent dialectical shift will be framed. What begins with fully actualised intellectual energy dissipates over the course of the book's development. By the conclusion, rather than arriving at the promised dialectical synergy, the reader is left with scattered potentials – an impression of unrealised possibilities rather than fully charged actuality.

This formal dissonance, where the execution of the book appears to contradict its central claim – the primacy of actuality over potentiality – presents an intriguing paradox. While Marder's argument extols energy as a fully realised actuality, the structure and progression of his text seem to mirror the very dissipation of energy that he seeks to critique. For now, however, I will leave these formal concerns aside to concentrate on his interpretation of Hegel's dialectics as energy-*Wirklichkeit*.

Is energy genuinely a novel contribution to Hegelian thought, or does it merely reframe Hegel's concept of mediation under a different guise? Furthermore, what are the implications of this reinterpretation for understanding the dialectical process, especially when examined through the lens of contradiction and its socio-political ramifications?

/// Energy and Plasticity: A Dialectical Encounter

Marder's claim that energy functions as the driving force of Hegelian dialectics positions it as both the process and the substance of *Wirklichkeit*. This perspective is compelling in its attempt to highlight the materiality and dynamism of Hegel's system, anchoring it firmly within the realm of material existence. However, it invites a critical question: is energy genuinely distinct from Hegel's concept of sublation (*Aufhebung*), or does it merely reframe the established interplay of negation, resolution, and preservation that already underpins the development of Spirit?

To elucidate the internal logic of energy – conceived as an "energising-energised" movement – Marder relies on the very categories of Hegelian dialectical logic that he aims to reinterpret. Energy is depicted as a self-moving circle, turning inward and outward, a motion that mirrors Hegel's conception of Spirit as a process of self-relation and self-reconciliation. In this framework, energy becomes a rearticulated expression of Spirit, intended to reveal its latent dynamism. Marder's project thus transforms into an exercise in Spirit's self-explication through an energetic lexicon. However, this seemingly tautological endeavour of interpreting *idem per*

idem remains closely aligned with the speculative structure at the heart of Hegelian thought.

Marder's approach bears a notable resemblance to Catherine Malabou's concept of plasticity in Hegel (Malabou 2005), as both pursue the shared objective of grounding Hegel's dialectics in materiality. They emphasise the transformative processes inherent in *Wirklichkeit* and Spirit, highlighting the dynamic interplay of opposites that propel dialectical development. Both Malabou's plasticity and Marder's energy challenge portrayals of Hegel as an abstract idealist and instead present his philosophy as deeply engaged with material and relational actuality. However, while they share a commitment to affirming Hegel's contemporary relevance, their methodologies diverge significantly, with Malabou providing a far more incisive interpretation of Hegel as a thinker of contradiction.

Catherine Malabou's concept of plasticity emphasises the liberating power of relinquishment as central to the destructive creativity inherent in Hegelian dialectics. For Malabou, Spirit's development is not characterised by a harmonious synthesis of opposites but by a process of rupture, where each stage must annihilate its autonomy to integrate into the totality. *Aufhebung* (sublation), in her reading, is not a smooth reconciliation but a violent transformation marked by loss and reconstitution. At the core of this process lies the act of letting go – to relinquish (*ablassen*) and to release (*weglassen*) – a negation that simultaneously preserves. This dynamic tension between release and preservation captures the essence of Hegelian contradiction: a generative antagonism that brings forth new forms while retaining the imprint of what has been negated. For Malabou, each phase of Spirit must "mourn" (*faire le deuil*) its autonomy, surrendering its independence to facilitate transformation and integration into a larger whole. This act of letting go is not passive resignation but a radically transformative gesture, embodying the productive violence essential to Spirit's self-development (Malabou 2005: 159).

In contrast, Marder's concept of the *absolute-as-energy* emphasises the harmonious integration of opposites, envisioning Spirit as achieving a synthesis of activity and rest, labour, and result. While this perspective successfully captures the relational dynamics central to Hegelian thought, it underplays the disruptive and transformative power of negation within the dialectic. The negative moment is acknowledged as pivotal, yet it is swiftly subsumed into a synergistic system of mediation, thereby tempering its radical capacity to unsettle and redefine. As Malabou illustrates, transformation in Hegel's philosophy is not merely a productive interplay of opposites

but a destructive creativity that fundamentally reshapes the very foundation of being. This focus on rupture and the violent relinquishment of autonomy, central to her concept of plasticity, offers a reading more faithful to Hegel's speculative core – particularly his materialism of contradiction, wherein the impossibility of seamless sublation drives historical and conceptual development. Similar radical reinterpretations can be found in Slavoj Žižek's exploration of Hegelian dialectical materialism (Žižek 2012, 2014, 2020) and Todd McGowan's concept of Hegel's "contradictory revolution" (McGowan 2019). For Hegel, Spirit does not sustain itself through relationality alone; it consumes, negates, and transforms. Contradiction, far from representing a tension to reconcile, operates as a generative force that destabilises and reconstructs reality itself.

/// Conclusion: Beyond Extractivism – Actuality as a Dialectical Alternative

Marder's *Hegel's Energy* invites a reconsideration of both the philosophical mechanics of Hegelian dialectics and their ethical and ecological implications. Although Marder's interpretation of energy as the driving force of dialectical movement has theoretical limitations – particularly when measured against the radical readings of Malabou, Žižek, or McGowan – it nonetheless brings to light a pivotal philosophical tension: the dominance of potentiality as the guiding paradigm of modernity versus the regenerative possibilities embedded in Hegel's concept of actuality (*Wirklichkeit*).

At its core, extractivism epitomises the ascendancy of potentiality over actuality. It treats the world as a repository of latent possibilities, extracting resources, energy, and value from what is in order to actualise a narrow vision of potential. This process annihilates the present – its material integrity, temporal continuity, and relational synergies – by subordinating it to an abstract, short-term future, a logic intimately tied to the imperatives of capitalist accumulation. Fossil fuels, for example, are consumed to perpetuate the illusion of endless potentiality, depleting finite reserves and destabilising ecosystems vital to life. This "murderous potentiality," as Marder aptly describes it, operates through one-way extraction, severed from the reversible and regenerative dynamics of dialectical energy. As Marder notes, "The extractivist ideology that saps the earth's 'natural resources' is, by way of contrast, irreversible, while the relations it prescribes between what is used and the users are set in stone (or in shale rock). Its

energy, hopelessly depleting itself, nourishes the irrationality of world-destruction" (Marder 2021: 53).

Hegelian dialectics, however, present a fundamentally different paradigm. In Hegel's philosophy, potentiality and actuality are not mutually exclusive but are mediated through a dynamic interplay, where potential is not merely consumed but transformed into something concrete and self-sustaining. *Wirklichkeit*, as Marder highlights, is not a static state but a self-relating movement shaped by negation and sublation (*Aufhebung*), in which what is negated is simultaneously preserved and elevated into a more integrated totality. Unlike the unidirectional, extractive logic that prioritises consumption, this dialectical process honours and incorporates the temporal, material, and relational dimensions of existence, fostering regeneration rather than depletion.

By juxtaposing extractivism's unidirectional, destructive focus on potentiality with the regenerative capacity of Hegelian actuality, Marder reframes energy as a relational, self-renewing process: "Dialectical energy does not extract resources from a world it construes as initially too abstract, too bare and vacant, to provide any fuel for being or for thought. Rather than extract, it extends and rhythmically contracts to come out of itself again" (Marder 2021: 54). This cyclical and self-sustaining dynamic aligns with Hegelian *Wirklichkeit*, where – echoing the Aristotelian *energeia* – destruction and preservation coexist, driving the dialectical unfolding of being.

The opposition between extractivist potentiality and Hegelian actuality reveals deeper philosophical tensions in late modernity. Extractivism, with its fixation on potentiality, reflects dominant paradigms of abstraction, unrestrained capital accumulation, and perpetual growth. By reducing the world to a mere substrate for human ambition, it neglects the material and relational conditions essential for sustaining life. Hegelian actuality, in contrast, insists on grounding freedom and transformation within the concrete realities of relational being. True change emerges through a dialectical movement that prioritises regeneration over depletion.

The lesson of *Hegel's Energy* is twofold. First, it urges us to confront the destructiveness inherent in extractivist logic and its philosophical foundations. Second, it calls for the adoption of Hegelian actuality as a framework for regeneration. By redefining energy as a relational, self-renewing process, Marder critiques the shortcomings of modernity while offering a speculative pathway towards sustainability. In this vision, energy transcends the notion of a resource to be extracted and consumed, emerging

instead as a dynamic movement of becoming – one that simultaneously transforms and preserves, consumes and renews.

Yet, this vision is not without its challenges. Malabou's plasticity and Žižek's concept of "non-reconciliation" with reality offer more radical alternatives, emphasising rupture as essential to dismantling the systems driving ecological collapse. Plasticity's destructive creativity resonates with the pressing demands of the Anthropocene, where systemic transformation requires not gradual regeneration but decisive breaks with entrenched paradigms. While Marder's energy inspires a vision of harmonious renewal, it may lack the disruptive force needed to confront the violent realities of the ecological crisis.

Despite these limitations, Marder's political conclusions remain profoundly significant. By uncovering the energetic core of *Wirklichkeit*, he provides a compelling counterpoint to the extractivist logic of depletion and abstraction that defines our age. His call to rethink energy, time, and relationality resonates as both a philosophical insight and an urgent intervention in the crises of late modernity. *Hegel's Energy* reminds us that the path to regeneration lies in the dialectical sublation – the dynamic interplay of negation and preservation – a movement that refuses to sacrifice actuality on the altar of potentiality but instead seeks to transform both in the service of becoming.

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HYDROCARBON HUNGER OR THE WILL OF THE OIL GOD

ANTTI SALMINEN, TERE VADÉN, *ENERGY AND EXPERIENCE: AN ESSAY IN NAFTHOLOGY*

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In the disputes dividing new materialists from cognitivists, that is, in the disputes about what should be considered first – matter ("nothing but matter") or information ("it from bit") – we have forgotten about a third term: we have forgotten about energy. In the disputes that have divided the supporters of virtual philosophy, that is, the philosophy of radical contingency (Quentin Meillassoux) and the philosophy of cosmotechnics and recursion (Yuk Hui), which aim to describe planetary cybernetics, we have forgotten that the complement of the Aristotelian category of potency (*dýnamis*) is actualisation (energy). Potency is the basis of change (motion) and determines how change is possible. Potency alone, however, does not guarantee the reality of change. In Aristotle's thought, matter is pure potency, which owes its reality to constant actualisation. Everything that exists is defined by the ability to perform work, which maintains the state of the system and postpones destruction.

Two writers from the University of Turku and the University of Lapland in Finland, Antti Salminen and Tere Vadén, whose book *Energy and Experience: An Essay in Naftholog*y is worth reading over and over again, remind us of this forgotten term – of the exclusion of energy from philosophical discourse and its obscuration by "naked matter" or "pure difference." This book comprises five excellent essays on the subject of energy

understood broadly, that is, as a material but also a spiritual and institutional condition of the economy. This book is a beautiful example of transdisciplinary and openly anti-disciplinary thinking. It has been a long time since I read a book that emanates such freshness and courage and power of thought. The authors combine reflections from the fields of economics, engineering, sociology, history, and, above all, philosophy. The authors quote with equal freedom David Graeber, Karl Marx, Martin Heidegger, George Bataille, Friedrich Nietzsche, Ernst Jünger, Max Weber, Slavoj Žižek, Paul Virilio, Jared Diamond, Albert Borgmann, Reza Negarestani, Simone Weil, and many others. All these references are made with the same competence and interpretative inventiveness.

Salminen and Vadén see energy and, above all, oil, as a new God who governs the conditions of our survival, a God who is generous in his extravagance but also severe in his assessment of our exploitation of his gift, that is, the gift of oil. Unlike matter and information, energy is not something given and is never obvious. Energy requires exploitation, extraction, and work in order to reveal its real power. Hence, it is almost a sacred power. Energy is shown at the moment of explosion, releasing the forces of creation and destruction contained in it. Energy, as Aristotle seemed to know, is actualisation. We – modern people – are still not atheists: not because "God is unconscious" (Jacques Lacan), nor because our lives are constantly governed by the spirit of asceticism (Friedrich Nietzsche), but because our lives depend on the God of Oil. This discovery is the strength and weakness of this important book, which makes energy a mystery equal to the mystery of the incarnation of God in the Christian religion. Every religion lives in mystery and there is no religion without mystery.

The authors of the book leave us with no illusions about the religious and apocalyptic aspect of our culture, writing that

> After God was killed in the bourgeois revolution, He went underground in order to be utilized as oil by its descendants. […] The death of God and the birth of the age of oil have been experienced together precisely by keeping them apart. The distinction – the sacred and the meaningful here, the economic and useful there – is one of the most essential characteristics of the age of oil. After His death, God turned into oil, and oil became a surrogate God with very straightforward utility: everything that smacks of being sacred is burned in the black engine of economic growth. (Salminen & Vadén 2015: 2)

Economics and, in a sense, calculability, save the thesis about the sacred nature of energy from strictly religious discourse or its caricatured incarnations.

The authors of *Energy and Experience* interestingly elaborate on the theme of the philosophy of technology, which is necessary to exploit nature. The authors' views on technology are clear: neither Marx nor Heidegger, who are both wrong about technology. After the rejection of Marx and Heidegger, the tradition of the Dark Enlightenment remains. This tradition stretches from Giordano Bruno to Ernst Bloch, Georges Bataille, and Nick Land. It sees both overt and hidden forces in matter, and destructive as well as evolutionary powers. The power of the fallen God and the power of the raging God, which is contained, hidden in matter, is precisely energy. In Giordano Bruno's understanding, everything is matter, but not in the sense given to this term in the natural sciences. Matter is permeated with the soul of God, and in the God–matter continuum, there is no hierarchy. The same idea will return in the inhuman and Dark Vitalism of Georges Bataille and Nick Land, Simone Weil, and Reza Negarestani. The demonic nature of oil is another name for the experience of its violence and vitality: the energy in oil is fundamental, but the fascination resulting from the multiplication of explosions of fire distorts the seemingly rational calculations of a digital calculating machine in the age of planetary cybernetics.

The technology of exploitation is neither about the commodification of energy nor about introducing nature into a pure resource but about something else. What is it? Perhaps it is about mobilising to manage the energy that never remains "waste." One of the unique properties of hydrocarbons, particularly oil, as a basic substance is their pure stellar energy, which can be described by the concept of energy return on investment (EROI). The value of this return is calculated by dividing the amount of energy gained by the amount of energy spent. If the value is greater than one, energy has been "gained"; if it is less, energy has been "lost." If the work required to produce one barrel of oil is greater than the energy compressed in the barrel, the energy return in the production process is less than one. In such a situation, we are on a slippery slope, which means that the world and the economy are governed by the desire for destruction, the desire for absolute dissipation, and the heat death of the cosmos.

I would place *Energy and Experience: An Essay in Naftholog*y near Andreas Malm's book *Fossil Capital* (2016), and Jason W. Moore's *Capitalism in the Web of Life* (2015). Malm realised the dependence of economics on fossil fuels, and he suggested a simple definition of the fossil economy as "an economy

of self-sustaining growth predicated on the growing consumption of fossil fuels, and therefore generating a sustained growth in emissions of carbon dioxide" (2016: 21). Malm, while declaring the need to move away from this type of economy, remained a Marxist to the end, and after criticising what he calls "the myth of the human enterprise," proposed complex models of economic cycles in which he describes "the real subsumption of labour by means of really subsumed nature" (2016: 375). Malm is also tempted by theories of power in which physical force translates into a political force that crushes physical nature and human bodies and minds, reducing them to bare resources. Malm declares that the power derived from fossil fuels was dual in meaning and nature from the beginning. For Malm, the fossil economy cannot explain the entire human impact on the climate. The burning of fossil fuels is just one cause of global warming, just as the Sun is just one of the bodies in the solar system, and the American president is just one actor in a larger team, yet it can be said that the burning of fossil fuels is the hard core of the future destruction of the world.

For Malm, the Anthropocene started in the second half of the eighteenth century. Analysing air trapped in polar ice has shown that global carbon dioxide and methane concentrations began to grow in this particular period. This date also coincides with James Watt's design of the steam engine in 1784. What we see in the world today are the large-scale effects of establishing a fossil economy. Timothy Morton seconds these statements, describing our location in time and history as follows:

> The end of the world has already occurred. We can be uncannily precise about the date on which the world ended. It was April 1784, when James Watt patented the steam engine, an Act that commenced the deposition of carbon in Earth's crust – namely, the inception of humanity as a geophysical force on a planetary scale. (Morton 2013: 7)

Everything begins not with the Death of God but with a certain invention – the gadget of the steam engine**.**

Jason W. Moore, unlike Malm, did not define nature as the content of the form of capital but showed something more ambiguous. *Capitalism in the Web of Life* tells the story of how capitalism works "through nature" and how nature works in the more limited territory of capitalism. Moore (2015) calls this double movement – capitalism thought "through nature"

and nature thought "through capitalism" – the "double internality." He writes explicitly that the "economy" and the "environment" are not independent of each other. Capitalism is not an economic system; it is not a social system but a way of organising nature. Moore also adds unequivocally that all social relations are spatial relations, that is, relations in the web of life, and capitalism – or modernity, or industrial civilisation – emerged from Nature, which means that it drew wealth from disturbed, degraded, or ruined Nature. The present time is a time of retribution, in which Nature will take revenge. This revenge entails catastrophe – the downfall of the world as we know it.

Capitalism has survived not by destroying nature but through projects that force nature-as-an-economy to work harder and harder – for free or at very low cost. For Moore, capitalism–nature crises are crises of what nature does "for capitalism" rather than what capitalism does "with nature." The appropriation of cheap nature has not only forced capital to seek new sources of cheap labour, food, energy, and raw materials, but also to close the atmosphere as a giant greenhouse gas dump. For Moore, the essence of capitalism is not the profit from energy or the invention of the heat engine, which modernised human labour, but the overall rate of profit. When capitalists can turn small amounts of capital and appropriate large amounts of unpaid labour/energy, the costs of production fall and the rate of profit rises. The unpaid "labour of nature," that is, in the short term, of agriculture, in the intergenerational period, of child-rearing, in the geological time, of creating fossil fuels, is the pedestal on which the paid "labour of capital" thrives. In short, for Moore, the end of the world is the end of Cheap Nature, not the destruction (or birth) of demons that have emerged (or been trapped) in oil.

What do the analyses of "fossil capital" and "cheap nature" contribute to a better understanding of nafthology? Neither Malm nor Moore go so far as to sacralise oil or nature; on the contrary, their writing seems to contain both profanation and desacralisation. The specificity of Salminen and Vadén's discourse is that it does not sensitise us to connection, but on the contrary to disconnection: "con-distancing." Economics as a science is born through con-distancing, when money is separated from the physical world and work. Economics is separated from politics; oil is the separator and connector between these poles. The work done by oil creates a distance between the economy and nature; this same work also leads to the destruction of nature. Everything that is deeply connected, on the level of

visibility, is separated. We see capitalism and nature, politics and economies, as separate spheres; this "optical separation" is necessary for the ontological connection to work.

The age of oil is characterised by a movement that, like a hammer drill, combines constant rotation with rhythmic blows; the blows are the drillings for new oil deposits and the circulations are work cycles. The authors of *Energy and Experience* diagnose humanity as immersed in a deep oil narcosis. Using an idea borrowed from Reza Negarestani's *Cyclonopedia* (2008), the authors claim that the word for oil, "nafth" comes etymologically from Persian and Arabic. "Nafth" is a mystical and occult matter that creates a phantasmatic collective and political unconscious. This unconsciousness again operates through isolation, separation, and con-distancing – in the West, oil is poured into engines, while in the East, it is the lubricant for apocalyptic Islamism. We will not change the world as long as this Dark God rules us and condemns us to a kind of economic unconsciousness. We are part of a dark vitalism, which, in opposition to the Sun and the Eye of Enlightenment, sees forms of life only from the perspective of destruction and death. The book's authors seem to abandon us – the readers – in a burning forest. We have no idea how to escape from it; the return of the logic of sovereignty in a world of universal dependence is not a rational solution.

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FROM "STICKY BLACK GOO" TO THE LIFEBLOOD OF THE ECONOMY: HOW OIL-FUELLED CAPITALISM PERPETUATES ITSELF

ADAM HANIEH, *CRUDE CAPITALISM: OIL, CORPORATE POWER, AND THE MAKING OF THE WORLD MARKET*

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Crude Capitalism: Oil, Corporate Power, and the Making of the World Market by Adam Hanieh is a remarkable attempt to grasp the role of oil in the historical evolution of global capitalism up to the present – the "oil-centred world" we now live in. "Continually transformed," writes the author, "oil comes to saturate and shape all aspects of our social existence." Disguised under numerous forms, it is "everywhere but nowhere." Having been ascribed the "inherent magical power" to change societies, oil must now be stripped of all this mysticism, until it is just "a sticky black goo."

Hanieh undertakes this task not in order to deny the substance its distinctive features but to reject the temptation of "commodity determinism," which seeks an answer where a question has yet to be posed. It is not the oil discovered in the poorest regions of the world that brings calamity to their inhabitants (the so-called resource curse thesis), nor is it oil itself that ruins our planet. Rather, what matters here are the socio-economic relations in which the sticky goo becomes so central to wealth and power that in its name humankind goes to wars, organises mass killings, exploits labour, and ruins the planet, driving it straight into climate catastrophe.

Thus, Hanieh begins by exploring the astounding congruence between oil's properties and capitalism's socio-economic logic, as once described by Marxist political theorist Elmar Altvater. Chemically flexible, easy to transport over large distances, and with high energy density, oil can satisfy the ever-growing demand for energy in a system based on the imperative of endless accumulation and matches the system's preference for mobility and liquidity. Hanieh's contribution here lies in how he operationalises this relation. Three main questions guide him throughout the book and allow him to go beyond the immense literature on oil and capitalism. The first question concerns how oil gains meaning under capitalism: "what it *does* for capitalism," or rather how it is transformed in a given socio-economic order, and how in turn it helps shape this order. Second, by focusing not only on the West but including all the complex interdependencies the world market produces, the book seeks to determine what role oil played in shaping US hegemony. Finally, the book examines how oil is controlled and what organisational forms the major corporations take and why (and no less importantly, what their relation is with the state).

As a result, we receive a truly captivating account of synergies between developments in the world market and the series of major societal and technological transformations revolving around oil. For instance, Hanieh tells the story of how US property laws influenced the development of the oil sector and how, through the emergence of trusts as an organisational form, the structure of the US industry impacted the world oil market. Then there comes the question of the role the two world wars played in the rise of oil, how the exigencies of the war effort helped the industry to bypass anti-concentration legislation, and later, how US militarism went hand in hand with the expansion of oil corporations, strengthening the position of the United States in the global economy. Technological change comes to the spotlight numerous times, for instance, in the chapter on the polymer revolution that led to the omnipresence of synthetic materials in our daily lives. The book also tells the story of the shifting geographies of accumulation, pointing to the connection between the transformation of the oil sector and the emergence of large financial markets that further secured the US dollar as the international currency. But the book also accounts for challenges to the domination of the United States and the West and clarifies many common misconceptions regarding the role of the Arab Gulf states in the 1973 oil crisis. These challenges seem to be peaking now with the emergence of an East–East oil axis (the Middle East and Asia).

This new axis not only heralds the end of US hegemony and the emergence of a polycentric world but also constitutes an important context for considering the climate emergency. In the last chapter, Hanieh scrutinises current efforts at combating climate change and argues that what we are witnessing is yet another transformation of the power of oil corporations, which will try to seize control over the energy transition and ground it in greenwashing non-solutions still based on fossil fuels and the exploitation of nature. Importantly, the emergence of the East-East axis entails the West's loss of control, so any climate solution, Hanieh argues, has to be global in scale.

What, then, is the solution? Understandably, the book is fuzziest here. Through thirteen chapters Hanieh has successfully convinced us that the state–oil–corporate nexus is astonishingly resilient and that right now the oil giants are earning incredible money through greenwashing and fossil-fuelled non-solutions to the climate emergency. Abandon all hope, ye who read this book? So it would seem, since the only answer the author gives is a rather generic three-page eco-socialist manifesto calling for connecting struggles, dismantling major oil corporations, submitting the energy industry to democratic control, building bike trails, and general demilitarisation. Systemic change is the only way to save the planet, says Hanieh, so this is what we have to do.

This sudden emergence of the collective "we" at the end of the book provokes the question of who "we" are in the present fossil-fuelled capitalism. Understandably, Hanieh on occasion addresses this question, but it is never the centre of attention. It would indeed be fascinating to learn how an author as insightful as Hanieh perceives the meaning of oil for the political agency of the people, for communication and information, and so forth. Nevertheless, the book is outstanding and hopefully will inspire more discussion and research.

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THE SOCIAL ENERGY OF TRANSITION

A DISCUSSION OF AGATA STASIK'S BOOK *PRZEŁAMAĆ KLINCZ WĘGLOWY. ZBIOROWE EKSPERYMENTOWANIE NA RZECZ ZRÓWNOWAŻONEJ TRANSFORMACJI**

Marta Strumińska-Kutra: Good evening, I'm Marta Strumińska-Kutra and I am very pleased to moderate today's meeting. I think we can expect a really dynamic and interesting exchange of views and experiences, because the format allows us to include the voices of practitioners, as well as theoreticians and researchers. Four guests have been invited to join our panel discussion. I hereby open our meeting and invite Agata to introduce the book.

Agata Stasik: First of all, thank you very much to everyone who accepted the invitation to this meeting. In my recent book, I develop and apply the concept of "collective experimentation for sustainable transition" and use it to analyse three cases. This work is theoretically grounded in two interconnected fields within the social sciences: science and technology studies and sustainable transition studies, and empirically in my research on the social aspects of energy transition, which I have conducted over the past ten years. I analyse three empirical cases: the emergence and growing impact of climate science; the development of prosumption – a model where individuals takes part in energy production; and the development of energy communities, in particular energy clusters, which constitute a specific, Polish proposal for a legal framework to enable local cooperation for energy.

I was prompted to write [the book] by a growing sense of dissonance. When it comes to a sustainable energy transition, on the one hand, we

* The discussion took place online on 5 December 2024.

know quite well where we want to get to, that is, we share the goal of reducing and then zeroing out greenhouse gas emissions from the energy sector. We have various plans, strategies, roadmaps that can give us some solidifying illusion of control. If we stop to read such documents, we get the sense that not only do we know where we want to get to but that we have a great step-by-step plan on how to achieve that. On the other hand, when we go out into the field and look at the details, we see how the implementation of these plans encounters the most mundane obstacles that pile up: technological, legal, or related to the public perception of new solutions. The buildup of obstacles is striking – and, of course, not a coincidence. I see it in my research when, for example, I talk to a practitioner working on energy community development. The gulf between the ambitious visions of the near future and today's paralysis is revealed when I hear first about the solutions we will have in just a moment – which are almost ready, advanced, great, and useful – and immediately after that we talk about ten different specific reasons why local power generation in Poland today hardly works at all. Implementation of well-known, almost-ready solutions seems thus to be an extremely resistant process.

I wonder, then, what and whether there is anything we can do about it as representatives of the social sciences, at this particularly urgent time, when it makes sense to work at using every resource to mitigate further climate change, given the stakes of the endeavour. Can the social sciences contribute something to the understanding of this process that will help guide it? Of course, we should beware of excessive hubris. It's probably difficult for us as sociologists to say that as soon as we join the table, we'll immediately solve all the problems with the enlightened guidance of social theory. But how can we contribute? First, it is worth looking at every moment of "bottleneck" in the change process. This alone requires the use of knowledge from many disciplines and practical areas of action that we cannot assign to one discipline, and forces us to conduct transdisciplinary research. Why, for example, do energy clusters in Poland not work, even though there are persistent efforts to make them work? As part of this approach, we are looking at what kind of mismatch of various factors is paralysing these efforts.

But in addition to this, I have developed a theoretical language that allows us to talk about all similar challenges – not just one at a time, as challenges of collective experimentation for sustainable transition. Following Gregory C. Unruh, I have captured these technical, social, legal, and institutional blockages as symptoms of carbon lock-in [Polish: *klincz*

węglowy]. The carbon lock-in stems from the fact that these individual elements of a stable system formed and shaped each other in a long process of coevolution. In the social sciences we have different ways of talking about similar processes. We can describe them as path dependence. However, the advantage of the notion of carbon lock-in is that it directs our attention less to the meanderings of historical coevolution and more to the currently experienced link to material infrastructure. It's important to observe this looping right now and think about how it can be disrupted to steer the system onto a different path. Here, the inspiration from actor–network theory (ANT) is important to me, as it explains how adding another element to some system affects the whole network, and also requires a whole series of successful translations. A change in one area means that every element of the network will work a little differently; if that broad change doesn't happen, then adding a new element can end in failure.

By analysing in this way the jam we are stuck in, I propose to think about change as a "collective experimentation for sustainable transition." What is important about the notion of experimentation is that the outcome of the process is not fully known. We would probably all prefer to apply known, proven, certain solutions, but there are none, so we are condemned to experimentation, in which we have a great many heterogeneous, hard-to-control elements that influence each other. This is a collective process, which is co-created and influenced by actors from different spheres: it consists not so much in simply finding new solutions as in creating new working configurations. These new configurations, on the one hand, must be compatible enough with the current system to emerge and scale up, because if they are not compatible, they will not become part of the network. It is useful to think of the "network" both as a theoretical category and simply as the electric power grid. But these new configurations must, on the other hand, be incompatible – to introduce disruption and push the system in a new direction consistent with the goal of reducing emissions, and to create new "black boxes," stabilising systems based on a new logic. Realising the tension between alignment and introducing radical change is paramount to understanding how to work to break the carbon lock-in. At such a practical level, this approach reveals and appreciates the work of mediators, facilitators of change, who make it possible for actions carried out, in a siloed way, by actors from different orders to take shape in this working configuration. And here, knowledge from the social sciences, or even the participation of a person with such expertise, could facilitate actions for change, by introducing a better understanding of these processes.

MSK: Thank you, Agata. After both reading the book and listening to your introduction, I have the impression that your goal was not only to describe collective experimentation and lock-in. The goal is also to create a useful narrative, that is, one that facilitates dialogue and translation understood in a colloquial rather than theoretical way. It is an attempt to create a way of communication between actors coming from very different worlds. And hence the first question I want to ask is a question of usability. Each of our panellists has a specific and unique knowledge of the energy transition, whether it comes from theory, research, or their own experiences of grappling with the issue. To what extent does the perspective presented in the book resonate with your experience and knowledge? To what extent do the categories of thinking that Agata proposes in the book – collective experimentation, the lock-in, the various constellations of actors who must align with each other in the process – to what extent do these categories that Agata uses allow you to better understand the reality of the energy transformation, and therefore also to better and more effectively work towards making it a reality? In particular, which ideas, research, and conclusions have you found particularly interesting, and which do you perhaps disagree with, or, to put it more diplomatically, find debatable?

Aleksandra Wagner: Starting with this question of how and where I see the usefulness of this book to my own research and also to the research or situation of my team, I will start with a personal remark. First of all, we take on very diverse topics in our work depending on where "the grant carries us." That is, we always focus on the social aspects of the energy transition, but they are very diverse. For example, we currently have a project in which we are working on the construction of energy islands, which are intended to float on the surface of the sea – here we are working closely with technologists. We have a project that deals with the presence of women in the energy sectors, but we are also doing research, for example, on how decarbonisation models are developed and then scenarios based on them to be used locally and globally. So the projects are very diverse, and we sometimes feel that we are jumping from different topics, and into different dimensions. When I started reading Agata's book, I thought to myself: that's good, right? We are in this collective experimentation in absolutely different networks and in different processes. There is a justification for this – "There is method in this madness." On a more serious note, these concepts that are adopted in the book are indeed very close to my own and I find them useful in two main areas. First, the author offers a synthetic, very interesting theoretical discussion at the beginning.

And this is material that is not only very interesting cognitively, but also one that we will use in teaching and working with our students, because it provides insight into the discussions that are currently taking place in the field of transition studies and in the sociology of energy. In the second part, which dives more deeply into the empirical layer, the interestingly selected cases consistently pursue a theoretical approach that I find very valuable for two reasons. First, the very notion of translation and the prospect of going into the network to follow these translations – following the actors to do so – seems to me to be very good and useful when we think about how complicated and how complex energy systems are and look for a key to try to understand them, but also to somehow constrain them. Of course, the ANT framework itself does not demarcate borders; it does not set a system's boundaries. But that's why the author narrows this approach and introduces a framework, declaring that she will use the concept of networks in a narrowed way that allows [one] simultaneously to focus on decarbonisation processes and to open up space for further exploration not only of how these processes are coupled between sectors, but also, for example, how they are coupled with other processes. There are threads of digital reality and materiality in the book, the coupling of which represents a transition to a new reality, or to a new system. Although this does not happen without some tensions. Furthermore, at the level of EU communication, the three dimensions of transformation – decarbonisation, democratisation, digitalisation – also overlap in their outworkings, sometimes leading to contradictory results. That is, in conclusion, I find the idea of framing socio-technological change through the prism of translation particularly interesting in the book – as is the related concept of experimentation, the social co-creation of knowledge and other resources. Such processes are open-ended, and it too can be controversial – controversial in the sense that it opens the field to new and not easy questions, and that is, for example, what happens in the case of failure. What about when these processes of experimentation fail? Because since the process of experimentation is open-ended, it can lead to surprising results – not necessarily intended and not necessarily positive. Experimentation may end in failure; it might not necessarily end in an improvement of a system's activities. Who then bears the responsibility for this? How do actors share these responsibilities? To conclude the theme of what is particularly valuable from my perspective in Agata's book, I would like to address the problem of time.

MSK: Thank you very much. Yes, I think the aspect of time deserves separate attention, and I hope we will come back to that. Radosław, what are your thoughts on the book?

Radosław Tyrała: First of all, thank you very much for inviting me to this discussion. I am not a sociologist of the energy transition. I have dealt with issues of energy, one might say, somewhat haphazardly – probably the least of all of you here. In my case, the content of Agata Stasik's book resonates primarily with my experience as a participant in the KlastER research project. This was a large project conducted at, among other places, AGH University of Krakow, in which we, as a team of eight sociologists, took an active part in 2020–2021. And from this perspective, this book, if we are talking here about its merits and the novelties it brings, appears to me to be a book that provides encouraging knowledge – a kind of "joyous science," to refer to F. Nietzsche. Perhaps this is the way to write about these issues today. We have a big discussion today about how to write about the climate crisis and the challenges it brings (including energy production and consumption), especially in light of the fact that the world as we know it may be about to end – whether to talk about it in a negative and pessimistic tone, which can further deepen the sense of stagnation, or perhaps precisely in a more optimistic and encouraging tone, which could have a mobilising effect. And I read this book as taking a stand for the second option. The category used in it – in a sense also perhaps a metaphor – of collective experimentation has a positive and motivating overtone for further change. Here I will refer to that research on energy clusters that we once conducted. I was personally responsible for conducting interviews with experts and cluster coordinators, as well as for two case studies conducted in the clusters themselves. And to be honest, the field really worried me. These clusters – and this was just evident both in the case studies and in these interviews – the experts I talked to and the cluster coordinators were really surprisingly and sometimes frighteningly unanimous about how energy clusters don't work. They openly asserted that we are dealing here with blow-up creations, with "apparent activities." They recounted how nothing was really working, both in terms of regulatory and infrastructure issues. In almost no case did the cluster succeed in activating the local community on a wider scale, that is, the social energy that this was, after all, about generating. Some things have succeeded, of course. There are exemplary clusters, but this is a definite minority, just as Agata writes. There are some special cases, extremely positive ones. But the vast majority of these certified clusters, let's say, have died out: they are in

a state of some kind of hibernation, some kind of stagnation. Here I quote my interlocutors: "hibernation," "survival form," "legal structure unfilled with content," "stagnation," and so on and so forth. A good example is our visit to an energy cluster in Tomaszów Mazowiecki. They wanted to show us the cluster, because we had made the request. We were taken to some three or four places, and it was a bit like this: "Well, listen, here, if it goes – well, yes, there will be some geothermal plant somewhere, some photovoltaics will be created under the banner of the cluster." Because for now it is being created, but under a completely different banner. Three years have passed and a lot has changed, but the clusters are still not activated. It's still hard to say whether 2022 will be a trigger, a factor that will perhaps set some processes in motion. We see some swallows of hope, such as last year's surge in RES energy production in Poland. However, the participation of energy clusters in this process is minimal. I say all this from the perspective not only of a researcher but also a citizen with a vested interest in the realisation of these better rather than worse scenarios of the future.

MSK: Thank you. That's an interesting perspective. I hope, too, that we can return to the question of the emotions associated with the energy transition, including hope, which indeed often comes up in this discussion as something we need, as something that can potentially activate and harvest social energy. For now, however, I invite Kamil to offer his thoughts on the book.

Kamil Lipiński: Thank you. The book very interestingly articulates several key issues regarding Polish energy policy. First, Agata accurately recognises that the story and the dominant energy narratives in Poland are, in general, constructed around megaprojects. This setting of the debate results in the reproduction of a certain static system of relations, centred around large actors such as state-owned companies, Transmission System Operators and Distribution System Operators. The interests of these large actors are identified quite well by the author of the book. An interesting thread in this context is the author's analysis of the legal framework of the energy-clusters operations. At great risk – because the legal systems are constantly changing – she shows how existing regulations reproduce relationships in the national energy sector, hindering the energy transition and the development of dispersed generation and distributed energy systems. Exposing the position of dominant actors and assigning them the responsibility that should come from such an important position is a significant feature of the book. The second important topic the author addresses is the concept of a carbon lock-in. From the perspective of an energy-sector analyst, it is not necessarily obvious. If we look at the situation in Poland,

hard coal mining fell by 41% between 2015 and 2024. The amount of coal-fired electricity produced per month in Poland's electricity mix fell by 38% over the period. As for employment in the coal-mining sector, it fell by 27% over the period. If we look at the Ministry of Family, Labour and Social Policy's monitoring of social conflicts, there were mining protests in 69% of the months between 2014 and 2024, on average there were three protests per month, and some of them were nationwide. So we are experiencing a certain tension and dynamic change in the Polish energy sector. However, this doesn't falsify what Agata writes in the book, because she describes a certain starting point, the sociotechnical imaginary of the Polish energy sector. It's a bit like with Mario Draghi's report. When he was asked if the European Union would face "certain death" if his proposals were not implemented, he replied that it might not be "certain death" but the EU's "slow agony" seemed likely. The lock-in suggests a certain static, doesn't it? We can imagine wrestlers who are in this sort of clinch. For me, this proposed approach corresponds somewhat interestingly with the dominant sociotechnical imaginary (in the sense proposed by Sheila Jasanoff) of the Polish energy industry, the "Let it flow," which the team of Katarzyna Rabiej-Sienicka, Tadeusz Rudek and Aleksandra Wagner identified in their work. Within this imaginary, the energy industry is perceived as a static system that supplies energy to households and undertakings. This centres narratives around security of supply, rather than, for example, energy affordability, the protection of vulnerable consumers, the sustainability of energy generation, and distribution. A third interesting element – quite controversial – is confronting this existing dominant narrative that is based on infrastructure megaprojects and reproduced by the legal system with clusters – with clusters, which, as Agata rightly points out, remain a marginal phenomenon in Poland. Rather, we count the power capacity of clusters in tens of megawatts, despite the fact that we have 1.5 million prosumers, or almost one in ten households in Poland. We had an explosion of prosumption in photovoltaics – 11 GW of power capacity – when the peak demand for power in Poland is 25–26 GW. This is fascinating; it makes you think about such a social-class dimension of the development of clusters in Poland and further deepens the analysis – ask yourself why people might not want to enter such clusters at all? The fourth interesting topic is the non-obvious scope of the analysis of energy clusters. This is always interesting when applying actor–network theory: when to end the narrative? Bruno Latour joked – provocatively, of course – in *Reassembling the Social* that we know that the research process is finished when it runs out

of funding, when the money for the research is gone. In cluster research, this is quite a problem. It's easy to see some asymmetries and some external costs associated with their operation that exist on a global level. The first external cost is the import of cheap, subsidised photovoltaics from China, and China's role in general in driving down the price of goods imported into the EU, which is now a major challenge to Europe's industrial policy. The second area is the issue of power grids and their role in cluster development – a very difficult question that the author raises. To what extent should the interest and involvement of Distribution and Transmission System Operators be taken into account – actually designing transmission and distribution networks top down? To what extent should it really be a bottom-up process? In the book, Agata points out a very important task for sociologists dealing with energy and the climate: to create a space for debate and involve very different actors. The green transition could be an opportunity for the development of a public sociology of the Polish energy sector.

MSK: Yes, so the active engagement of science is a clear theme in this book. Thank you and I now invite Marta [to speak].

Marta Anczewska: Good morning, thank you very much for the invitation. I represent a think tank that is actively working on public policy, so I have a handful of such very practical comments on how the information gathered by Agata in this book can be used to work with this topic. But before I begin, I'd like to make a small *ad vocem* to Kamil, because in my opinion, the carbon lock-in continues. And this can be seen, for example, in the fact that even though coal is going away – its share in the energy mix is declining – cash transfers to the mining industry continue, and the state, unfortunately, is still in the model of supporting the sector. On a symbolic level, society is also not quite ready to part with the important role of mining. For example, yesterday was Barbórka [a Polish mining holiday], and, classically, the media headlines were dominated by the age-old question: is Poland ready to move away from coal, can we afford it, won't the economy collapse, and so on? So it seems to me that we are still in a clinch, despite all those positive elements you mentioned. On the other hand, moving on to the questions asked here in the panel – I, first of all, would like to thank Agata very much for the vision of Poland in 2050 contained in the book's introduction that shows how our lives will function in a climate-neutral economy. Because it's a great operationalisation of what we're aiming for when we try to shape public policies, write strategies, and come up with solutions, for example, for mechanisms to incentivise the implementation of those strategies. There Agata tells us point by point how we are going to

move, how we are going to use energy, how we are going to use heat, how our lifestyles are going to change in such a very tangible way. And this is needed for us practitioners, because we sometimes already have a deficit of such examples, and I have the impression that there is generally a paralysis of imagination among decision-makers, who are focused on surviving, and are also constrained by political tenure. To refer a bit to the terms Agata uses in the book, it is neither backcasting nor forecasting on their part, but survival. We just want to survive until next year, we don't want our programme to collapse, we don't want anyone to start suspecting us of being too ambitious. Just look at the political agendas and the topics of energy and climate, which I think only started to appear there in 2019. And we know that this is an existential threat to all of us; we've known that for years. I'm running out of time, so maybe I'll move on to two things, which is, first, what specific examples I see that can be described in the language created by Agata, and where this language can actually also help solve some crisis moments, where you don't know what to do next, because there are either technological or social obstacles. The first example is the Clean Air [Polish: Czyste Powietrze] Programme, which in theory was a great programme to support prosumers responding to the smog crisis and the fact that the public has gained awareness of how much it threatens their health. At the moment, the Clean Air Programme has been suspended for a week. We don't know yet what the consequences will be. On the other hand, it will most likely lower the public's confidence in state institutions and in the fact that there can be an effective intervention that supports them to take care of their heat sources themselves, as well as energy efficiency in their homes. This programme constitutes an experimentation on a living organism; it is changing dynamically depending on the regulations and the response of households to the proposed support and subsidy mechanisms (e.g., pre-financing has been introduced for poor households that are unable to put up the money for investments upfront). The programme has a ten-year target, and the institutional and regulatory environment will change very dynamically during that time, so that's where the kind of openness to making mistakes that Aleksandra mentioned is also needed. In contrast, among leaders, clearly there is no such margin for error. The system was shut down overnight. I'll give another example, that of electric cars, which as far as I know are very controversial. On the one hand, without electric cars, we will not decarbonise the transportation sector, which is very difficult to decarbonise. And on the other hand, at the social level, it is known that there is a debate as to whether this is a safe mode of

transportation, whether it can really move us long distances, how much of it is entertainment for the rich, how much of it will ever be available to the less affluent, and there is clearly no confidence in this technology. Well, and the question is what can be done about it, especially since it will change dynamically. And on the other hand, there are electric bicycles, which Polish society has come to love during the course of the past couple of years, that is, they have found a mass of takers, and they solve everyday problems – from people who do extreme sports to couriers who do food delivery. So it's also very interesting how different technologies are narrated, by whom they are narrated, how much of it is based on actual experience, real-world experience, how much of it is simply about the promotion and domination of certain technologies. And my last point, what most caught my attention in this book – well, I am terribly pleased with chapter three. There is a subsection there entitled, "An individual in the energy market in the European Union." And in fact, Agata, you have captured something that I have been sensing for some time now, a tension that I could not name. It's a tension between whether the consumer is supposed to be a so-called active user, that is, to take responsibility for shaping the energy system, to be an energy citizen, to manage his consumption and production – that is, the prosumer, for example, reduces his consumption, makes sure he stores energy, knows how to give it back to the grid, and at the same time earns money from it – versus an interventionist approach like the one prevailing in Poland today, for example, at the household level. That is, we have a right to energy, and it's up to the state to make sure it's supplied at the right price. And in the European Union itself, where the key regulations for the energy market are taking shape, the former approach, the market approach, dominates, where you have to expose the consumer to price incentives and they are supposed to shape his behaviour. On the other hand, there is also a very large group of circles associated more with social justice and the fight against poverty, which says that, well, it can't be such a full exposure, it must also be linked to minimising risks. And there is an even more extreme group that says electricity should be a right, not a commodity. And these tensions are very evident in the debates even when the law is being shaped, because these are such contradictory paradigms that creating regulations here is a huge challenge. Well, and of course, yes, as you rightly point out, this market approach, which has the prosumer invest his own capital and thus also be such a subject of this system, dominates in the regulations, but I see that more and more a reverse approach is emerging. This is where the tension will continue in my opinion.

MSK: Many topics have been raised in the discussion, and you are, of course, free to choose the issues you would like to discuss in greater detail. At the same time, it is worth focusing our discussion on experimentation and its potential or the challenges that this experimentation encounters. Aleksandra, you mentioned failure and responsibility, because this is not just about dealing with failure, but also a very practical question: who bears the real responsibility? Radek, you mentioned stagnation, pessimism, and how certain social initiatives, despite being de facto experimentation, when you look at them closely, they are more like extinguished, once-burning ideals. Kamil spoke about the macro scale, the structure of global economic connections, but also the class structure of society, as aspects that shape the dynamics of these processes, including experimentation. Marta, you also referred to social classes and climate justice. So if we relate these themes to experimentation, what are your thoughts on the potential and limitations? Aleksandra, could I ask you to take a position, or speak on what you feel needs commenting?

AW: This is a difficult question, but at the same time an important one, about these potentials and limitations. It seems to me that you can probably look at it differently from an economic point of view, and still a little differently from a social point of view. Although that's what I also really like about this theoretical proposal – that it proposes to go beyond these oppositions and look at practices, that is, at these skills, meanings, at what people do, how they manage energy. So [it goes] a bit beyond technical, political, and economic divisions. But on the other hand, surely such an opportunity – and also a promise that resounds in the book – is that there is potential for greater inclusivity: here again referring to this year's Nobel laureates in economics – that inclusive institutions nevertheless build wealth and build communities. So this inclusiveness, if you follow the network in such a way – follow the actors in such a way – that they have a chance to be included regardless of, for example, the resources they have, that would be good. On the other hand, however, this market approach that we've turned to limits this inclusivity somewhat. The barriers to entry are increasing, and they too, in my opinion, are not so fair. That's because, on the one hand, people have been encouraged to invest, for example, in photovoltaic panels, and they have invested. But on the other hand, their rate of return is limited, because they, first of all, can't fully recover these funds, and besides, for example, they can't sell them to anyone, right? Or they can't exchange this energy for something else, as they don't have a license. At most, they can donate it to a neighbour to – I don't know – charge his car, right? But

they can't resell it anymore under today's regulations. So this inclusivity is probably an opportunity, but I think it's being limited at the moment, though. Vision. This vision of the world after transition is also, in my opinion, really valuable. And it is also new, because a great deal of research, studies, and papers focus precisely on this transformational path, that is, on what needs to be done now. And here, perhaps, that category I mentioned earlier appears, that is, time, because time is treated in the book as the pace of transition. And this is an important variable, that this pace of transition depends on various factors and also on how these actors come together, how they cooperate, whether they just block each other, whether they create opportunities for each other to act. But it seems to me that time can also be a resource. On the one hand, we think that we don't have time – we need to make a transition, because there is no time, because there is a disaster around the corner, right? That is, the pressure is on to recognise the urgency of change and to give the actors an impetus to act. And, on the other hand, they are of very different orders, because time is treated differently by businesses and investments, differently by politicians who think in terms of tenure, differently by people who, since they have invested, would probably already like to have benefits from it immediately, and I don't know if for them it is so promising that in ten or fifteen years they will see a return, right? So here what puzzles me is how it happens that these different time orders nevertheless come together. Are they also subject to some kind of translation? How does this actually happen?

MSK: Thank you. Radosław?

RT: Then let me just start briefly and give you an anecdote about the coal lock-in. I wanted to point out that as of 2021, there is no longer a Faculty of Mining or a Faculty of Mining and Geoengineering at the AGH University of Krakow. Instead, we now have a Faculty of Civil Engineering and Resource Management. This is a significant change.

AW: But there is still a miner's monument in front of the academy.

RT: Yes, there are even two of them left. But speaking of time – nothing is eternal, so you never know. But let's get back to the discussion regarding collective experimentation. As I said, this metaphor seems to me to be very well tailored for today's times, and it somehow makes me optimistic. And this openness of the process of building all sorts of new connections and translations has positive connotations sewn into it. That's how I read it. Perhaps, as I say, my view is a bit skewed here. But I wanted to draw attention to two issues that need to be added here. They do appear in the book, but they're tucked away somewhere on single pages, and

it ultimately doesn't break out of this optimistic and "joyous" vision of openly building new energy communities of various types. First, it seems to me that what needs special attention is a matter of the conflict factor. These things were mentioned here and also appear in the book, but, as I said, they are somewhere in the background. Our AGH sociological team, and also more recently with Maria Nawojczyk and Łukasz Afeltowicz, with whom we have published various articles on this subject, used Neil Fligstein's concept of the field, and strategic action field theory, where such themes seem to me to stand out quite well, because the theory itself is tailored in such a way that it accentuates well the tension between incumbents and challengers in the energy field and in niches within it. While the ANT theory used by Agata operates with a flat ontology, it should be noted that in this ontology there are, shall we say, larger protrusions – there are various elements of this network, various actors, who mean more. This is the role of grid operators, the big energy players, who impose the rules of the game. These moments must not be missed. The second issue is that the role of apparent activities is underestimated or sometimes not taken into account. Apparent activities, that is, according to Jan Lutyński, are activities that are designed to not be able to fulfil the purposes for which they were declaratively created. It is precisely using such categories that we once interpreted the institution of the energy cluster – as apparent actions aimed at solving problems of energy production, distribution, and local energy balancing. The third issue that has emerged here and that is worth remembering in the context of time is the issue of institutional discontinuity. In particular, the role of ministries – their constant transformations, changing competencies, changing leadership, the emergence of some on the ruins of others, the dependence of strategy on ad hoc political considerations and interests. We in Poland in general have a problem with discontinuity in the historical and institutional dimensions, and our various modernisation woes probably stem from the fact that we had such strong caesuras in the history of the twentieth century. Moreover, in the case of distributed and grassroots energy, it seems to me that what is happening – especially at the level of the ministries, the structure of the ministries, and how this process from that level has been managed – is a major factor in the disorganisation of the country's energy transition. This is something that we need to pay attention to, and unfortunately it is repeated over and over again in Polish history, and somehow we don't learn any lessons from it.

MSK: Thank you. Kamil, it's your turn.

KL: That was a very interesting point raised by Radek as to some limitations of ANT when it comes to describing relations of power. Limiting yourself to this conceptual framework, it is quite difficult to formulate a critique of asymmetric relations that contain elements of oppression and exploitation. From the perspective of the Polish public sector, it is very interesting to pay attention to stranded costs, which are relevant in Polish public policies in general, but especially in the energy sector. A symbol is the unfinished Żarnowiec Nuclear Power Plant; there have been three approaches to the Baltic Pipe project, and at least five approaches to a nuclear power plant in the last thirty years. However, I would like to address the issue of collective experimentation in the Polish energy sector. Noting the potential for a "long march" through social lifestyles as a tool for developing public acceptance of the Polish energy transition is a great feature of the book – pointing to sociologists as social emancipators and as people who give voice to actors who are not heard. That being said, I somewhat missed in the book the voice of the energy-sector actors themselves. It kind of lacked, for example, excerpts from interviews; this would have been very interesting, especially in the context of the study of leadership, whose relevance for clusters Agata describes – which is another plus of the book. Excerpts from the interviews would help better capture the leadership patterns in energy clusters, which are interestingly described in the book. The dominant leadership patterns seem to be important – they make some clusters last and reproduce themselves, while some clusters are completely passive, façade-like, and ultimately disappear. It would be worth highlighting a more macro-structural constraint on cluster development. For thirty years, Polish sociologists complained that the level of social capital in Poland was low. Nowadays, they can complain that there are not enough energy clusters and energy communities. That remains apparent not just in Poland, by the way, but in general. If clusters exist, they usually have the face – as in the case of Germany – of an upper-middle-class or upper-class white male. We had a similar problem in our report *The Four Faces of Energy Poverty* in Poland, for the Polish Economic Institute, when we described household energy practices. There are households that belong to the "transformational Poland" and ones stuck in "emissions-intensive Poland." The differences lie not so much in distribution of economic capital, but more in cultural and social capital. The question is to what extent public policies should seek to structurally change existing divisions and inequalities, and to what extent they should accept it and optimise efficient spending on the energy transition.

Another limit to collective experimentation, in addition to the structural conditions, is, as Aleksandra pointed out, the issue of how the Polish energy sector operates within the EU energy market. In addition to vertically integrated undertakings, natural monopolies, and large state-owned market players, there is a second group of institutions, so to speak, that do not fully support the development of dispersed generation and distributed energy systems. The market assumes the greatest possible turnover and leads to a concentration of capital. Certain mechanisms related to the functioning of the transmission and energy market – such as, for example, the mechanism of market coupling, which encourages the greatest possible exchange between market areas, or the ruling of the EU Court of Justice in Case C-239/07–Julius Sabatauskas, which shifts the costs of connection to small generators, or the role of state-aid in Germany, Italy, and France – all this creates a tension between the development of local energy markets based on very limited local prosumption and the development of an EU-wide competitive energy market. It comes down to a choice between co-operativism and capitalism. These great structural tensions and constraints will limit the development of clusters in Poland, even with the involvement of sociologists and public institutions.

MA: The limitation that I see in the system in general is a lack of knowledge, that is, the basics of climate change are not part of the curriculum in schools, and this unfortunately has consequences. We also have little knowledge of the various technologies, their limitations, where electricity even comes from in the socket. This is not valued knowledge in our society, and I don't think there is a belief that everyone should have this information. I very much support the idea about institutional discontinuity. This is a powerful constraint. If an infrastructure project is going to succeed, it has to run for a decade, and otherwise it's burning through money. There is the risk of widening inequality, which was mentioned earlier – that the middle class with capital will be winners and the lower classes will not. But from what I observe, citizens are nevertheless beginning to see the mismanagement of at least state-owned companies or certain government decisions, and this raises a certain frustration that could be creative, and that could encourage them to this collective experimentation – not just in the form of prosumers who invest, but as participants in the debate. Thank you.

MSK: Thank you, Marta, especially since you did some moderation work for me and summarised the common themes. Well, many topics here deserve to be developed, of course. Unfortunately, time does not allow us to do so. We would like to give the other participants of the meeting

a chance to actively participate, whether by asking a question or sharing their thoughts on the book. We will then ask the author of the book to summarise the discussion.

Jakub Motrenko: Let me start with a quick question. This experimentation indeed sounds like something very pleasant, because we like to experiment. The comment about those experiments going wrong was interesting. And I associate experimentation in general with such a response to what some people call a crisis of expertise, of expert knowledge, in that we don't trust experts. One answer, then, would be to include participants in various processes. Well, but the history of such participations often just ends in failure, that is, it is very difficult to reach any conclusions. The process is prolonged; new interests emerge all the time and so on. And on the other hand – and Kamil mentioned this – what particularly seduces us are these big infrastructure projects. Well, and I wonder – maybe the answer is not experimentation, but atomic energy and top-down management of the whole process? So, a little provocatively, but experimentation appeals to me a lot.

AW: Yes, I'm sorry to interject – just for a moment – I just wanted to say that, like most of you here, most of us, I didn't get the impression that experimentation is described as being so nice and pleasant. The book makes it clear that experimentation causes discomfort, that it is very difficult, that it involves commitment, supplementing knowledge, that it can be a very painful process. I have a question about this failure, starting from this point: exactly what happens then and who takes responsibility for it? For the effort, for the commitment, for the costs of various kinds, which, although incurred, did not lead to the intended results.

On the other hand, it's also a very interesting observation about centralisation and just thinking about energy through the prism of large projects, including nuclear power. It seems that it is at the other pole of just such open social experimentation […] although maybe not, because the production of knowledge and thinking about this energy in a local context can also have different forms and involve different actors. The author starts with a certain imaginary – at the very beginning of the book there is a statement that points us to such a basic deep conviction: that energy is to be on demand, always available, and – the author does not say this directly, but I will add it myself after numerous interviews with actors from the energy system – not too expensive. It is supposed to be available. And that puts us in a certain position. But the vision presented at the beginning also provokes a different view. It causes a person to think: "Could it be different?" It makes one realise

that we have the kind of energy system we have created for ourselves – not as individuals, but one that we have nevertheless collectively worked out over the years. And the author makes it clear: such thinking about energy is neither natural nor even globally dominant, nor does it have a very long history. So it's possible to think about it differently. Such an opening of the book, leaning it into a potentially possible and quite optimistic future, opens the space for a serious conversation about experimentation in the here and now. I wanted to point out that, for me, this experimentation is also a painful process, though one that perhaps offers hope.

MSK: Yes, that once again brings us to *time* […] time and the imaginary remain important categories. Łukasz Dąbrowiecki would like to ask a question.

Łukasz Dąbrowiecki: I'm a doctoral student at the AGH Department of Sociology and Technology Studies and I have a couple of comments. The issue just raised on the topic of experimentation and innovation in the nuclear power sector is very interesting, because it seemed to be an abandoned area. Sociologists are very often just interested in micro projects, such as clusters, and perhaps the solution is to socialise the construction of a nuclear power plant. The five projects that have been tried didn't come to fruition precisely because of institutional discontinuity. Perhaps they should get support, so to speak, from grassroots organisations, so that this process goes faster. As we know, those countries in Europe that have decarbonised the electroenergetic system effectively – those that have made the transition, such as France, Sweden, and, not in Europe, but Ontario in Canada, for example – have systems based largely on nuclear power. I have another point. Miners are not just mining coal. Miners will be badly needed for the energy transition, and they will have to dig for various other minerals that will also be needed to build RES. The electric bicycles that we have seen – it was Marta Anczewska who mentioned their growing popularity in the Polish transportation system – increase emissions, not decrease them. Because potentially whoever switches to an electric bicycle was previously riding a regular bicycle, and if they are getting electricity from the Polish grid, they are burning coal mainly.

MSK: Thank you. I now invite Marta Anczewska and then Kamil Lipiński [to speak].

MA: I wanted to support this notion about the importance of time, because based on the collective experimentation happening now […]; I mean the process of spending the Just Transition Fund in coal regions. That is, in principle, a very good idea – funds that have been set aside, dedicated from

EU funds for the regions themselves to plan investments and towards economic diversification and social mitigation. On the other hand, it turns out that two years after these funds were made available, there are not enough resources there to submit good, substantive projects. And this shows that sometimes time is the resource that is most lacking, and it really needs to be taken into account in transition planning – possibly supplemented with other resources to compensate for the lack of that time.

MSK: Thank you. Kamil?

KL: I would like to ask Agata a question about turning points. When did the coal lock-in start? My hypothesis is [that it began with] the decision of the Polish Government in 1990 to cancel the construction of the Żarnowiec Nuclear Power Plant. Since then, for decades there have really been no clear strategic decisions on energy policy in Poland. And the second question is whether the coal lock-in has already died, or do we have some kind of peak moment, a high-water mark, so to speak, and the beginning of a period of decline? In my opinion, the outcome of a discussion on updating the Energy Policy of Poland in 2022 between the ruling coalition members proved that the possibility of reproducing a certain static narrative during the 2022 energy crisis is slowly running out. You've written about the 1970s, the energy crisis, which encouraged many countries, such as France, to revise their energy policies and broke the existing consensus. Is the recent crisis a turning point for Poland? Have there been such turning points in the Polish energy industry in the past?

MSK: Thank you. Agata, how do you feel after this discussion? Have any of your assumptions been shaken? Are you planning to write another book?

AS: To fairly address the issues raised in the discussion, we need more books. I think that especially issues of leadership and accountability in the process of experimentation deserve more attention to allow us to better understand problems such as the paralysing effects of institutional discontinuity and the problem of apparent actions. An important issue is also how and for whom we should write the next books. As an author, I struggle with the question of how to write to do justice to the complexity of the processes: on the one hand, when we try to grasp them theoretically and when we think about this incredibly complex empirical layer; at the same time, we would like our writing to be interesting, inspiring, and also inviting to those involved in the energy transition who do not have long training in the social sciences. That, I believe, should also encourage experimentation – that impacts the very shape and soul of sociology.

MSK: Yes, I think this is an important conclusion. Starting the book with a vision of the future also attracted my attention, because of a topic that emerged here as one of many very interesting ones, that is, the crisis of imagination. I think that using a certain vision, a metaphor, in order to explain intentions, practices, and bring us to a common denominator […] has a very high value and your book is a carrier of this often-underestimated value – although I would be happy to test this hypothesis in a non-sociological group, because as we know this community of sociological view makes it easier for us to discuss certain things together. I would like to hereby conclude our meeting in the hope of continuing the discussion at another time, in other configurations, but also, I hope, with the people who had the opportunity to meet here today. Agata, congratulations again, [it's a] great book and I think many people will use it soon and for a long time.

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Article in another author's book

Bourdieu P. 1967. "Postface," [in:] E. Panofsky, *Architecture gothique et pensée scolastique*, Editions de Minuit, pp. 133–167.

Multi-volume works

Jones D., ed. 1999. *Definitions of Life*. 6 vols, Pirate Publishers.
Pfeiffer J.W., ed. 1991. *Theories and Models in Applied Behavioural Science*, vol. 4: *Organizational Models*, Cambridge University Press.

Article in a journal

Ross N. 2015. "On Truth Content and False Consciousness in Adorno's Aesthetic Theory," *Philosophy Today*, vol. 59(2), pp. 269–290.

Articles with DOIs

Donati P. 2011. "Modernization and Relational Reflexivity," *International Review of Sociology – Revue Internationale de Sociologie*, vol. 21(1), pp. 21–39, https://doi.org/10.1080/03906701.2011.544178.

Online references

Butterworth Ch. 2010. *Leo Strauss in His Own Write. A Scholar First and Foremost*, http://www.bsos.umd.edu/gvpt/Theory/Transcript_Butterworth.pdf, accessed: dd.mm.yyyy.

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Leff G. 1962 [1958]. *Medieval Thought*, rev. ed., Penguin.

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Virginia Kelly Karnes Archives and Special Collections Research Center, Steven and Clara Summers papers, box 1, folder 1, MSP 94: Letter to Steven Summers, 29 June 1942.

FORTHCOMING

2(27)/2024 /// The Spirit of Capitalism

Max Weber's famous thesis on the relationship between the Protestant ethic and the "spirit of capitalism" was one of his most important theoretical proposals, and it has since been much discussed and critiqued. In an upcoming issue of State of Affairs we would like to take a closer look at the question of this "spirit" in the light of what classic thinkers of the social sciences, such as Weber's contemporaries, Georg Simmel and Werner Sombart, and earlier Karl Marx, wrote about capitalism. First of all, we want to ask questions about the spirit of today's capitalism from different perspectives, as we have been inspired to do by Richard Sennet's work on "new capitalism," which was recently published in Polish, or by Luc Boltanski and Ève Chiapello's book, which deals directly with the "new spirit of capitalism." Does contemporary capitalism in its various forms (financial capitalism, etc.) actually have a spirit? And if so, what is it?

The title question may also lead to the one of whether capitalism has (or had?) a nationality. At least two possible aspects come to mind here. First, under what socio-cultural, economic, and historical conditions was capitalism born: in northern Italy in the sixteenth century, in the Netherlands in the seventeenth century, or in Great Britain in the eighteenth century? Or is it the case, as Fernand Braudel has argued, that capitalism has always existed but only became dominant in the modern era, subordinating other social organizations to itself? Second, in a more contemporary dimension, the question could be reduced to the different institutional systems that regulate the capitalist order (the market economy?) at the level of the nation-state. In this context, research on non-Western "capitalisms" seems particularly interesting.

We are thus looking for texts in the following areas for the proposed issue of State of Affairs: perspectives of classical sociology, psychology, and philosophy on capitalism; the spirit, logic and metaphysics of contemporary capitalism; discussion on existence of one or multiple capitalisms and finally, the role of culture in today's capitalism.

1(28)/2025 /// State of Emergency: Lessons from the COVID-19 Pandemic

Historically, major epidemics have been facts of a total nature, introducing upheaval into all social subsystems. However, the COVID-19 pandemic was the first time we had an event of this magnitude in a modern society

with its unprecedented functional complexity. In the first phase of the crisis, the solutions for minimizing the number of victims were mainly those known since the dawn of time, for instance, isolating the sick and maintaining physical distance to prevent further infections. Controlling the development of a biological phenomenon had far-reaching consequences in many areas of social life.

The widespread policy of lockdowns caused layered global disturbances. It quickly came to the awareness of policymakers and the public that a pandemic is not just a narrow medical and logistical problem but a colossal challenge due to shortages of knowledge, procedures, and material and personnel resources; a pandemic is difficult to manage, though with clear borders – a wicked social problem, a mega-crisis with general health (including mental health) dimensions and economic, legal, social, etc., aspects. An effective COVID-19 policy required the mobilization of enormous resources, including cognitive, material, organizational, symbolic, emotional, and communication resources. In modern knowledge societies, policies require not only legal legitimacy but also scientific justification. In a situation where every action or inaction resulted in far-reaching consequences, the responsibility of those in power grew, and management of the situation required testing previously unknown solutions, adapting to still new circumstances, and constantly developing and synthesizing the available information.

In this issue of *State of Affairs*, we would like to present the lessons in emergency management that should be learned from the COVID-19 pandemic. Though keeping in mind the saying Winston Churchill immortalised, that "the War Office is always preparing to fight the last war," we are confident that the accumulated knowledge will allow us to increase our preparedness and resilience for major crises in the future, not just health ones. In other words, we invite authors to reflect on preparing for crises, based on the experience of the pandemic.

2(29)/2025 /// Weberian Problems in the Social and Historical Sciences

Weber's work encompasses a wide range of problems in the social and historical sciences. At the same time, his works are classics, and a classic work is one in which we can find answers to our own questions. We are looking for texts that are devoted to Weberian topics and problems and that are written from the viewpoint of the authors' own research and theoretical

interests. These should be texts that confront Weber's analyses with the current state of research while also examining Weber's inspirations (how Weber transformed them and used them in his research and theoretical analyses) and considering the extent to which Weber's specific theoretical and methodological proposals may (or may not) provide answers to our own theoretical and research problems.

We invite authors to explore thematic areas such as: methodology of the social sciences; conflicts of values and the ultimate foundations of life in the analysis of today's politics, economics, religion; the scholar's current vocation at the university and in the public space; the sociology of governance in the analysis of political phenomena; Weber's theory of the state and modern bureaucracy as a helpful tool in responding to the problems of modern states; degrees and trends of rejecting the world; theses about the disenchantment of the world due to the emergence of new forms of spirituality, including non-religious ones.

1(30)/2026 /// Sociology of Concentration Camps

The year 2025 marks the eightieth anniversary of the end of the Second World War and the liberation of the Nazi concentration and extermination camps. This is a good opportunity to look at how these camps have been interpreted in the social sciences, especially in sociology.

As our starting point, we take the research and work of Polish social scientists who analyzed the camps immediately after the war and in the subsequent postwar decades. We would like to consider the contemporary relevance of their works in view of the enormous growth of academic literature on the subject (especially historical literature) and also in regard to the transformation of social theory.

We invite authors to submit either historical-sociological texts, recalling and organizing the Polish sociology of camps, or theoretical texts, considering camps on the grounds of sociology, anthropology, psychology, philosophy, or other disciplines with possible subject areas being: the history of social research on camps, history (historiography) versus the sociology of camps, individual testimony and social science generalizations, memory of camps as shaped by literature, art, social science, museums or exhibitions, "prison society" categories, the concentration camp as a social experiment, the contribution of concentration camp research to general sociology, the contribution of general sociology and social theory to the study of Nazi concentration camps,

Nazi camps versus the Gulag, postwar concentration camps in different latitudes; modernity and concentration (or extermination) camps in comparative and global approaches.

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Sociology is a late child of Western modernity. As an institutionalised system of knowledge, it was born of accelerated urbanisation, the spread of capitalist labour relations, and other fundamental social changes that were part of the overall process known as industrialisation. Currently, there are many indications that we are in the midst of another civilisational change. It involves a planned and forced shift away from "fossil modernity," that is, an economy based on an energy industry that relies entirely on fossil fuels, towards new energy regimes. It is impossible for the process to take place without social or political consequences, although it is very difficult to foresee all of them today. For this reason, energy research is a fascinating field for the social sciences and humanities. This issue of *State of Affairs* illustrates how energy research reveals the strengths, limitations, and dilemmas of present-day social sciences and humanities, while also pointing towards possible developmental trajectories in the coming years, exploring new ways of grasping stability and change, collaborating across domains and disciplines, and balancing rigour with engagement.

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