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POST-EXTRACTION BUGS

A Critical Reading of Territorial Repair & Energy Transition in Germany

■ EXTRACTION

■ REPARATION

■ STRUCUTRAL TRANSITION

■ BEYOND REPAIR

● A BUG OF TAKEN COMMONS

● A BUG OF GOLF COURSES

● A BUG OF MOVED MOUNTAINS

● A BUG OF NEGOTIATED ISLANDS

● A BUG OF HOME OWNERSHIP

● A BUG OF ENERGY GOVERNANCE

● A BUG OF LAND USE

● A BUG OF DESIRED LAKES

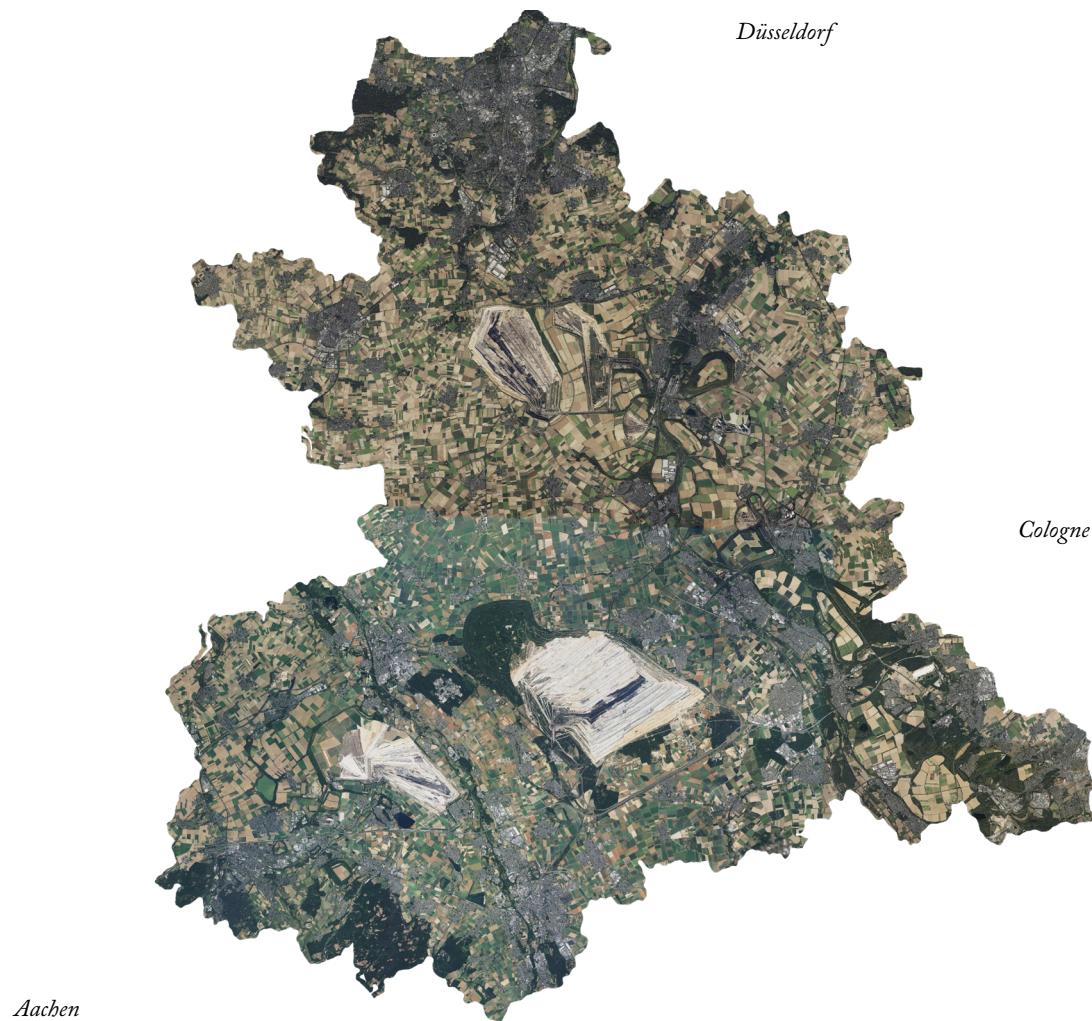


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↑ Site of Research:
Rheinisches Revier, Germany

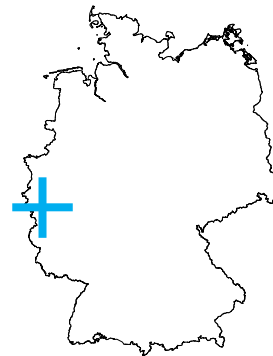
For over a century, coal extraction and trade have shaped political decision-making across Europe, embedding carbon-based energy deeply into its infrastructure and territory. This legacy continues to influence Europe's energy transition and decarbonization efforts. As outlined in national law and the public law agreement, Germany has committed to starting the coal-phase out by 2030.¹ To achieve climate neutrality, the country's energy transition is causing landscapes to undergo profound transformation, while simultaneously contending with the enduring legacy of the country's fossil fuel dependence.² Formerly exploited extraction regions are repurposed as hubs for renewable energy, creating new territorial and economic networks that redefine regional connections. Renewable energy is implemented without critically examining the symbiotic relationship between carbon and governance structures, modes of living and the built environment.

To understand how the new energy paradigm affects regional realities, this paper examines the *Rheinisches Revier*, Germany's largest brown coal mining region, where the transition away from coal leaves notable traces and tensions. The region is a study in contrasts: rolling farmlands and quiet forests share the landscape with cooling towers, vast open-pit mines, and intricate industrial networks. Situated in the expansive metropolitan region between the Rhine and Rur rivers and near the borders of Belgium and the Netherlands, this area is Germany's most densely populated region. For over 130 years, coal extraction has fueled local livelihoods and national progress. However, this has come at a cost: the disappearance of over 50 villages, including Etzweiler and Manheim, the loss of cultural practices such as flower picking and communal forest management, the erasure of the Bürgewald forest and the Erft lowlands, and the movement of vast amounts of soil, creating artificial mountains and lakes. Ultimately, extraction has reinforced the energy monopoly of the mining operator and energy company Rheinisch-Westfälisches Elektrizitätswerk (RWE), underscoring how such an infrastructure project intertwines the political and economic forces that shape the entire region.

As Germany transitions toward renewable energy the Rheinisches Revier finds itself at a crossroads between the energy transition and intertwined narratives and

1 "Gesetz zur Reduzierung und zur Beendigung der Kohleverstromung und zur Änderung weiterer Gesetze" (Bundesministerium der Justiz, Bundesamt für Justiz, August 8, 2020), <https://www.gesetze-im-internet.de/kvbg/KVBG.pdf>; <https://www.gesetze-im-internet.de/kvbg/KVBG.pdf>; "Kohleverstromungsbeendigungsgesetz" (Bundesministerium der Justiz, Bundesamt für Justiz, August 8, 2020), <https://www.gesetze-im-internet.de/kvbg/KVBG.pdf>.; The first coal phase-outs are scheduled for 2030 in the Rheinisches Revier, with a nationwide phase-out across Germany set for 2038.

2 "Climate Change Act 2021: Intergenerational Contract for the Climate" (The Federal Government of Germany, June 25, 2021), <https://www.bundesregierung.de/breg-en/service/archive/climate-change-act-2021-1936846>.

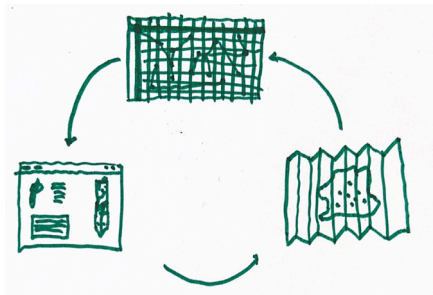


↑ Location of the Rheinisches Revier in Germany



↑ A Territory in Contrasts

3 “Änderungsvertrag zum öffentlich-rechtlichen Vertrag zur Reduzierung und Beendigung der Braunkohleverstromung in Deutschland” (Bundesministerium für Wirtschaft und Klimaschutz, August 11, 2022).



↑ Methodology

practices of repair.³ The term *repair* is seldom mentioned explicitly in the regional discourse on post-extraction; instead, it surfaces indirectly through *reparation* and the politico-economic endeavour of *structural transition*. In this web of narratives, we situate our research and fieldwork. The paper investigates the transition of the Rheinisches Revier to a post-extraction landscape, exploring how the dynamics and processes of the energy transition may undermine efforts and narratives of repair. Does the transition of the Rheinisches Revier perpetuate altered forms of extractive practices and land degradation, hindering repair in communities and habitats? This paper critically considers repair not merely as a restorative act but as a contested practice shaped by political, social, and ecological tensions.

To navigate the complexity of the Rheinisches Revier, where conventional frameworks fall short of capturing these intertwined tensions of a post-extraction landscape, this paper employs a two-sided methodology that combines a critical reading of territorial repair with both virtual exploration and on-site fieldwork. This approach uncovers frictions and ruptures that we call *post-extraction bugs*, moving beyond linear narratives. In doing so, the paper embraces the open-ended and contingent nature of the region, highlighting its complexities and potential for radical imagination beyond repair.

Our research approach is two-sided:

1. The first part traces the repair narratives and practices prevalent in the post-extraction landscape: Reparation and Structural Transition are the main characters for a critical reading of regional politics and legislation of space, linking to a larger theoretical context of post-extraction and resulting in a radical imagination beyond repair.

2. The second part collects place-based stories, revealing frictions within the post-extraction territory. Through field notes, we document our journeys through the landscape and encounters with people and things, intertwining observations and voices. With drawings and 3d-scans we archive our findings and their spatial traces.



↑ Our (Inevitable) Mode of Transport

The two parts inform each other, just as our research and fieldwork do. Diagrams and maps serve us as tools to process the complexity of the territory – an attempt to make the messy territory, networks and planning processes legible. They can be read as on-going analysis that maps actors, activities and spatial forms of repair, where the bugs are located and create new readings.

To set the table for this work, we lay out the terms and concepts that we take as our lens on the territory and that tie everything together.

browsing – To approach the dynamics and spatialities of repair within the Rheinisches Revier we first enter into Google Maps, Google Earth, Google Street View and the regional geo portal, finding orientation and getting lost.⁴ We see this as a practice of browsing. Browsing, usually used in a digital context, means to inspect in a casual and non-exhaustive way.⁵ Browsing through landscapes includes the distant view from above and the street views on the ground, inhabiting different views and scales. Being able to browse the whole landscape makes palpable the infinite vision that Donna Haraway describes as the “god trick”.⁶ On Google Street View, we even inhabit embodied views, which makes us raise questions on privacy and the ethical use of these tools.

4 “GEOportal.NRW,” GEOportal.NRW, accessed December 28, 2024, <https://geoportal.nrw/>.

5 Mohamed Salah Hamdi, “Improving the Quality of Web Search:,” in *Handbook of Research on Web Information Systems Quality*, ed. Coral Calero, M. Angeles Moraga, and Mario Piattini (IGI Global, 2008), 463–80, <https://doi.org/10.4018/978-1-59904-847-5.ch026>.

6 Donna Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” in *Feminist Studies* 14, no. 3 (1988): 584, <https://doi.org/10.2307/3178066>.

fieldwork and situatedness – We feel the partiality of our virtual perspective when we physically walk and drive around in the vast territory and enter into conversations – every pixel on Google Maps and point in our diagrams unfolds a universe. In contrast to the claims of objectivity and rationality by science, Haraway calls for “the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity”⁷. She describes how knowledges are open-ended and therefore able to join each other; to be stitched together imperfectly.⁸ We take this not as an invitation to draw a big picture that concludes our research, but rather to stitch together the patches of observations, contexts and interpretations that we have gathered.

field notes – Ursula Le Guin’s “The Carrier Bag Theory of Fiction” offers a feminist approach for the kinds of stories needed in the Anthropocene.⁹ From the heroic stories of fight and victory, she shifts the attention to the carrier bag as metaphorical container for all kinds of stories, allowing for heterogeneity and contingent effects.¹⁰ Our field notes serve as containers for the situated cases and their entanglements within the larger context of the Rheinisches Revier.

post-extraction bugs – In common use, bugs describe computer glitches and errors in softwares, its name given by the first computer bug, a moth trapped in a computer in 1974.¹¹ On our virtual journeys through the landscape we stumble across numerous glitches that are joined by irritations and surprises while we explore laws and plans and undertake our fieldwork. Post-extraction bugs (throughout the paper we mostly use the short form bug) are our lens to identify places where we encounter frictions, meet dissonances of lived realities and practices of so-called repair. Beyond an unexpected problem or error, we consider the bug with existing theories on “mistakes”¹², “rupture”¹³, and “superbug”¹⁴. “Correct Mistakes”¹⁵, the theme of the 2024 Tbilisi Architecture Biennial addresses the exploitation and neglect of resources and ecosystems. In tandem, the term “rupture”¹⁶ of the “Field Guide to the Patchy Anthropocene” addresses mistakes in environmental protection and management of natural resources that are closely linked to political decisions and economic dynamics. As points where something is irreversibly broken, ruptures trace how “imperi-



↑ Tentacular Thinking and Storytelling

7 Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective”, 589.

8 Haraway, 586.

9 Anna Lowenhaupt Tsing et al., *Field Guide to the Patchy Anthropocene: The New Nature* (Stanford, California: Stanford University Press, 2024), 9.

10 Tsing et al., 9.

```
Nov 17 08:33:38 ws pppd[2158]: Timeout waiting for PAD0 packets
Nov 17 08:34:35 ws pppd[2158]: Timeout waiting for PAD0 packets
Nov 17 08:34:35 ws pppd[2158]: Exit.
Nov 17 09:17:02 ws rcheckd for updates: Running /usr/local/bin/check_for_updates
Nov 17 09:17:02 ws check_for_updates: Starting
Nov 17 09:17:02 ws check_for_updates: Updating holdlist
Nov 17 09:17:11 ws check_for_updates: Running 'cat -get update'
Nov 17 09:17:11 ws check_for_updates: Error exit called
Nov 17 09:24:18 ws nagios3: Auto-save of retention data completed successfully.
Nov 17 10:05:58 ws kernel: [ 6185.581784] br0: port 1(eth0) entering forwarding state
Nov 17 10:05:58 ws kernel: [ 6185.581784] br0: port 1(eth0) entering disabled state
Nov 17 10:05:58 ws kernel: [ 6185.598413] ADDRCONF(NETDEV_UP): eth0: link is not ready
Nov 17 10:06:02 ws kernel: [ 6186.598394] device eth0 entered promiscuous mode
Nov 17 10:06:02 ws kernel: [ 6186.607303] r8159 0000:03:00.0: eth0: Link down
Nov 17 10:06:02 ws kernel: [ 6186.607303] r8159 0000:03:00.0: eth0: Link down
Nov 17 10:06:02 ws kernel: [ 6186.698125] ADDRCONF(NETDEV_UP): eth0: link is not ready
Nov 17 10:06:02 ws kernel: [ 6186.698773] ADDRCONF(NETDEV_UP): br0: link is not ready
Nov 17 10:06:03 ws kernel: [ 6186.706443] r8159 0000:03:00.0: eth0: Link up
```

11 “Log Book With Computer Bug,” accessed December 9, 2024, https://americanhistory.si.edu/collections/object/nmah_334663#.

12 “Correct Mistakes,” Tbilisi Architecture Biennial 2024, accessed October 9, 2024, <https://biennial.ge>.

13 Tsing et al., *Field Guide to the Patchy Anthropocene*, 65.

14 Keller Easterling, “Collectivity - Going Wrong,” e-flux Architecture, accessed December 9, 2024, <https://www.e-flux.com/architecture/collectivity/304220/going-wrong/>.

15 “Correct Mistakes.”

16 Tsing et al., *Field Guide to the Patchy Anthropocene*, 65.

17 Tsing et al., *Field Guide to the Patchy Anthropocene*, 65.

18 Tsing et al., 3.

19 Tsing et al., 2.



↑ How to Blow up a Pipeline - climate activists at Tagebau Hambach 2017

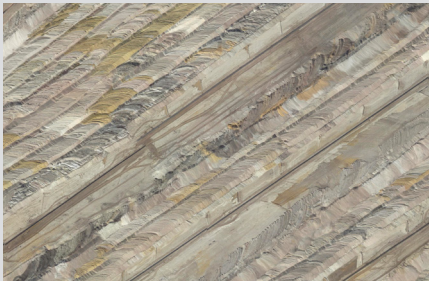
20 Easterling, “Collectivity - Going Wrong.”

21 Easterling.

22 Easterling.

al and industrial infrastructures, repetitively built, have transformed ecosystems across the surface of the earth - and often beyond easy fixing”.¹⁷ Human infrastructures modify land, water and air, evoking responses from all beings that encounter these modifications.¹⁸ The authors of the “Field Guide” refer to this phenomenon as “feral effects”¹⁹ - answers stimulated by human infrastructures but outside of human control, uncovering the uncertainty of sometimes positive, sometimes devastating effects that remake the world. This reveals how technological infrastructure and human activity are deeply intertwined in a post-extraction landscape, to the point where they become indistinguishable. In the Rheinisches Revier, enormous machines shape the post-extraction terrain, digging and moving matter to create hills and lakes - landscapes that are products of immense engineering. In this sense, the bug analogy becomes particularly compelling, as it highlights how even the physical landscape can be understood as a machine-driven system, blurring the boundaries between natural and artificial in a profound way. Finally, Keller Easterling’s “Superbug” hints at the power of failures that are typically seen more as deficits rather than assets.²⁰ She urges us: “Rather than fighting or eliminating problems, consider the productivity of multiplying problems.”²¹ What we take away from Easterling, is that problems and failures inspire alternative and adjustable ways to design.²²

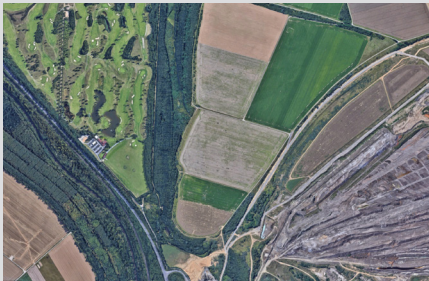
In the context of a territorial repair project, tracing past and future mistakes, frictions and blank spaces serves as a starting point for action and a shift towards other practices. We dig into places somehow undefined, or redefined, mutating matters. A bug can then be not just a problem to solve, an error to eliminate, but a point of openness in a system, a space for new imaginaries.



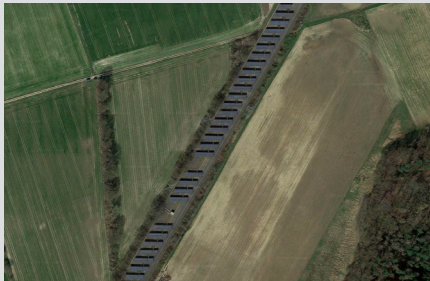
● A BUG OF TAKEN COMMONS



● A BUG OF HOME OWNERSHIP



● A BUG OF GOLF COURSES



● A BUG OF ENERGY GOVERNANCE



● A BUG OF MOVED MOUNTAINS



● A BUG OF LAND USE



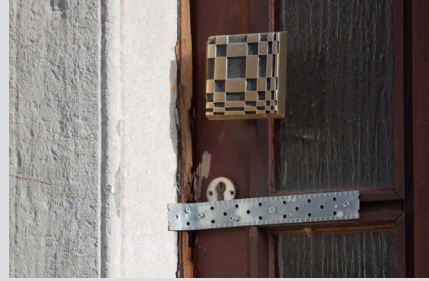
● A BUG OF NEGOTIATED ISLANDS



● A BUG OF DESIRED LAKES



● A BUG OF TAKEN COMMONS



● A BUG OF HOME OWNERSHIP



● A BUG OF GOLF COURSES



● A BUG OF ENERGY GOVERNANCE



● A BUG OF MOVED MOUNTAINS



● A BUG OF LAND USE



● A BUG OF NEGOTIATED ISLANDS



● A BUG OF DESIRED LAKES

This catalogue of post-extraction bugs puts in dialogue place-based stories, voices of inhabitants, and narratives of post-extraction. Each bug is a fragment of moved matter and ownership, of loss and renewal. We pay attention to the voices of actors with leverage, gathering in offices, golf clubhouses, meeting rooms, dining tables, and over zoom. We also try to notice: the hum of mining machines, the shifting shadows of wind turbines, the croak of frogs in a new pond, the songs of demonstrators, the mushrooms sprouting in recultivated soil, and the cars sweeping by the newly constructed village.



↑ Visitor Parking of RWE Power AG

Voices of our fieldwork:

Daniel Hofinger / Green Party of Regional Government / 26.08.24

Dr. Daniela Karow-Kluge / RWTH Aachen Faculty of Architecture / Chair of Planning Theory and Urban Development / 19.11.24

Dr.-Ing. Jann Weinand / Research Center GmbH Jülich / Institute for Climate and Energy Systems 20.11.24

Torsten Stamm / City of Bedburg / Department for Planning, Construction, Climate Protection, Mobility and Economy / 21.11.

Dirk Jansen / BUND NRW e.V. / 21.11.
Hermann Oppenberg / Golfclub Erftaue e.V. / formerly RWE Power AG / Mining Production Department / 22.11.24

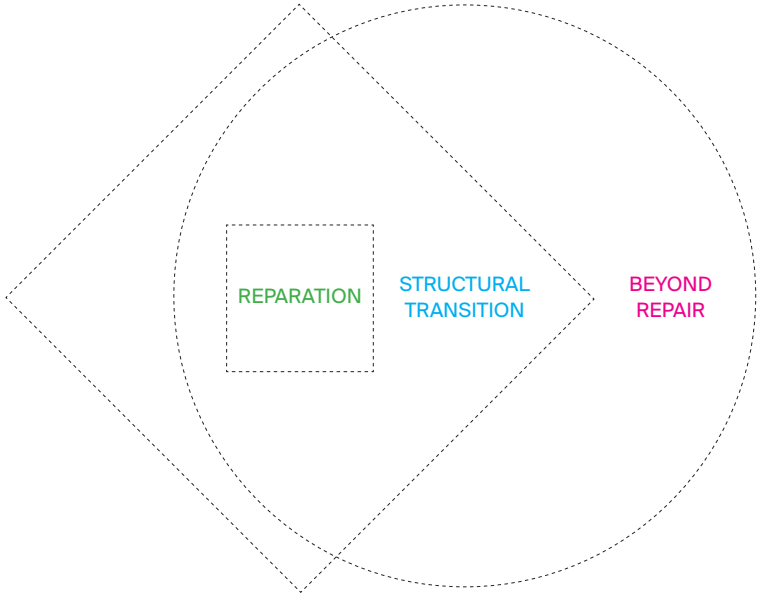
Hendrik Stemmann / RWE Power AG / Brown Coal Mine Planning Department / 22.11.24

Erich Gussen / Agricultural Association Rhineland e.V. / Vice-President of Association and Farmer / 23.11.24

Giulia Fanton and Annette Schneider-Reinhardt / LVR Landschaftsverband Rheinland / Projekt geSCHICHTEN / 25.11.24

Anna Hecker / Municipality of Merzenich / manager of Structural Transition and Economic Geographer / 27.11.24

In this multiplicity of encounters, we gain insight into the underlying struggles and conflicts of interest, as well as the dreams and aspirations for the future of the Rheinisches Revier. These diverse stories reveal that concepts such as repair, reparation, and structural transition are negotiations of competing interests that immediately affect lived realities. Moving beyond these entrenched interests and establishing an altered practice of care begins with listening to both the loud and the quiet.



Repair Narratives in the Rheinisches Revier

“An act of restoring an object or structure to good condition by replacing or fixing parts, or of replacing or fixing parts in order to maintain it in good condition.” - Oxford English Dictionary



REPAIR

who: mining operator
where: extraction sites
how: renaturation and recultivation
what: compensation for past damage



REPARATION

who: national and federal state
where: extraction region
how: politico-economic funding program
what: investment in future development



STRUCTURAL
TRANSITION

“Tunnel under it, fly over it.” - Ozayr Saloojee.
Field Notes on Repair: 3, Places Journal, 2024.



BEYOND
REPAIR

Repair -

An act of restoring an object or structure to good condition by replacing or fixing parts, or of replacing or fixing parts in order to maintain it in good condition.²³

²³ "Repair, n.2 Meanings, Etymology and More | Oxford English Dictionary," accessed December 28, 2024, https://www.oed.com/dictionary/repair_n2.

Within the Rheinisches Revier and its landscape of moved mountains and new lakes, repair becomes more than a term for broken things. When repair evolves into a territorial concern, architecture and urbanism take on a critical role in maintaining habitats and ensuring their continued livability. “Critical Care”, a medical term borrowed by editors and curators Angelika Fitz and Elke Krasny of the Architekturzentrum Wien “offers an alternative vision for architecture and urbanism that focuses on caring for the broken planet.”²⁴ While the very meaning of repair is enmeshed with practices of care and maintenance, it remains to be assessed how forms of planetary care come into practice in this context: What does repair of a former extraction territory involve and exclude?

We trace two prevalent narratives in the Rheinisches Revier: firstly, the public law project of reparation, and secondly the politico-economic endeavour of structural transition. These interpretations of repair intersect and complement one another, offering a multifaceted perspective on the legislative understanding of repair. By examining the moved soils and villages, their recultivated or renatured surroundings, and the financial transactions that come along, we aim to uncover how the concept of repair often fails to challenge the underlying structures of extractive economies, environmental degradation, and systemic inequalities.

Ultimately, this paper challenges and critically interrogates the concept of repair itself. Artist and theorist Aliza Shvarts articulates the paradox embedded in repair: “As an abstract concept, repair is shot through with contradictory, politically-coded ambivalences.”²⁵ Preservation and rupture bear the risk of being stuck in the past or promoting innovation and techno-fixes, both perpetuating problematic existing systems. Ozayr Saloojee, teacher and designer who addresses architecture as “a practice of tender epistemic repair”²⁶, urges us to “Refuse that form of repair. Resist that form of care. Tunnel under it, fly over it.”²⁷ He critiques repair practices as reinforcing the status quo, describing them as “bypass urbanism, border architecture, and knowledge gatekeeping”, where the purpose is not genuine transformation but to maintain existing power structures.²⁸ These forms of repair are superficial gestures that mask deeper inequalities and injustices, offering no real change to the systems that perpetuate harm.²⁹

24 Elke Krasny, “Critical Care. Architecture and Urbanism for a Broken Planet,” in *Critical Care: Architecture and Urbanism for a Broken Planet*, ed. Angelika Fitz, Elke Krasny, and Architektur Zentrum Wien (Vienna, Austria: Cambridge, MA: Architekturzentrum Wien ; MIT Press, 2019), 10–22.

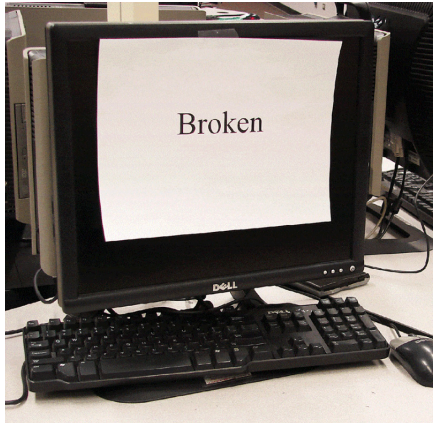
25 Aliza Shvarts, “Field Notes on Repair: 3,” *Places Journal*, November 2024, <https://placesjournal.org/article/field-notes-on-repair-3/#0>.

26 Ozayr Saloojee, “About,” *Ozayr Saloojee* (blog), August 22, 2022, <https://ozayrsaloojee.com/about/>.

27 Ozayr Saloojee, “Field Notes on Repair: 3,” *Places Journal*, November 2024, <https://placesjournal.org/article/field-notes-on-repair-3/#0>.

28 Saloojee.

29 Saloojee.



↑ 'Fix' the Broken?

Building on this perspective and Shvarts's recognition of repair's dualities, we propose a shift beyond repair to enter speculations for a landscape of commons. In this context, the impossibility of fully 'repairing' the damage caused by extraction or exploitation becomes the starting point for imagining something new. Instead of seeking to 'fix' the broken, we turn to the potential of creating alternative ways of living and organizing – a perspective that transcends repair altogether. But before moving beyond repair let us understand what lies behind the narratives of reparation and structural transition that make up today's post-extraction landscape in the Rheinisches Revier.

Auflösung und Abwicklung der bergrechtlichen Gewerkschaften

Auflösung oder Umwandlung	§ 163
Abwicklung	§ 164
Überleitung	§ 164a
Fortgeltendes Recht	§ 165

Drittes Kapitel

Sonstige Übergangs- und Schlußvorschriften

Bestehende Hilfsbaue	§ 166
Fortgeltung von Betriebsplänen und Anerkennungen	§ 167
Erlaubnisse für Transit-Rohrleitungen	§ 168
Genehmigungen im Bereich der Erweiterung des Küstenmeeres	§ 168a
Vorhandene Unterwasserkabel	§ 168b
Übergangszeit bei Unterstellung unter die Bergaufsicht, eingestellte Betriebe	§ 169
Haftung für verursachte Schäden	§ 170
Verjährung bei Bergschäden	§ 170a
Eingeleitete Verfahren	§ 171
Mutungen	§ 172
Zusammenhängende Betriebe	§ 173
Änderung von Bundesgesetzen	§ 174
Außerkräfttreten von Bundesrecht	§ 175
Außerkräfttreten von Landesrecht, Verweisungen	§ 176
(weggefallen)	§ 177
Inkräfttreten	§ 178

Erster Teil

Einleitende Bestimmungen

§ 1 Zweck des Gesetzes

Zweck dieses Gesetzes ist es,

1. zur Sicherung der Rohstoffversorgung das Aufsuchen, Gewinnen und Aufbereiten von Bodenschätzen unter Berücksichtigung ihrer Standortgebundenheit und des Lagerstättenschutzes bei sparsamem und schonendem Umgang mit Grund und Boden zu ordnen und zu fördern,
2. die Sicherheit der Betriebe und der Beschäftigten des Bergbaus zu gewährleisten sowie
3. die Vorsorge gegen Gefahren, die sich aus bergbaulicher Tätigkeit für Leben, Gesundheit und Sachgüter Dritter ergeben, zu verstärken und den Ausgleich unvermeidbarer Schäden zu verbessern.

§ 2 Sachlicher und räumlicher Geltungsbereich

(1) Dieses Gesetz gilt für

1. das Aufsuchen, Gewinnen und Aufbereiten von bergfreien und grundeigenen Bodenschätzen einschließlich des Verladens, Beförderns, Abladens, Lagerns und Ablagerns von Bodenschätzen, Nebengestein und sonstigen Massen, soweit es im unmittelbaren betrieblichen Zusammenhang mit dem Aufsuchen, Gewinnen oder Aufbereiten steht und sich nicht aus Absatz 4 etwas anderes ergibt,
2. das Wiedernutzbarmachen der Oberfläche während und nach der Aufsuchung, Gewinnung und Aufbereitung von bergfreien und grundeigenen Bodenschätzen,

§2 (12)

This Act applies to the restoration of usable surfaces during and after the exploration, extraction, and processing of (...) mineral resources.³⁰

30 “Bundesberggesetz” (Bundesministerium der Justiz, Bundesamt für Justiz, August 13, 1980), 8.

The Rheinisches Revier is mined for brown coal, in technical context referred to as lignite, which is abundantly found in this region and mainly used to generate electricity. Its low energy density makes it the most harmful coal: Besides high carbon dioxide emission through combustion, this kind of coal requires opencast mining, causing drastic terraforming. The energy company Rheinisch-Westfälisches Elektrizitätswerk (RWE) holds the monopoly as the only mining operator in Western Germany since over 100 years. They are bound to the German Mining Law which obligates operators of opencast brown coal mines to ensure the recultivation of the affected surfaces.³¹ This is in line with the EU's environmental policy and its Polluter Pays Principle, which asserts that those responsible for environmental damage are obligated to bear the costs of its restoration.³²

However the environmental repair policy and strategy has three critical gaps:

1. Reparations are confined to the extraction sites and their immediate impacts.³³
2. The law stays abstract with its definition of repair responsibilities by using the wording “Wiedernutzbarmachung der Oberfläche”, which translates to “making the surface usable again.”³⁴ RWE's reserves for large-scale renaturation projects, such as water management and landfill sealing, address some direct scars, but
3. questions about the long-term financing and management of reparations remain unanswered. The Federal Nature Conservation Association BUND calls for contractual agreements to secure funding for the so-called eternal burdens of mining.³⁵

What should this reparation project encompass? Addressing this requires evaluating the full extent of extraction, including the power exerted and the damage caused over the past 130 years (see Diagram “About What”). Such an approach not only makes the measurements taken by RWE and the state traceable but also highlights the limitations of these efforts.

The mines represent sites of exceptional power. To begin with, this power is deeply embedded in the



↑ Opencast Mine Hamabch

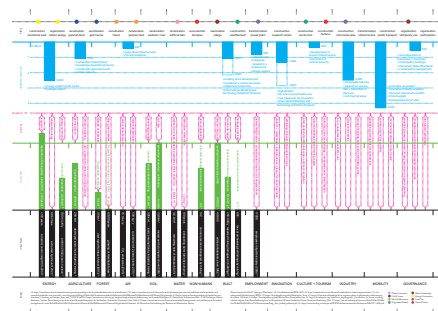
31 “Bundesberggesetz”, 8.

32 “Ensuring That Polluters Pay - European Commission,” June 18, 2024, https://environment.ec.europa.eu/economy-and-finance/ensuring-polluters-pay_en.

33 “Bundesberggesetz”, 8.

34 “Bundesberggesetz”, 8.

35 “Ewigkeitslasten-Fonds für Braunkohle ist überfällig,” BUND - BUND für Naturschutz und Umwelt in Deutschland, accessed November 12, 2024, <https://www.bund-nrw.de/themen/braunkohle/im-fokus/ewigkeitslasten/>.



↑ Diagram “About What” - Enlarged Version in the enclosed Booklet

36 Kathryn Yussof, “Mine as Paradigm – Survivance,” *E-Flux*, 2021, 9, <https://www.e-flux.com/architecture/survivance/381867/mine-as-paradigm/>.

37 Yussof, 2.

38 Dennis Pohl, *Building Carbon Europe*, Critical Spatial Practice 13 (London: Sternberg Press, 2023), 29.

↓ The Key to Railway Harmony (Bern Key)



39 Ashley Dawson, *People's Power Reclaiming the Energy Commons* (La Vergne: OR Books, 2022), 44.

40 Dawson, 44.

41 Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London ; New York: Verso, 2014), 15.

42 Easterling, 15.

43 Tsing et al., *Field Guide to the Patchy Anthropocene*, 72.



↑ Groundwater Pumps to prevent the Mine from Flooding

44 Marcia Bjornerud, “The Pace of the Earth,” in *TIMEFULNESS How Thinking Like a Geologist Can Help Save the World* (Princeton and Oxford: Princeton University Press, 2018), 62–92.

enduring legacy of brown coal extraction, which carries the colonial and imperial histories of the mine as a project of property, accumulation, domination, and race.³⁶ Kathryn Yussof, professor of Inhuman Geographies, articulates the mine’s devastating impact: “The mine as the archetype or industrial blueprint of those extractive relations, combined racial subjection with planetary dissolve.”³⁷ This power extends further as coal trade has shaped European politics: beginning in the nineteenth century, it influenced the opening of national borders and the development of international railway systems.³⁸ In short: Europe that we know today is built on carbon agreements.

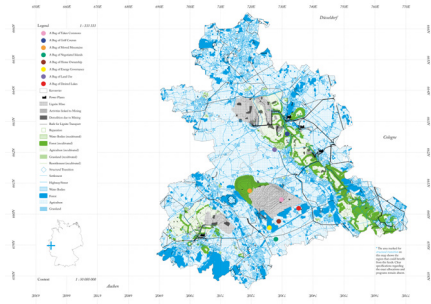
The outreach of power becomes further apparent in the structure of Germany’s coal energy infrastructures, commonly organized with monopoly rights of regional power companies just like RWE.³⁹ This centralized framework was installed during the nazi era and underlines the power dynamics of the energy infrastructure that constitutes today’s supply chains.⁴⁰ On the scale of the Rheinisches Revier, the extent of land expropriation and the multi-layered, long-term damage caused by the coal mining project exemplifies what Keller Easterling refers to as “Extrastatecraft”.⁴¹ The term describes the unquestioned legitimacy of infrastructure projects and the complicity with statecraft.⁴² In other words, infrastructure projects can resist critique because they are framed as essential to progress.⁴³ The brown coal mines of the Rheinisches Revier vividly demonstrate their exceptional power, embedding a technological order that structures social, economic, and political relations. This interplay of power and harm impacts agricultural land, forests, air, soil, water, nonhumans, built environments, and human communities (see Diagram “About What”).

These dimensions of extraction tie into the geologic perspective that structural geologist Marcia Bjornerud gives in “Timefulness: How Thinking Like a Geologist Can Help Save The World.” She highlights the unprecedented topographic changes and their long recovery times, alongside impacts on groundwater, ecosystems, and livelihoods.⁴⁴ Bringing this back to the Rheinisches Revier, the sheer scale of damage (see Diagram “Which Grounds”) becomes evident when considering that it will take over 300 years to restore the water table, alongside the loss of 12,000 years of forest ecosystems and the displacement of 44,000

residents. The 325km² of forest and agricultural land lost to mining activities are barely comparable to the 200km² of recultivated land whose soils are deeply disrupted, often polluted and acidified, and take decades to be again habitat for de-rooted species and ground for agricultural activities (see Diagram “About What”). Reparations framed by National Mining Law and the Public Law Agreement cover only a fraction of the damage, hinting at the limits of the legal definition.

Taking this further, this reveals the limits of reparation: The era of the Anthropocene requires acknowledging the extent of human-induced harm, recognizing environmental precarity, and taking responsibility for the legacy of waste, pollution, and degradation.⁴⁵ Fitz and Krasny argue that the Anthropocene perspective risks homogenizing humanity's responsibility, obscuring the disproportionate impact of corporate industries.⁴⁶ Additionally, this view risks perpetuating Western rationality by relying on engineered solutions to 'repair' extraction sites. This is clearly reflected in the Rheinisches Revier, where projects aim to transform open-pit mines into artificial lakes and address water scarcity by constructing a water transport pipeline from the Rhein River.

Human-controlled and engineered efforts are, without a doubt, essential for transitioning to a post-extraction landscape. However, reparation risks becoming a continuation of extractive practices, and therefore land degradation remains. The limits of these constituting legal and conceptual frameworks demand a reimagined understanding of reparation.



↑ Diagram “Which Grounds” - Enlarged
Version in the enclosed Booklet

45 Hélène Frichot, *Dirty Theory: Troubling Architecture* (Baunach: AADR Art Architecture Design Research, 2019), 25.

46 Krasny, "Critical Care. Architecture and Urbanism for a Broken Planet," 11.

↓ The Lake to Come



47 Philipp Huntscha, Fabian Kröning, and Anna Graff, “Zurück in die Zukunft. Eine denkmalpflegerische Analyse zur Dorferneuerung von Morschenich” (Amt für Denkmalpflege im Rheinland, 2021), 14.

↓ Fierce Battles to Stop Mining



↑ Map of Bürgewald Commons, 1806

48 Huntscha, Kröning, and Graff, 13–14.

49 Thomas Lessmann, “Erinnerung aus der Natur,” *geSCHICHTEN Rheinisches Revier* (blog), August 14, 2023, <https://geschichten-rheinisches-revier.lvr.de/erinnerung-aus-der-natur/>.

50 Lessmann.

51 Lessmann. With “mark” he refers to the former German currency.

The journey begins at the Hambach open mine, often referred to as ‘the hole’. As we drive along the A4 highway from Cologne, the landscape unfolds before us, offering glimpses of the Rheinisches Revier. Even today, some locals still greet each other with the traditional miners’ salutation, ‘Glück auf!’. Yet, brown coal is just one part of the story. For some, it is the fertile soils that make up this flat landscape and are the pride of local farmers. The so-called loess soils arrived during the last glacial period, giving rise to agricultural activity thriving until today. Over two millennia, the forests got gradually cleared and human farming activities created a predominantly agrarian landscape with only little woodland.⁴⁷ On the other side, the loess soils made a dense oak-hornbeam forest and diverse ecosystems flourish. Only small parts of these forests remain. The Hambach Forest ‘Hambi’ was not new to us, because it was fiercely contested and became a symbol of environmental resistance, famous far beyond Germany.

While we gaze at the hole without any sense of scale for this terraforming by extraction, we try to picture the Hambach forest that once dominated this patch of erased landscape. The Hambach forest was once a *Bürgewald*, a forest of commons. There are sources from Frankish times that describe how the forest was given as a gift to the surrounding villages to combat the prevailing poverty.⁴⁸ For over 10 centuries the woods were common ground for the local population to collect mushrooms, herbs and wood for heating and building, as well as for cattle farming.

Digging deeper into histories lost in the hole, we come across Thomas Leßmann and his story of his family’s annual practice of collecting flowers in the Hambach forest: “It was my playground”⁴⁹, Thomas writes. He remembers the forest close to the village Etzweiler between Morschenich and Elsdorf, “right where the hole is now”⁵⁰. In spring, the forest took on a special significance for the entire family, because that’s when the lilies of the valley were collected and tied together in bouquets, which they sold for 5 marks each on the Königsallee in Düsseldorf.⁵¹ The story is part of the project “geSCHICHTEN” of the association Landschaftsverband Rheinland. We meet Giulia Fanton and Annette Schneider-Reinhardt who are part of the project that collects voices of the Rheinisches Revier and they share their view on

life-changing ruptures and transformations caused by extraction.

Searching for Etzweiler on Google Maps and the village is still marked with a red circle. However, the satellite pictures reveal that the location is now the lowest point of the brown coal mine. Besides numerous villages, the habitats of nonhumans like the Bechstein's bat, the tree frog, the hazel dormouse and the middle spotted woodpecker, protected species according to EU law, were continuously erased, swallowed by the hole. The damage of livelihoods evoked a long history of civil resistance and activism, culminating in the protests and the occupation of the Hambach forest in 2018 which in the end achieved an earlier mining stop for the region.

We ask RWE, more precisely the head of brown coal mine planning Hendrik Stemmann and the former employee of the mining department Hermann Oppenberger, about the taken commons of the Hambach Forest. Hendrik Stemmann argues pragmatically that due to German Forest Law, every hectare of forest has to be replaced with at least one hectare of replanted forest. "So there will never be less forest in Germany. It will always be the same or more."⁵² The loss of ecologically highly valuable and centuries-old forests are missing in his calculation. Hermann Oppenberg emphasizes the economic use of the forest to question its value for protection: "The Hambach Forest, which was so controversial, is a 'Forst' and not a forest."⁵³ The German term *Forst* describes a forest that is managed and cultivated. This correlates with our research on the Bürgewald and its pre-modern practices of commoning. Oak-hornbeam forests as well as the lilies of the valley have been strongly fostered by forest management practices such as grazing and cutting trees. This knowledge of generations of regenerative land management is then not any more something that makes this forest less valuable. On the contrary, it proves that it is worth learning from it.

In the end, the view of the giant hole tells the story of this landscape's past, but also of its future. The vanished spot of flower picking is now right in the middle of the new lake project that is meant to fill the over 400m deep hole of the Hambach mine. This unprecedented undertaking of the largest artificial

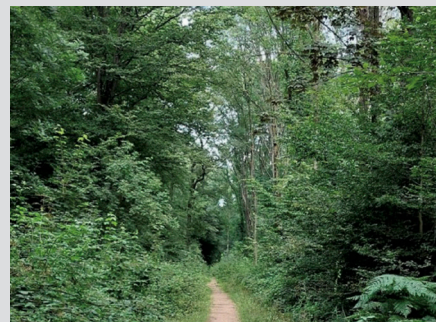


↑ A Google Maps Glitch

52 Hendrik Stemmann, in discussion with the authors, November 22, 2024.

53 Hermann Oppenberg, in discussion with the authors, November 22, 2024.

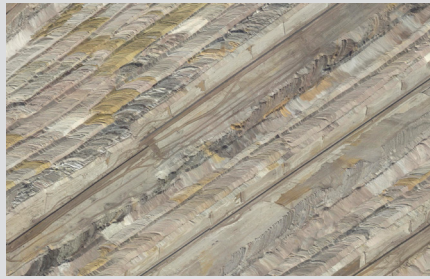
↓ The Once Forest Commons of Hambach



⁵⁴ “Rheinwassertransportleitung,” BUND für Naturschutz und Umwelt in Deutschland, accessed December 4, 2024, <https://www.bund-nrw.de/braunkohle/hintergruende-und-publikationen/braunkohle-und-umwelt/braunkohle-und-wasser/braunkohle-restseen/>.

lake of Europe won't happen overnight, leaving much space for uncertainties.⁵⁴ However, the lake already begins to shape the narrative of a new identity, concealing the remnants of the extraction project. We wonder if it is a promise of a new landscape of commons.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ BLOG_LVR_GESCHICHTEN

↑ SCAN_241122_BEDBURG
↓ SCAN_241124_SÜNDEWALD

LOCATION

Hambach Forest
(former Village of Etzweiler)
50189 Elsdorf

CHRONICS

~ 10th century / Bürgewald
1987 / Coal Mine Start
2002 / Coal Mine reaches Etzweiler
2016 / Deepest Point of Coal Mine
2030 / Start of Filling the Lake
~ 2070-2130 / Completion of Lake

TPOLOGY

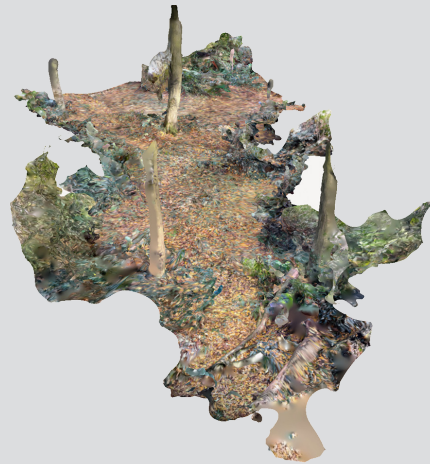
Reactivation Village

AT STAKE

Centuries-old Oak Forest Commons
Loss of Protected Habitat + Species

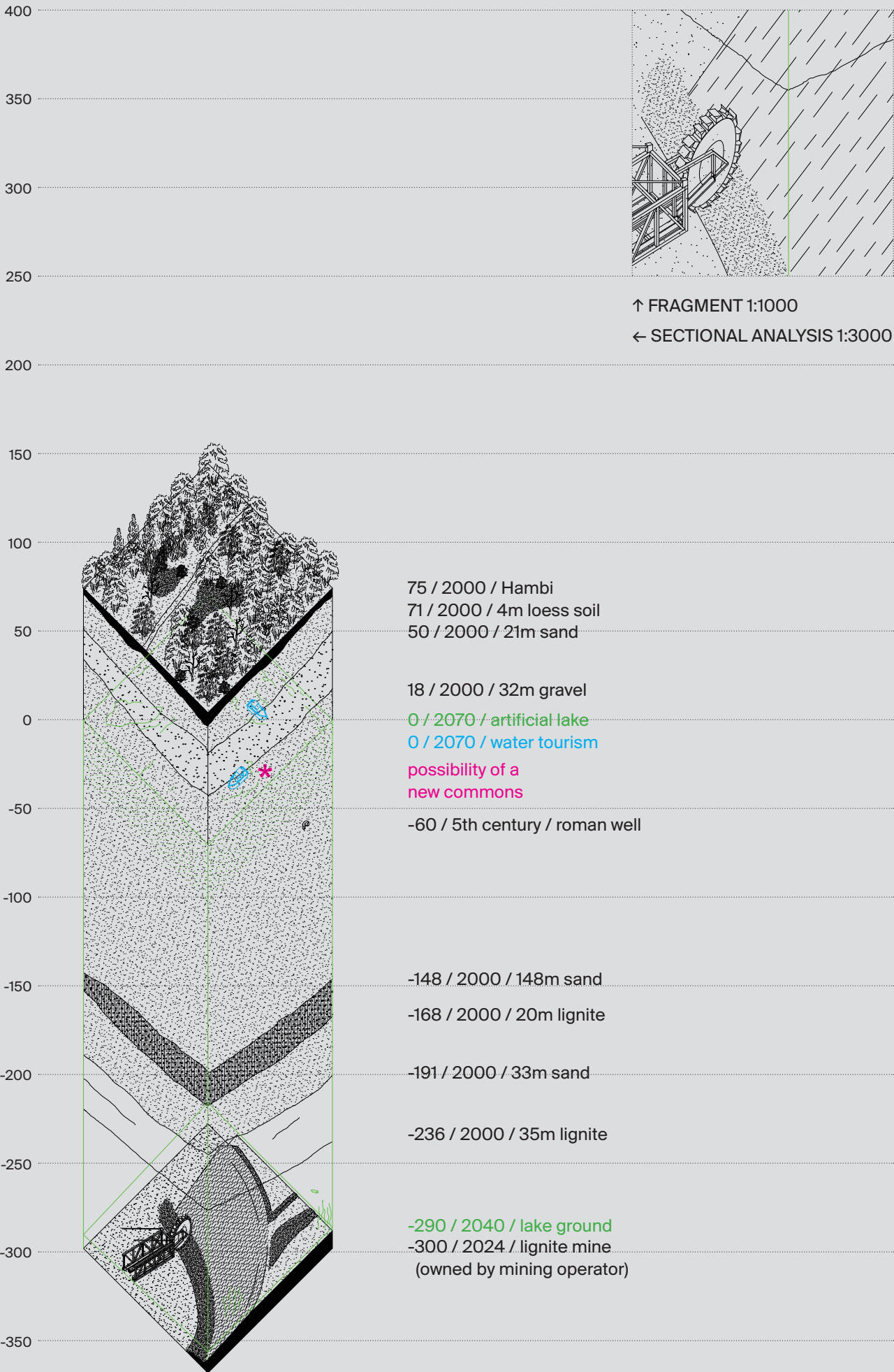
CONTACT

Giulia Fanton (cultural anthropologist)
Projekt geSCHICHTEN



ACTORS





Browsing on Google Maps, we take a closer look at the recultivated patches of land. Much of it consists of agricultural fields with bizarre shapes, hinting at the contours of former mining pits. But something else strikes us: The Golfclub Erftaue e.V. Grevenbroich. How did a golf course come to replace what was once agricultural land, forests, and wetlands? As part of the Rhenisches Revier, the Erft lowlands was interspersed with various wetlands and forests. Since World War II, the mine has taken its course, moving earth and coal, diverting the Erft River from its natural bed. Where once laid villages like Morken, Harff and Eppath was then gaping the mine of Fortuna.

After exhaustion, the hole of Fortuna was filled back in with earth, the dumps were sealed and the mine moved on. The recultivation process began. However, there is no doubt that the exploitation of brown coal has largely destroyed the Erft lowlands as a centuries-old cultural landscape.⁵⁵ We meet with Dirk Jansen, activist and managing director of the regional nature conservation association BUND. He makes clear that a lot has changed: “They used to plant poplars in rows and rows, fast-growing, to enrich the soil with nitrogen. And of course they don’t do that any more.”⁵⁶ Hendrik Stemmann of RWE notes: “If treated properly, it is possible to regenerate highly productive soils.”⁵⁷ Today, clear recultivation regulations for the mining authorities ensure that landowners receive land of equivalent size and soil quality to what they previously owned.

Hermann Oppenberg, the golf course’s greenkeeper and retired RWE employee, explains that the area of the golf course was recultivated in the 1970s and was used for agriculture for around 20 years. By 1994, the golf club took over the lease and eventually purchased the land shortly after. He notes: “The golf club benefited from RWE’s services. All the earthmoving was done with RWE machinery.”⁵⁸ The 85-hectare golf course is now privately owned and operates as a non-profit club. However, members are still required to pay an annual fee of €1,440 to play. To our question whether there were any efforts to open the space to other audiences or purposes, Oppenberg laughs and replies that they stand by their exclusivity.⁵⁹

The allocation of land for the enjoyment of a wealthy few raises questions on social equity within the recul-



↑ Erft Lowlands around 1950

55 Adolf Flecken et al., “Denkschrift: Das Rheinische Braunkohlenggebiet - Eine Landschaft in Not!,” ed. Rheinischer Verein für Denkmalpflege und Heimatschutz (Gesellschaft für Bruchdruckerei AG., Neuss, 1953), 22, https://rheinischer-verein.de/wp-content/uploads/2023/03/Denkschrift_Das_Rheinische_Braunkohlenggebiet_Web.pdf.

56 Dirk Jansen, in discussion with the authors, November 21, 2024.

57 Hendrik Stemmann, in discussion with the authors, November 22, 2024.

58 Hermann Oppenberg, in discussion with the authors, November 22, 2024.

59 Oppenberg.

60 Hermann Oppenberg, in discussion with the authors, November 22, 2024.

↓ Intensive Maintenance for Exclusive Joy



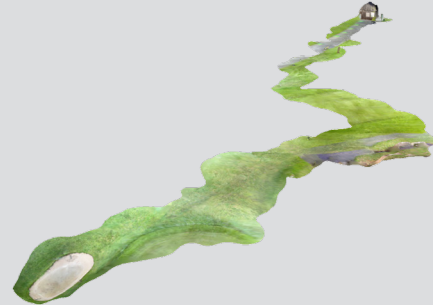
tivation practices of post-extraction landscapes. This approach seems to ignore the long-term responsibility for neglected habitats and communities. Oppenberg aptly remarks: “If this were agricultural land, what would it be like? Not everyone is allowed to run through this land or through the cornfield or trample the turnips flat (...).”⁶⁰ His point is well taken. In case of recultivation neither an agricultural field, a forest, nor a golf course is a fully public ground. Is this where a weakness of the reparation narrative lies? To us, it seems a bit ironic to place, in this very post-extraction landscape, a playground for the very few. Walking over the recultivated grounds, which have been reshaped into soft hills and pits for the golf course, we think that recultivation practices risk being too short-sighted, prioritizing private leisure over public well being.

The surface has been rendered usable again according to German Mining Law, yet the required seven years of recultivation by RWE offer scant evidence of the mining company’s long-term commitment to this ground. Once the property was sold, RWE’s responsibility effectively ceased. This raises a critical question: what truly defines meaningful recultivation when the usability of the land manifests in such varied forms? How to ensure the prevention of further land degradation? As we continue our journey, drawing closer to the moved mountains, we can’t help but wonder who will find a place within the landscapes to come.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ WEBSITE_GOLFCLUB_ERFTAUE

↑ SCAN_241122_GREVENBROICH
↓ SCAN_241122_GREVENBROICH_2

LOCATION

Golfclub Erftaue e.V.
Zur Mühlenerft 1
41517 Grevenbroich

CHRONICS

35 mio years ago / River Lowlands
~ 16th century / Village Epprath
~ 1958 / Village Demolition
~ 1965 / Extraction Site
~ 1975 / Recultivation
1994 / Golf Course

TPOLOGY

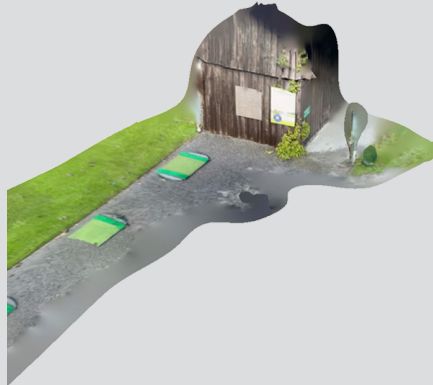
Recultivation / Golf Course

AT STAKE

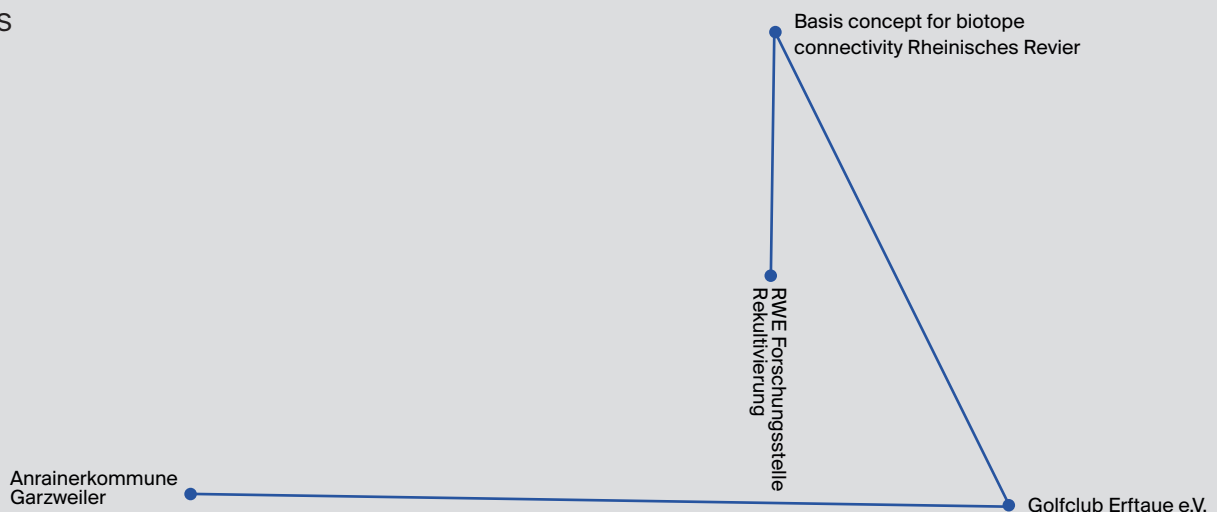
Redistribution of Land
Landscape of Commons

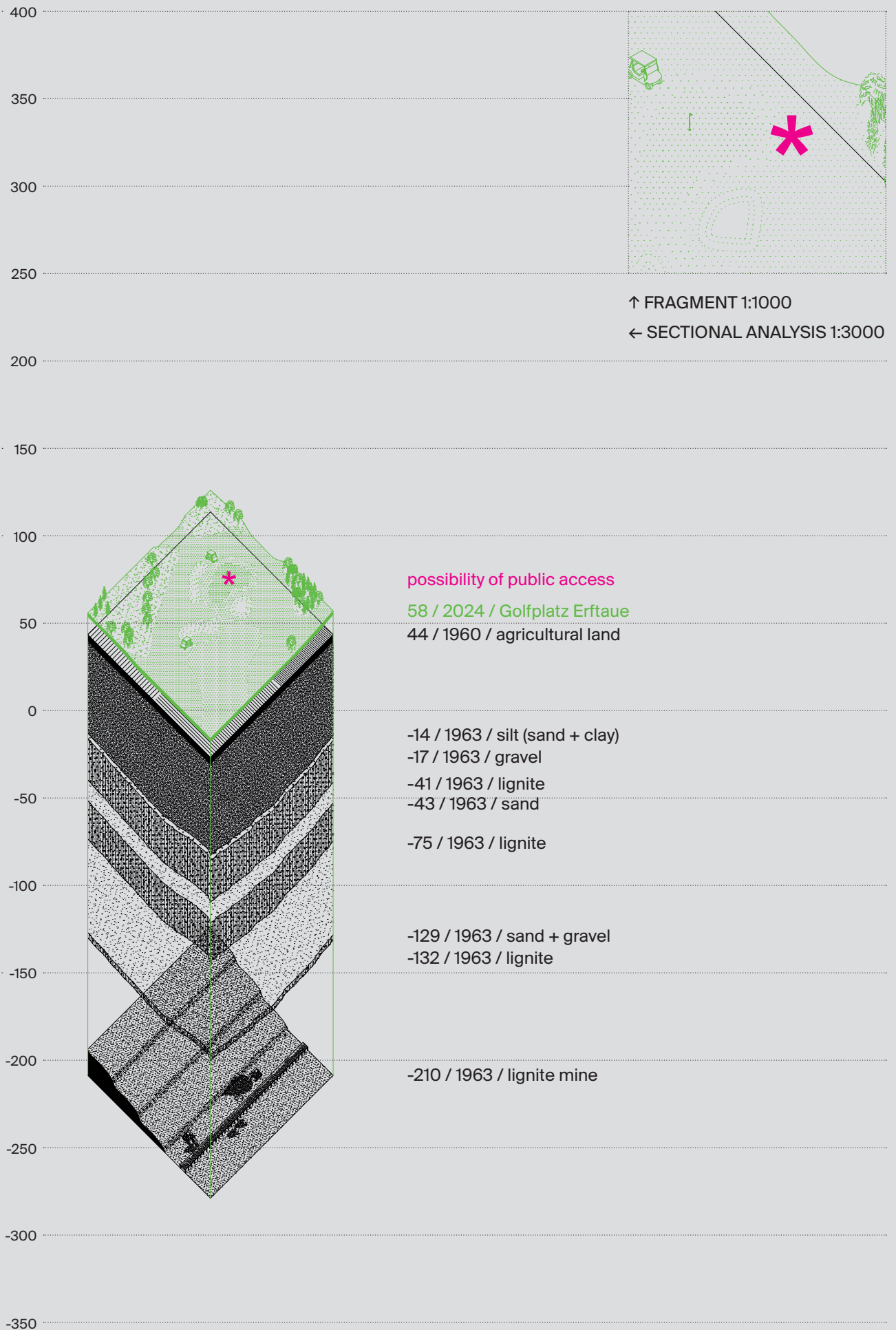
CONTACT

Herman Oppenberg
Platzwart and Retired RWE Engineer



ACTORS





People say there are wild horses on the hilltop of the artificial mount *Sophienhöhe*. On a windy November afternoon, we begin our hike. The matter of the Hambach mine has created a mountain of 200m in the predominantly flat landscape. Since the machines began digging in 1987, earth began to accumulate on the fields next to the mine.

Right before beginning the quest to the hilltop, we meet farmer Erich Gussen. He runs a farm next to the *Sophienhöhe*. “It has simply been dumped into the landscape because the overburden had to go somewhere.”⁶¹ While brown coal as an energy resource has high positive social and economic valence, the growing heap next to the hole embodies the enormous mass of ‘side product’ without apparent value.⁶² The recultivation project of the *Sophienhöhe* already started in 1988 and is meant to compensate for the loss of the Hambach forest and the vanished lands around it. “It has to be said that the *Sophienhöhe* now has a high ecological value,”⁶³ Dirk Jansen acknowledges. “But well, 4,000 hectares of RWE-planted forest is different to 4,000 hectares of 12,000-year-old community forest.”⁶⁴

While we follow the meandering paths slowly gaining altitude, the landscape around us changes. The patches of conifers and deciduous trees are planted in rank and file, leaving traces of the recultivation of ‘useful forest’, dedicated to high-yield forestry and efficient soil regeneration.⁶⁵ What recultivation means, specifically to the mining operator, clearly has changed since the 1990s. Especially on the *Sophienhöhe*, practices shift from recultivation towards renaturation – a testing ground for the RWE’s research center of recultivation. Here, the diversity of soils, habitats and nonhumans find particular attention and space. The research center is responsible for the project management and bio-monitoring of a wide-ranging biodiversity strategy.

While talking with Dirk Jansen, it becomes clear that the room for maneuver of RWE’s recultivation department is limited: “They only get, at best, 4-5% of the area where they can do what is ecologically meaningful.”⁶⁶ This might be linked with the obligations of RWE to compensate for lost agricultural land, we assume. But the reasons for this aside, Dirk Jansen underlines the will for unconventional practices by



↑ Our Destination is the Golden Meadow

61 Erich Gussen, in discussion with the authors, November 23, 2024.

62 Gavin Bridge, “The Hole World: Scales and Spaces of Extraction,” in *Landscapes of Energy*, ed. Rania Ghosn, New Geographies 02 (Cambridge, MA: Harvard University Press, 2009), 47.

63 Dirk Jansen, in discussion with the authors, November 21, 2024.

64 Jansen.

65 Hendrik Stemmann, in discussion with the authors, November 22, 2024.

↓ First Inhabitations of Freshly Moved Soil



66 Dirk Jansen, in discussion with the authors, November 21, 2024.

67 Tsing et al., *Field Guide to the Patchy Anthropocene*, 16.

68 “Braunkohlentagebaue und Gewässererschütz,” BUND für Naturschutz und Umwelt in Deutschland, accessed December 31, 2024, <https://www.bund-nrw.de/themen/braunkohle/hintergruende-und-publicationen/braunkohle-und-umwelt/braunkohle-und-wasser/>.



↑ Pioneer Vegetation



↑ A Deadwood Post Hosts Diverse Non-humans

69 Dirk Jansen, in discussion with the authors, November 21, 2024.

the research department of recultivation. He describes a particular place on the Sophienhöhe called *Höller Horn*. Here, the nutrient-poor, often highly acidic soils result in sparse vegetation. However, the uneven terrain supports pioneers like scots pines, sand birches, sand lizards, blue-winged grasshoppers, and wild bees in its rugged dune landscapes. This links back to what anthropologist Anna Tsing observes during her fieldwork: disturbance-oriented species create a „feral geography“⁶⁷ in the brown coal mining site. A feral actor in the Rheinisches Revier are chemicals in the ground that are dug up by extraction and cause a constant stream of pollutants into the water table.⁶⁸

While walking on human-shaped grounds, paths are hardly traceable on Google Maps. We leave the indicated path to find our own way to the hilltop. The so-called *Golden Meadow* feels dystopian and peaceful, abandoned and neatly planned at the same time. The machines of the mine create a faint, low-toned soundscape. We meet traces of earthworks, deadwood erected like totem posts, and finally a small group of wild horses close to a frozen pond. The wild horses are supposed to care for the grasslands and its inhabitants by grazing. They are owned by a foundation commissioned by RWE; the collaborative project only started this summer. We are not the only guests on the hilltop on this freezing late afternoon, there are bikers and a woman with binoculars. Another side effect might be to attract more visitors on the artificial mount by these new inhabitants.

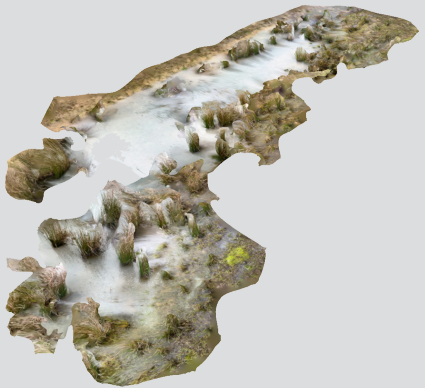
We wonder how this new habitat will be maintained over time. At the moment, the ground is owned by the mining company and their warning signs are constant companions on the Sophienhöhe. But mining activities will be over in 2033 at the latest, what will happen after that? Dirk Jansen shares his concerns: “The solution can’t be to give them to the foresters of the regional forestry department or whoever. That’s why (...) there needs to be a foundation that actually has a mandate and management plan based on a consistent landscape ecology.”⁶⁹

The horses keep their distance and we do as well. As for many other nonhuman and human inhabitants in this territory, change and recovery need much more time than the timescopes we are used to thinking with.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ WEBSITE_NEULAND_HAMBACH

↑ SCAN_241123_GOLDENE AUE
↓ SCAN_241123_GOLDEN AUE_PUMP

LOCATION

Golden Meadow
Sophienhöhe
52382 Niederzier

CHRONICS

1988 / Beginning of Recultivation
2008 / End of Dumping
June 2024 / Arrival Wild Horses

TYPOLOGY

Renaturation Pastured Landscape

AT STAKE

Long-term Renaturation Practices
Biotope Connection, Biodiversity

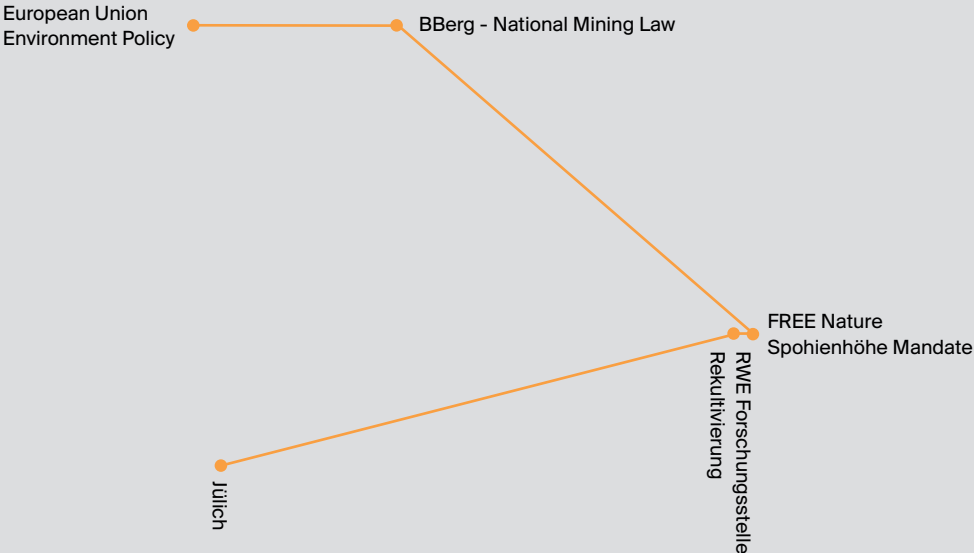
CONTACT

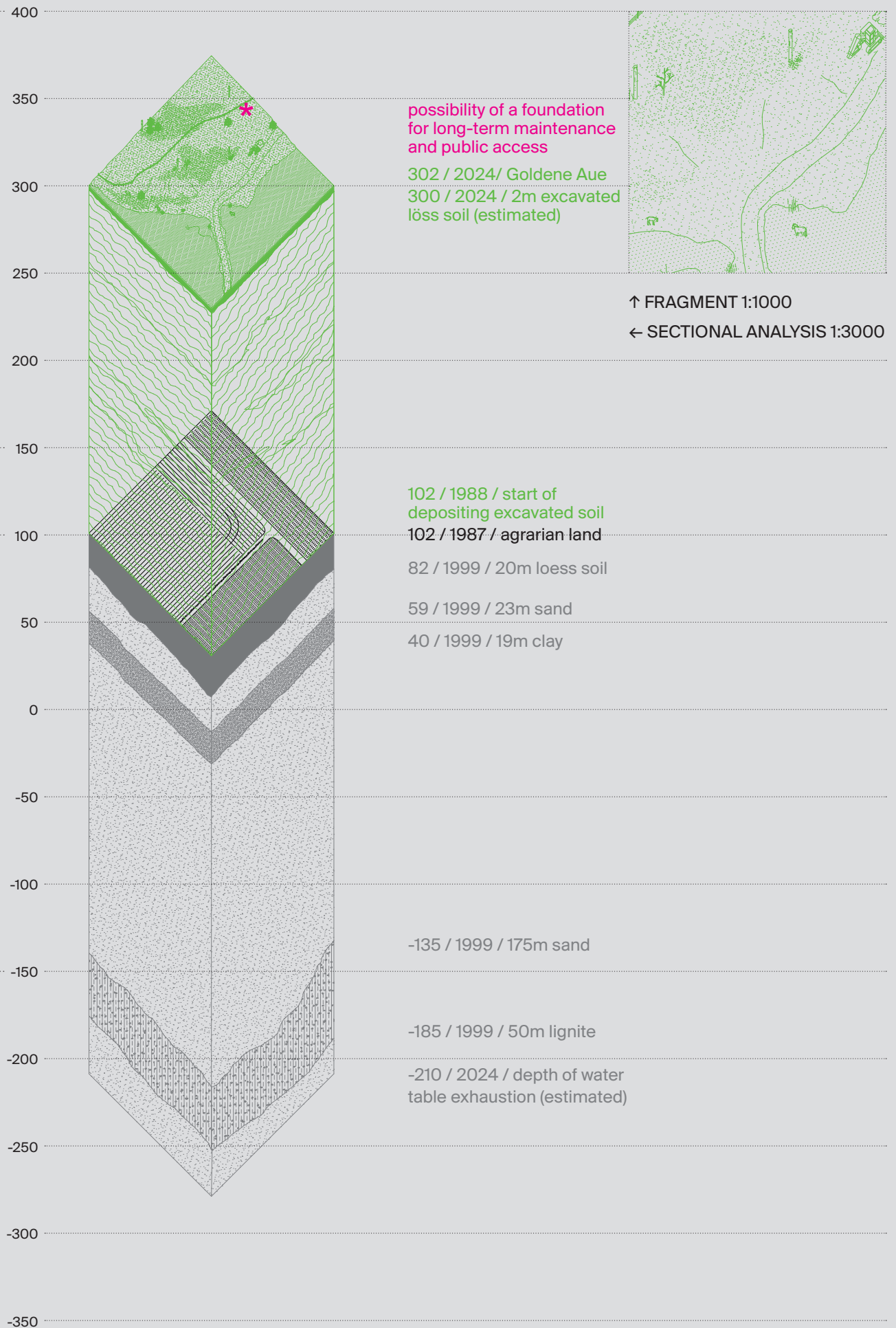
Hendrik Stemann (RWE Power AG)
Tagebauplanung und Genehmigung

Dirk Jansen (BUND NRW)
Umwelt- und Naturschutzpolitik



ACTORS





Next to the moved mountains there are whole villages and communities that got relocated. The extraction project turns out as an anthropocenic choreography of moving matter – or as Hermann Oppenberg says, “RWE is the world champion in moving masses.”⁷⁰ We are heading to Neu-Morschenich, one of the over fifty villages that got resettled in the last decades of mining activities. Some call them *dragged villages* – in this description one can feel the painful process and the weight of things and memories that got moved. Giulia Fanton and Annette Schneider-Reinhardt are in constant exchange with inhabitants around the Hambach and Garzweiler mines. They describe how the inevitable relocation processes accompany inhabitants up to 20 years, and the future place of life is bound to years of negotiations – all supervised by RWE.⁷¹ Homes move, but neighbourhoods don’t necessarily end up staying together, since negotiation processes with RWE are anonymized and often tabooed among inhabitants. Relocating the church bell, the graveyard, the village linden tree, and the shooting club embodies the emotional transition.

When we arrive at the new village, some final construction works are still underway. A bridge crosses the highway and connects the new settlement of Neu-Morschenich to the village of Merzenich. To prevent the landscape from sprawling, RWE’s resettlement department has shifted its strategy to integrate new settlements into existing villages. However, the connection is rather an administrative and infrastructural one in this case. The new village stands out like an island built on green fields. A brand new soccer field and club house of the soccer club SV Morschenich and the volunteer fire force proudly mark the entry of the village. To relocate and rebuild such social spaces needs funding and often involves further negotiations with RWE.⁷² As Dirk Jansen describes: “RWE happily paid for everything. Nice neighborly help. When a sports club needed money, RWE was there.”⁷³

Walking past the small plots with predominantly single family houses, garages and small front gardens, the new settlement seems to us like a suburban dream, barely comparable with the former village. The traditional three-sided farmhouses and long vegetable backyards that characterized the former farming village have given way to smaller plots and single-family houses. We meet Anna Hecker, who manages the

70 Hermann Oppenberg, in discussion with the authors, November 22, 2024.

71 Giulia Fanton and Annette Schneider-Reinhardt, in discussion with the authors, November 25, 2024.

↓ Procession of the Shooting Club from Old to New Village



↑ An Island on the Greenfield

72 Fanton and Schneider-Reinhardt.

73 Dirk Jansen, in discussion with the authors, November 21, 2024.

74 Anna Hecker, in discussion with the authors, November 27, 2024.

75 Hendrik Stemann, in discussion with the authors, November 22, 2024.

↓ Suburban Dreams



76 Erich Gussen, in discussion with the authors, November 23, 2024.

77 Niklas Maak, “Eurodrive: Repopulation Utopia,” in *Countryside, A Report* (Köln: Taschen GmbH, 2020), 20–61.

78 Anna Hecker, in discussion with the authors, November 27, 2024.

structural transition of this municipality. She agrees on our impression that the newly built houses materialize a demand for individual family homes shaped by personal desires and societal norms.⁷⁴ Hendrik Stemann states in this context: “People said: ‘Well, (...) if you want us to move here, then we want to build the way we want. (...) So then there’s the Roman villa, next to the thatched-roof house, next to the Tuscan pavilion and the Bauhaus style.’”⁷⁵

The decorative front yards vary from stone gardens, arrangements of little sculptures to small flower beds of ornamental plants. In the backyards there are swings and sandpits, BBQs and deck chairs, lawns and young trees. Traditionally, biodiversity hotspots thrived on the outskirts of villages, where vegetable gardens seamlessly blurred into meadows and pastures. Farmer Erich Gussen agrees: “Well, the gardens and meadows are gone for now. (...) And now we have the problem that the ornamental gardens are just rock gardens. And that can’t work.”⁷⁶ The new villages seem to have lost a vibrant way of coexisting with insects, birds, and weeds. Idealizations of traditional rural life and prejudices of the suburban dream aside, can we also speak of a broader loss – the erosion of the vibrancy of former village life, its communal infrastructures, and its local forms of subsistence?

“The old village’s bungalows show an astonishing love for detail and perfectionism. Their architecture mirrors the wealth and care of the West German post-war welfare state, while the buildings in (...) sketch a portrait of the effects of a shareholder value-driven market economy.”⁷⁷ As Niklas Maak observes, resettlements are part of a broader transformation of rural hinterlands, accelerated by the extraction projects. Urban dependencies like commuting increase while local economies and subsistence erode.⁷⁸ Villages like Morschenich exemplify the creation of suburban housing developments, often neglecting soil, resources, community, and biodiversity. Although RWE-led resettlements are complete as brown coal extraction nears its end, new housing developments remain central to the ongoing structural transition ahead. We leave the island of Neu-Morschenich amid the sugar beet fields behind, heading toward the former village of Morschenich. Here, we are told, regenerative practices of transformation and participation are taking shape.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ WEBSITE LANDSCAPE ARCHITECT

↑ SCAN_241124_MORSCHENICH
↓ SCAN_241124_MORSCHENICH_2

LOCATION

Morschenich (-Neu)
52399 Merzenich

CHRONICS

2012 / Decision Location
2015 / Construction Start
2017 / First Village Fair
July 2024 / Village Renaming

TPOLOGY

Construction Resettlement

AT STAKE

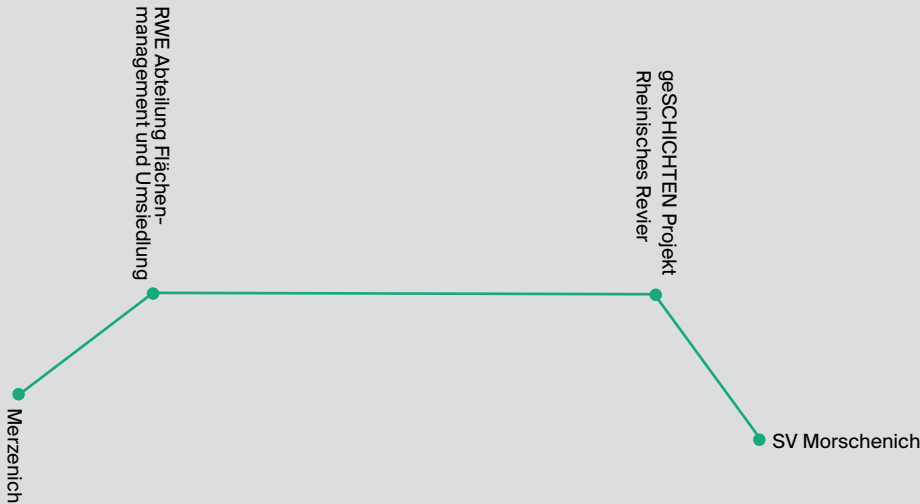
Forms of Living and Community
Biodiversity

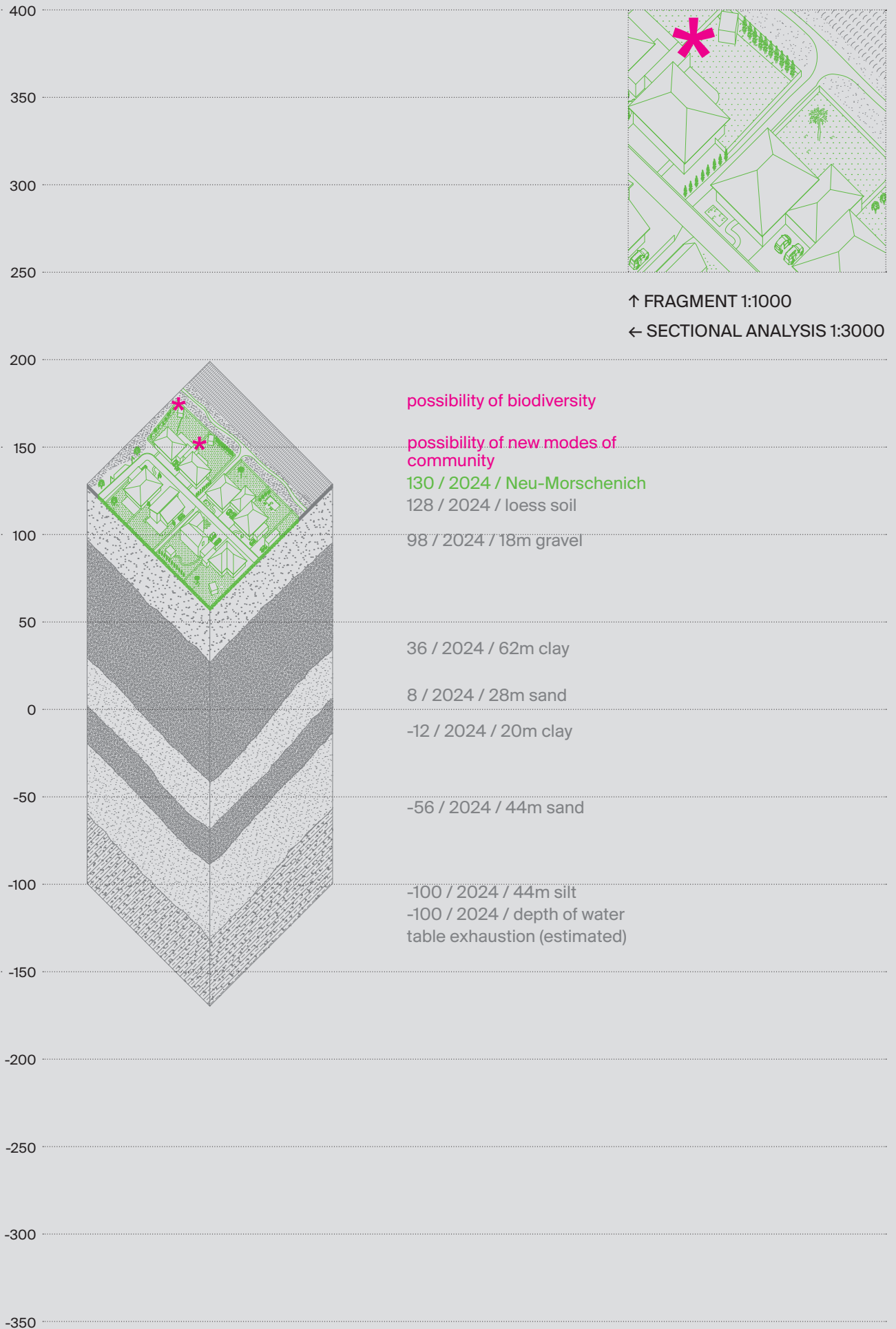
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ACTORS





Investitionsgesetz Kohleregionen (Investitionsgesetz Kohleregionen - InvKG)

InvKG

Ausfertigungsdatum: 08.08.2020

Vollzitat:

"Investitionsgesetz Kohleregionen vom 8. August 2020 (BGBl. I S. 1795), das durch Artikel 9 des Gesetzes vom 22. Dezember 2023 (BGBl. 2023 I Nr. 409) geändert worden ist"

Stand: Geändert durch Art. 9 G v. 22.12.2023 I Nr. 409

Fußnote

(+++ Textnachweis ab: 14.8.2020 +++)

(+++ Zur Anwendung vgl. § 27 Abs. 2 Satz 2 +++)

Das G wurde als Artikel 1 des G v. 8.8.2020 I 1795 vom Bundestag mit Zustimmung des Bundesrates beschlossen. Es ist gem. Art. 5 dieses G am 14.8.2020 in Kraft getreten.

Kapitel 1

Finanzhilfen zum Ausgleich unterschiedlicher Wirtschaftskraft und zur Förderung des wirtschaftlichen Wachstums in den Braunkohlerevieren nach Artikel 104b des Grundgesetzes

§ 1 Förderziele, Fördervolumen und Leitbilder

(1) Zum Ausgleich unterschiedlicher Wirtschaftskraft und zur Förderung des wirtschaftlichen Wachstums unterstützt der Bund die Länder Brandenburg und Nordrhein-Westfalen, den Freistaat Sachsen und das Land Sachsen-Anhalt in den Fördergebieten nach § 2. Hierzu gewährt der Bund diesen Ländern nach Maßgabe des § 27 Finanzhilfen für besonders bedeutsame Investitionen der Länder und ihrer Gemeinden und Gemeindeverbände nach Artikel 104b Absatz 1 Nummer 2 und 3 des Grundgesetzes **in Höhe von bis zu 14 Milliarden Euro, längstens bis 2038.**

(2) Die Finanzhilfen dienen im Rahmen der Förderziele nach Absatz 1 insbesondere der Bewältigung des Strukturwandels und der Sicherung der Beschäftigung im Zuge des Ausstiegs aus dem Braunkohleabbau und der Verstromung von Braunkohle.

(3) Die Länder haben sich für die Fördergebiete nach § 2 Leitbilder nach den Anlagen 1 bis 3 gegeben, die sich auf eine nachhaltige Entwicklung in einem umfassenden ökonomischen, ökologischen und sozialen Verständnis beziehen. Die Leitbilder beschreiben in Umsetzung der Förderziele nach den Absätzen 1 und 2 Ansatzpunkte für die regionale Entwicklung und die Verwendung der Finanzhilfen. Sie können im Einvernehmen mit dem Bundesministerium für Wirtschaft und Klimaschutz weiterentwickelt und an die Strukturentwicklung der Reviere angepasst werden.

(4) Die Förderziele nach den Absätzen 1 und 2 sind auch für die Maßnahmen der Kapitel 3 und 4 maßgebend.

§ 2 Fördergebiete

Fördergebiete sind das Lausitzer Revier, das Rheinische Revier und das Mitteldeutsche Revier, die sich jeweils aus den folgenden Gemeinden und Gemeindeverbänden zusammensetzen:

1. das Lausitzer Revier aus den Gemeinden und Gemeindeverbänden:
 - a) in Brandenburg: Landkreis Elbe-Elster, Landkreis Oberspreewald-Lausitz, Landkreis Dahme-Spreewald, Landkreis Spree-Neiße, kreisfreie Stadt Cottbus,
 - b) im Freistaat Sachsen: Landkreis Bautzen, Landkreis Görlitz;
2. das Rheinische Revier aus den Gemeinden und Gemeindeverbänden Rhein-Kreis Neuss, Kreis Düren, Rhein-Erft-Kreis, Städteregion Aachen, Kreis Heinsberg, Kreis Euskirchen, Stadt Mönchengladbach;

§1 (2)

The financial grants [in the amount of up to EUR 14 billion until 2038] shall, within the framework of the funding objectives (…), serve in particular to manage structural change and secure employment in the course of the phase-out of brown coal mining and the generation of electricity from brown coal.⁷⁹

⁷⁹ “Investitionsgesetz Kohleregionen” (Bundesministerium der Justiz, Bundesamt für Justiz, August 8, 2020), 1, <https://www.gesetze-im-internet.de/invkg/InvKG.pdf>.

In German the word “Strukturwandel”⁸⁰ means *structural transition* and describes a process primarily driven by political and economic forces often marked by the rise and fall of various industries. The documents detailing the structural transition of the Rheinisches Revier – including laws, agreements and initiatives, as well as regional master plans and strategies⁸¹ – serve as blueprints for a new regional identity and define a 14-billion-euro investment for this transition until 2038.⁸² They envision the structural transition as more than just an economic transformation; they propose to install an economic, social, and cultural identity that is sustainable and consistent with the identity of the region’s inhabitants. However, many objectives lack actionable plans or concrete strategies for investment allocation. Additionally, the question of who will manage and finance the transition beyond 2038 remains unresolved, casting uncertainty over the project’s long-term feasibility.

Historically, energy transitions – from foraging to fossil fuels – have profoundly transformed architectural typologies, infrastructural networks, and societal structures. Architectural researcher Elisa Iturbe refers to this phenomenon as “carbon form”⁸³, a term that reflects how the built environment has been shaped by fossil fuels and energy abundance that capitalism thrives on. This dynamic is intricately tied to the “carbon paradigm”⁸⁴, a framework that encompasses the societal, economic, and political dependence built around fossil fuels. Together, these concepts underscore how deeply fossil energy has influenced not only the physical structures of society but also the systems that sustain its growth and functionality.

The structural transition risks remaining locked within the carbon paradigm by focusing solely on replacing coal with renewables, without addressing the deeper systemic forces. As Charlotte Malterre-Barthes illustrates, “(...) the so-called ‘ecological transition’ and its attending policies are expected to stimulate and increase demand for ‘green infrastructure.’ These supposedly ‘clean’ and ‘green’ technologies – such as solar-powered heating and e-cars – rely on more resource mining, not less.”⁸⁵ While essential, the structural transition may simply shift extraction sites away from our doorsteps without tackling the consumption patterns that brought us here.

80 “Strukturwandel,” in *Das Lexikon der Wirtschaft* (Bundeszentrale für politische Bildung (bpb)), accessed November 11, 2024, <https://www.bpb.de/kurz-knapp/lexika/lexikon-der-wirtschaft/20784/strukturwandel/#:~:text=die%20mit%20der%20marktwirtschaftlichen%20Dynamik,Wirtschaftszweige%20und%20Wirtschaftssektoren%20zum%20Sozialprodukt.>

81 “Investitionsgesetz Kohleregionen”; “Reviervertrag 2.0” (Zukunftsagentur Rheinisches Revier GmbH, April 27, 2021); “Wirtschafts- und Strukturprogramm für das Rheinische Revier 1.1” (Zukunftsagentur Rheinisches Revier GmbH, April 17, 2021); “Regionales Investitionskonzept (RIK) für das Rheinische Revier” (Zukunftsagentur Rheinisches Revier GmbH, August 2022); “Rahmenplan Hambach” (NEULAND HAMBACH GmbH, February 2024).

82 “Investitionsgesetz Kohleregionen,” 1.

83 Elisa Iturbe, “Architecture and the Death of Carbon Modernity,” *Log* 47 (2019): 11.

84 Iturbe, 12–15.



↑ Solar Park in the Open Mine Hambach

85 Charlotte Malterre-Barthes, “Carbon Architecture: Towards an Expanded Political Economy of Space Production,” in *Transcalar Prospects in Climate Crisis*, ed. Jeffrey Huang et al. (Zürich: Lars Müller Publishers, 2024), 26.

86 Malterre-Barthes, 25.

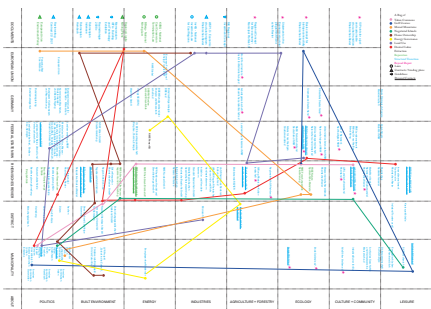
87 Jason W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*, 1st Edition (New York: Verso, 2015), 77.



↑ Territorial Machinery

88 Neil Brenner and Nikos Katsikis, “Operational Landscapes: Hinterlands of the Capitalocene,” in *The Landscapists: Redefining Landscape Relations*, ed. Ed Wall, 1. Edition (Newark: Wiley, 2020), 33.

↓ Diagram “Who Cares” - Enlarged Version in the enclosed Booklet



Understanding how fossil fuels subliminally influence our environment is crucial when considering the transition from carbon to renewable energy as carbon form can be found everywhere: in carbon-based materials and its indirectly generated carbon emissions like those from fuel used to transport materials and workers to construction sites.⁸⁶ This entanglement shows that shifting to renewables does not inherently mean moving away from our economic model rooted in fossil fuel legacy. Instead it shows that this model, based on profit-maximization and global supply-chain capitalism, remains firmly entrenched within the epoch of the Capitalocene, a term that underscores how capitalist dynamics drive climate change and ecological degradation.⁸⁷

In this Age of Capital, the Rheinisches Revier serves as a clear example of the phenomenon concisely described by Neil Brenner and Nikos Katsikis, where “many erstwhile hinterlands (...) are transformed into configurations of large-scale territorial ecological machinery: mechanised assemblages of human and nonhuman infrastructure oriented towards capital accumulation within a planet-encompassing profit-matrix.”⁸⁸ The strategies proposed for the structural transition, aimed at further building upon this territorial machinery, raise significant concerns. What will ultimately matter is how the structural transition addresses and actively engages with the deeper dynamics of systemic change.

Looking closely at the actors involved (see Diagram “who cares”), it becomes evident that the key decision-makers driving the structural transition are either embedded within or closely aligned with political institutions and economic stakeholders. These actors direct investments at both the municipal and regional levels. While new stakeholders are beginning to participate in the process, this has not led to a significant challenge to RWE’s long-standing energy monopoly. Our efforts to map the bureaucracy of this territorial planning revealed a dense and convoluted network of actors, which is making the processes rather exclusive and intransparent. Without fundamentally reshaping the extractive, fossil-based framework, the structural transition of the Rheinisches Revier risks replicating the same developer-driven, capital-centric growth patterns of the past century. In short, coal may be leaving the party, but the economic model it nur-

tured remains, paving the way for similar exploitative systems to be repeated under the flagship of green progress.

A tendency towards a continued exploitation of land is already evident, as the local government is about to approve the allocation of 4,000 hectares for new industrial areas, framing this economic transition to come “From Coal to AI”.⁸⁹ While the arrival of companies like Microsoft signals an economic rebound, the structural transition risks tackling the challenges of the Rheinisches Revier with “progress-centric techno-engineerial fixes”.⁹⁰ Digitalization and innovation efforts by actors like Microsoft would lead to the continuation of the delusion of unlimited capital accumulation, while introducing new ecological and social challenges. This mindset turns the territory into a canvas for unlimited growth, ultimately undermining, what feminist economic geographer Katherine Gibson describes, as the chance to “take back the economy as a site of ethical deliberation and fashion new ways of living together that do not damage our conditions of existence”.⁹¹ This is not to say that technology won’t play a major role in transforming the existing carbon paradigm, however a genuine structural transition will take more than optimizing a system that in itself is unsustainable.

↓ Press conference with NRW Minister President Hendrik Wüst and Dr. Marianne Janik, Head of Microsoft Germany



89 “Von der Kohle zur KI - Das Rheinische Revier” (Die Landesregierung Nordrhein-Westfalen, March 18, 2024), <https://www.land.nrw/pressemitteilung/von-der-kohle-zur-ki-plaene-fuer-ki-rechenzentren-von-microsoft-im-rheinischen#:~:text=Ministerpräsident%20Hendrik%20Wüst%3A%20„Nordrhein%2D,Technologien%20und%20eine%20starke%20Wirtschaft.>

90 Krasny, “Critical Care. Architecture and Urbanism for a Broken Planet,” 12.

91 Katherine Gibson, “Speculations on Architecting Care Beyond the Anthropocene,” in *Critical Care: Architecture and Urbanism for a Broken Planet*, ed. Angelika Fitz, Elke Krasny, and Architektur Zentrum Wien (Vienna, Austria: Cambridge, MA: Architekturzentrum Wien ; MIT Press, 2019), 111.



↑ A Ghost Village?

92 Anna Hecker, in discussion with the authors, November 27, 2024.

93 Huntscha, Kröning, and Graff, “Zurück in die Zukunft. Eine denkmalpflegerische Analyse zur Dorferneuerung von Morschenich,” 28-33.

94 Huntscha, Kröning, and Graff, 34.

↓ Courtyard Houses and Workers Houses



Where was the village Neu-Morschenich dragged from? In most cases, it is now impossible to visit the original villages. They have been simply swallowed up by the expanding mines. The narrative around the mining project reinforced the belief in the necessity and inevitability of these planned demolitions. For decades, the looming presence of the mine and the eventual relocation of Morschenich to Neu-Morschenich were constant reminders of its fate. The final chapter began in earnest in 2015, marking the beginning of the end for the village. But things turned out differently than assumed for decades. The heavy protests accelerated the coal phase-out and some villages once doomed for demolition were saved in 2020. Unfortunately, this last minute victory came too late for most residents. Many had already sold their homes and moved away or relocated to the newly established resettlement villages. The village was left mostly abandoned and partly demolished in standstill. One would imagine the village has turned into a ghost village. Anna Hecker corrects this assumption: “It’s not a ghost village. Originally, around 500 people lived there. And currently there are 200 refugees alone that we have accommodated in the village.”⁹²

However, the abandoned houses, with rampant front yards and leaking roofs demonstrate that there hasn’t been much living happening here. In the property of the mining company for nearly 10 years, the built heritage of the historic village was substantially neglected. Historic built forms like the courtyard houses tell stories of the formerly close ties of domestic space to farming: The brickwork and timber-framed houses were built eaves along the street with stables and ancillary buildings expanding into the long lots, followed by vegetable gardens and connected to the farm land adjacent to the lots.⁹³ Already since the 1950s the form of employment shifted towards the railroad and mining industry and the mine worker’s housing type found a way into the village’s structure.⁹⁴ These detached single family homes built in masonry made space for foregardens and car parking, adapting the village to a changing mode of living and working. Those are just two types that witness the continuous transformation of the village and its anchored history.

The village of Morschenich, now called Bürgewald, also carries the name of *The Village of the Future*, why is this? In 2024, the municipality of Morschenich

repurchased the village for 40 million euros, using the structural transition funds dedicated to the revitalization and investment in the coal-mining region. The Village of the Future initiated as a pilot project by the municipality of Merzenich, has become a magnet for various initiatives, promising a counter-narrative to the region's history of extraction. Despite years of neglect, the derelict houses retain their value, appreciated both as built heritage and as homes. We ask Daniela Karow-Kluge, a scientific collaborator at RWTH Aachen, about the challenges of revitalizing this valuable building stock. How can one incorporate the memories, the modes of living and working, the relationship to the landscape, and the forms of community bound to it? She explains that the Chair of Planning Theory and Urban Development is exploring these questions through the establishment of an *Umbaulabor*, meaning renovation laboratory, in the village of Bürgewald.⁹⁵ Another initiative already underway is the *Temporary University TU!Hambach*, an annual festival held in Bürgewald since 2023 to explore the village's potential futures. Together, these projects highlight the transformative potential of Bürgewald, positioning it as a site for innovation and interdisciplinary learning.

Hearing about these projects, we wonder: who will eventually live in Bürgewald? Hecker reflects on the situation, noting that “this is the challenge we’re now facing, so to speak: a completely empty village shell that needs to be filled with new life. And that is both an opportunity and a challenge at the same time.”⁹⁶ Sometimes she feels like the caretaker of the village, she shares. What makes Bürgewald particularly unique is that, with the exception of a couple still privately owned houses, the entire village – including its land and built structures – is fully owned by the municipality. Until 2025, former owners retain a prior right of repurchase, but under the condition that they adopt the land trust model instead of traditional land ownership. Additionally, the municipality anticipates “that many people from Cologne, Düsseldorf, and Aachen will move to the region due to the rents and the purchase price development in the real estate market in general”⁹⁷, Hecker notes. The land trust model serves as a safeguard against land speculation, a likely outcome of the coal industry's decline and the rising land values driven by developments like artificial lakes.

↓ Imagining Acts of Transformation and Possible Futures for Oberstraße 40



95 Daniela Karow-Kluge, in discussion with the authors, November 19, 2024.

96 Anna Hecker, in discussion with the authors, November 27, 2024.

97 Hecker.

98 Daniela Karow-Kluge, in discussion with the authors, November 19, 2024.

This all seems quite promising. But does it sound too good to be true? We share our observation with Daniela Karow-Kluge, that many projects discussing the region's future appear ambitious yet lack clear, concrete visions. She responds: "Some of them are just buzzwords, like smart city and stories like that. It's all kind of forced into this future or these future villages (...). But what exactly it means has to be developed now."⁹⁸ This points to a critical challenge – going beyond conventional renovation standards and the labels of green construction and moving beyond empty sustainability slogans to become a meaningful project that others can learn from.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ POSTKARTE_AUS_MORSCHENICH

↑ SCAN_241124_BÜRGEWALD
↓ SCAN_241124_BÜRGEWALD_2

LOCATION

Bürgewald / Alt-Morschnich
52399 Merzenich

CHRONICS

1978 / Start of Hambach Mine
2015 / Start of Resettlement
2018-20 / Activism and Preservation
2024 / Repurchase of Village
2025 / Start of Buyback Procedure

TPOLOGY

Reactivated Village

AT STAKE

Heritage Transformation
Participation and Land Trust

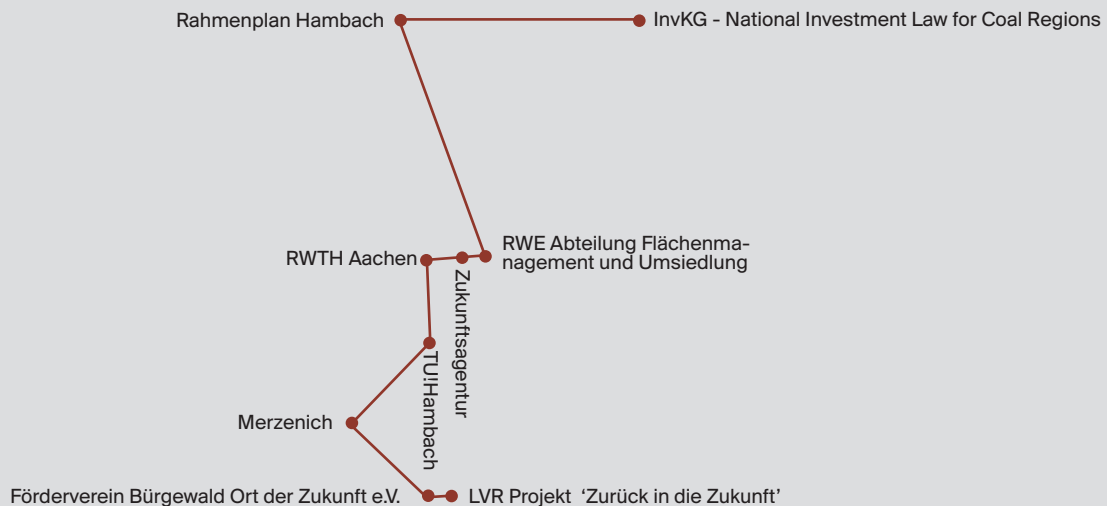
CONTACT

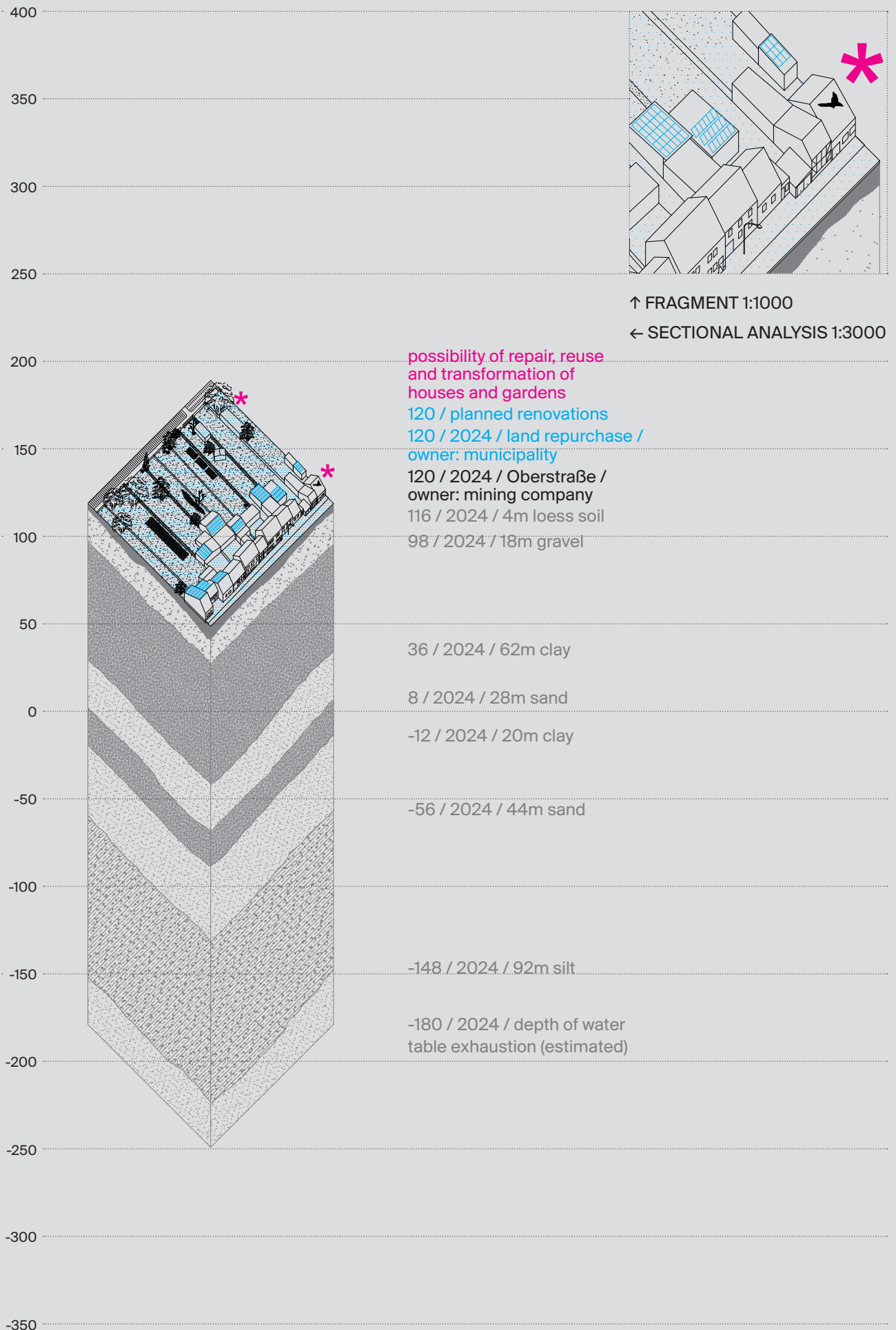
Anna Hecker (Management for
Structural Transition in Merzenich)

Daniela Karow-Kluge (RWTH Aachen)



ACTORS





Navigating through the evolving landscapes of the Rheinisches Revier, it becomes clear how deeply the energy transition is intertwined with the region's broader structural transition. This transformation fosters economic diversification, innovative industries, and sustainable modes of transport. The intricate interplay of environmental, economic, and social changes in the Rheinisches Revier highlights how these shifts shape communities and redefine the physical landscape, establishing the region as a pivotal case study in Germany's energy transition.

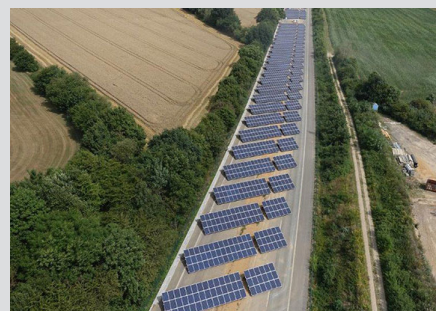
The energy transition does not only entail moving from brown coal to wind or solar energy, but even more moving from a centralized to a decentralized energy system. We speak to Jann Weinand, Head of the Department of Integrated Scenarios at the Jülich Research Centre which is part of the new technological and innovative landscape of the Rheinisches Revier. He explains that “now the fact is that renewable energy facilities tend to be located close to the consumers, meaning decentralised, (...) unlike in the past. And that's because renewable energy sources simply have a much lower energy density, which means you need a lot more space for less electricity generation.”⁹⁹ Does a decentralized energy system have the potential to enable new, more democratic forms of energy governance that go beyond the monopoly of a single energy company? One concept of such is called *Bürgerenergie*, translating to citizen energy, which refers to a model of energy production and distribution that is owned, managed, and controlled by local citizens and communities, rather than large, centralized energy companies. As such, *Bürgerenergie* allows individuals and communities to take an active role in the energy transition.

Not far from Neu-Morschenich lie the remnants of the former A4 highway, which had to be diverted to make way for the expanding coal mine. While browsing Google Maps, we notice that the remaining unused sections of the road have been transformed into a solar park, managed by the municipality of Niederzier. This project may involve municipal collaboration; however, as Dirk Jansen points out, “these are not precisely citizen energy projects.”¹⁰⁰ The solar park is only 49% owned by the municipality. The remaining majority is owned by RWE who is “making sure that (...) [it] remains active here in the region”¹⁰¹, as we



↑ Transitioning from Coal to Renewables

99 Jann Weinand, in discussion with the authors, November 20, 2024.



↑ The Solar Highway

100 Dirk Jansen, in discussion with the authors, November 21, 2024.

101 Hendrik Stemann, in discussion with the authors, November 22, 2024.

102 Hendrik Stemann, in discussion with the authors, November 22, 2024.

103 Torsten Stamm, in discussion with the authors, November 21, 2024.

104 Jann Weinand, in discussion with the authors, November 20, 2024.

↓ RWE's New Look



105 Dawson, *People's Power Reclaiming the Energy Commons*, 64–66.

learn from the head of the brown coal mine planning department Hendrik Stemann. He adds “This is also important for us because we have a strong foothold here in the region. And, of course, the land also makes it readily available, so why not use it?”¹⁰²

In Bedburg a similar model is applied to a wind farm. Torsten Stamm, Director of City Administration in Bedburg, explains that RWE is dependent on the municipality’s consent, which means in Stamms words that “they need us”¹⁰³. This creates a delicate balancing act between local municipalities and the powerful monopoly of RWE. However, is it naive to think that this may be a step in the right direction? Jann Weinand believes that, although there are positive examples of citizen energy projects, which he has studied across Germany, “These companies are not really interested in giving up their market shares.”¹⁰⁴ In this context, RWE’s role seems to be shifting, not only as an energy producer but also as an energy manager, navigating the complex intersection of corporate interests, local politics, and the growing demand for renewable energy.

To truly address sustainable energy consumption, how can we also build communal energy infrastructures that empower local citizens? This challenge brings to mind Ashley Dawson’s call to action in her book “People’s Power: Reclaiming the Energy Commons”. She calls out the need for radical transformation, urging that energy systems should not just serve corporate interests but be reimagined to prioritize collective empowerment and the public good.¹⁰⁵ As we pass solar parks and wind farms on our way to Bedburg, we try to envision what forms these new governance models might take.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ INNOGY_SE

↑ SCAN_241124_BEDBURG_WIND
↓ SCAN_241124_BEDBURG_WIND_2

LOCATION

Highway A4 Solar Park
52382 Niederzier

CHRONICS

2014 / Relocation and Abandonment
2024 / Solar Park

TYPOLOGY

Construction Energy Park

AT STAKE

Energy Landscapes/Commoning

CONTACT

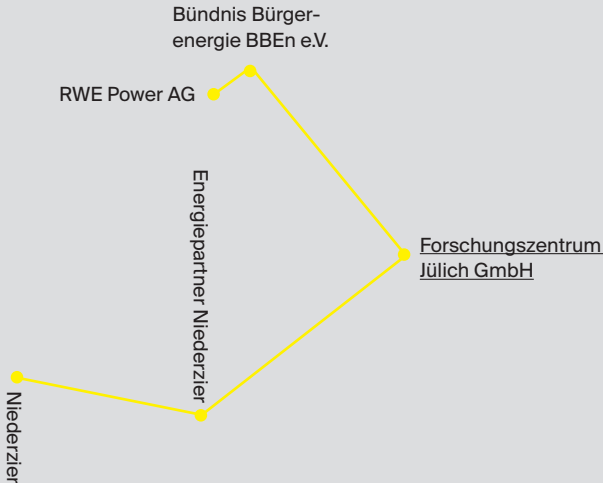
Torsten Stamm
Stadtverwaltung Bedbug

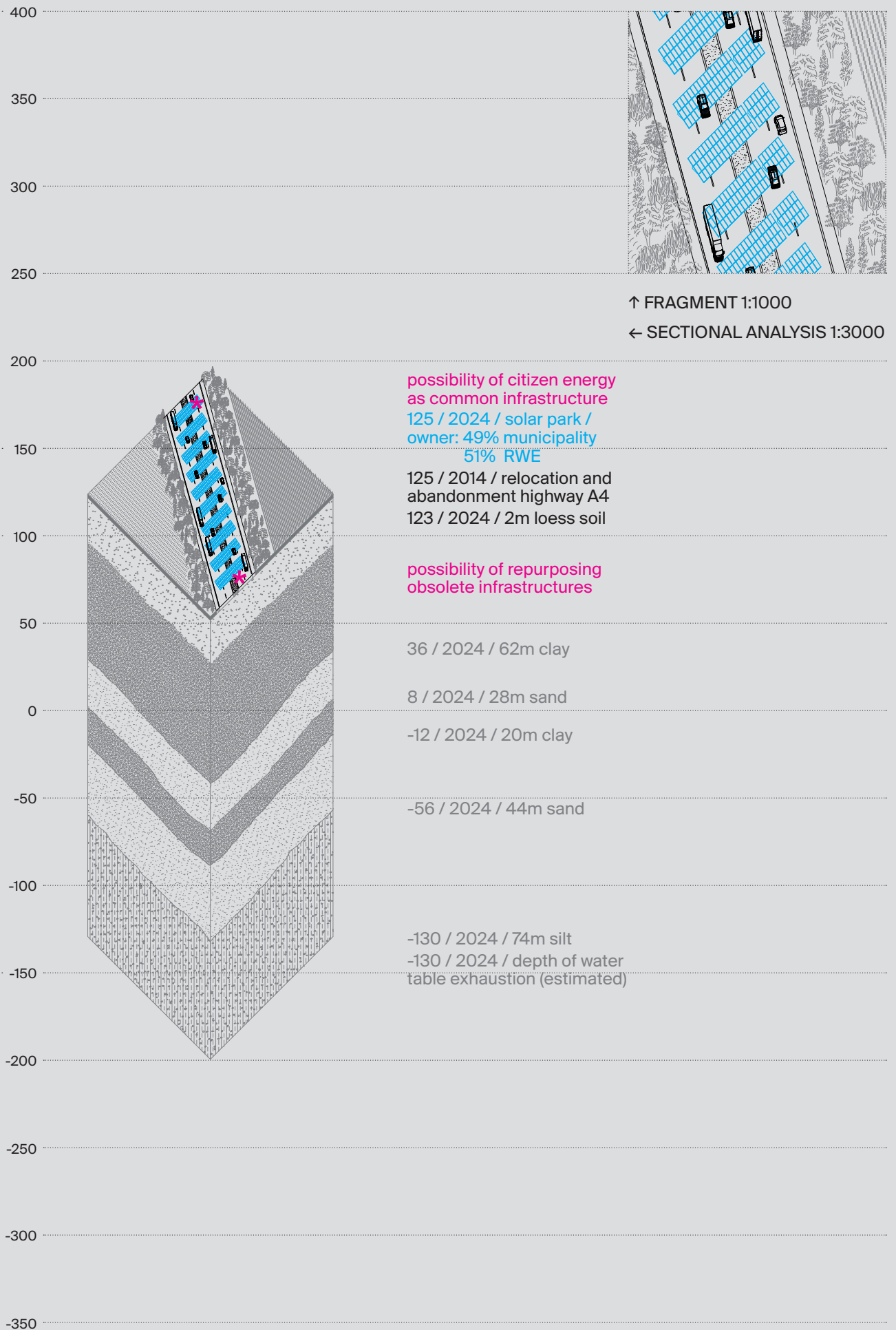
Jann Weinand
Forschungszentrum Jülich

Erich Gussen
Landwirtschaftsverband NRW



ACTORS





Early in our research we met with Daniel Hofinger, co-founder of the activist group *ausgeco2hlt* and political assistant to Antje Grothus, a politician of the party *Die Grünen*. Daniel explained us the dynamics of regional politics. He mentions that the local government is about to approve the allocation of 4,000 hectares for new commercial zones. Out of these, 40 hectares will be turned into 4 Microsoft data centers, so-called *hyperscalers*. Much of this innovative expansion will occur on greenfield sites, further jeopardizing the already limited open spaces. We share the opinion of Dirk Jansen, who argues, “Protecting our unspoilt landscape is essential to ensure a sustainable and liveable future for generations to come. The government’s aim of transforming the Rheinisches Revier into a climate-neutral and sustainable industrial region otherwise runs the risk of being missed.”¹⁰⁶

One of the Microsoft data centers will be a key component of a wider industrial development initiative in the town of Bedburg. The project is planned on agricultural land so far untouched by extraction activities. To explore the town’s aspirations for a post-coal future, we speak to Torsten Stamm, the town’s director of administration. One of Bedburg’s central goals is to compensate for the loss of 2500 of jobs by 2030.¹⁰⁷ The hyperscaler itself may not directly create a significant number of jobs. However, it will serve as a powerful magnet for other tech and IT industries that rely on its infrastructure. As Stamm aptly puts it, “where Microsoft goes, there is gold in the ground.”¹⁰⁸

This case illustrates the ongoing tension between economic and environmental interests. While the need for data centres is undeniable, especially in an era of digitalisation and artificial intelligence, a major challenge is the lack of adequate regulatory oversight. The rapid growth of the data center industry is outpacing legislation, leaving local authorities struggling to adapt.¹⁰⁹ This expansion needs to be taken into account in regional and infrastructural planning. Stamm assures that the energy need for this expansion would be met by the wind farm of Bedburg. However, when we inquire about the source of the vast amounts of water needed, he stays rather vague and answers that “a lot of technical work is currently being done on the cooling system”¹¹⁰. This raises concerns where this water will come from as the regional water table will take decades to recover from the mining activities.

106 Dirk Jansen, “Stoppt den Flächenfraß im Rheinischen Revier – Microsoft muss umplanen!,” *bund-nrw.de*, July 8, 2024, <https://www.bund-nrw.de/meldungen/detail/news/stoppt-den-flaechenfrass-im-rheinischen-revier-microsoft-muss-umplanen/>.

107 Torsten Stamm, in discussion with the authors, November 21, 2024.

108 Stamm.

109 Pietro Bonomi and Nicolò Ornaghi, “Less Than Zero,” *AA Files*, no. 77 (2020): 134.

110 Torsten Stamm, in discussion with the authors, November 21, 2024.

Amid all these uncertainties, one thing is certain: the waste heat generated by the hyperscaler. Stamm, with fascination, remarks, “This data center produces an astonishing amount of heat. If I could harness it, I believe I could heat all of Bedburg – twice over. Every single house.”¹¹¹ In Bedburg, there is a new development project that will incorporate district heating, potentially making use of this waste heat.

On the development site, sugar beet and rye are growing in this exceptionally fertile soil. However, construction is already underway, with the necessary infrastructure being put in place for the hyperscaler to be operational by 2027. It is clear that greenfield development will lead to the irreversible loss of valuable agricultural land. Stamm acknowledges that “It is a balancing act that we have to deal with (...).”¹¹² Farmer Erich Gussen shares his frustration about this loss of qualitative agricultural land. Since most of the agricultural land is mainly owned by non-farmers and only leased to the local farmers, resistance against such developments lies often beyond their power, he argues.¹¹³

Such a development illustrates how the structural transition feeds into the dynamics of land scarcity, initially triggered by the expansion of open-cast mining. Land prices are skyrocketing due to the developments like the hyperscalers and the increasing demand for compensation areas.¹¹⁴ Why are the out-dated power plants not taken into account for these new industrial areas? The brown coal extraction project involves not only vast areas of land and massive amounts of moved matter, but also a vast built infrastructure to accommodate processing and proliferation processes. However, Microsoft is powerful enough to demand “a completely clean surface”¹¹⁵, how Stamm describes it. In theory, data centers are scalable and could easily make use of existing, soon-to-be-obsolete mining infrastructures. The discussions surrounding the hyperscaler development are just one of many new sites of transformation we encounter. They leave us with a sense of tension, a feeling that resonates throughout the Rheinisches Revier, reflecting the permanent battle over land use.

111 Torsten Stamm, in discussion with the authors, November 21, 2024.

↓ The Sacrificed Sugar Beet Fields



112 Stamm.

113 Erich Gussen, in discussion with the authors, November 23, 2024.

114 Gussen.

115 Torsten Stamm, in discussion with the authors, November 21, 2024.



↑ A Soon to be Obsolete Building Mass

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ MICROSOFT_AUSTRIA_GOLEM.DE

↑ SCAN_241122_BEDBURG_FIELD
↓ SCAN_241122_BEDBURG_WIP

LOCATION

Mircosoft Hyperscaler
Commercial Zone
50181 Bedburg

CHRONICS

unknown / Agricultural Land
2024 / Construction Site Preparation
2027 / Completed Construction

TYPOLOGY

Construction Commercial Area

AT STAKE

Sustainable Land Use
Repurposing Existing Infrastrucutres

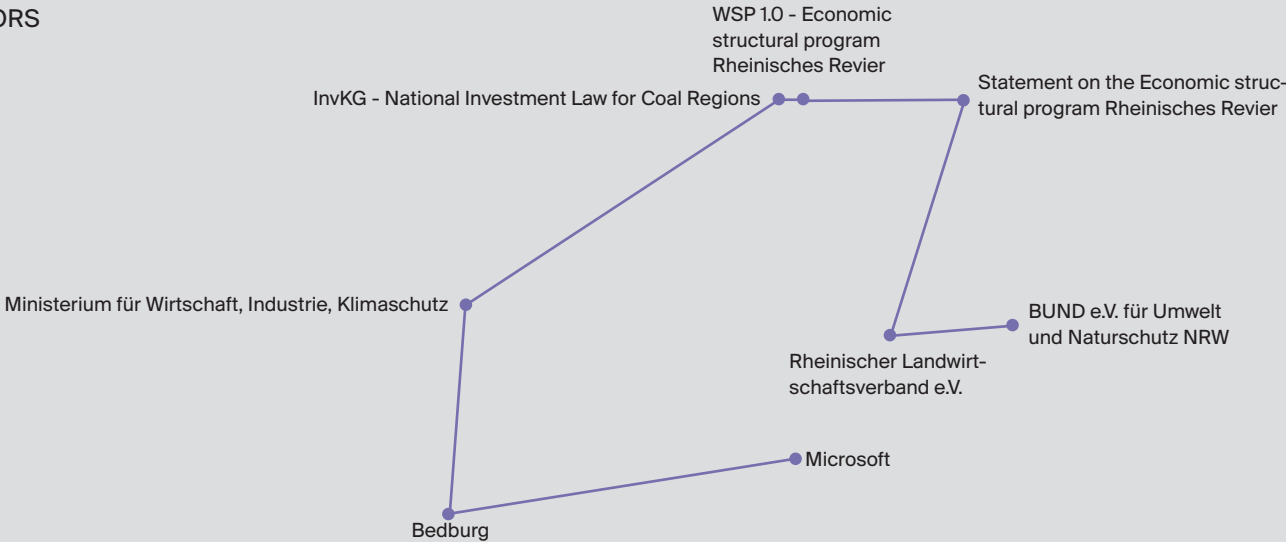
CONTACT

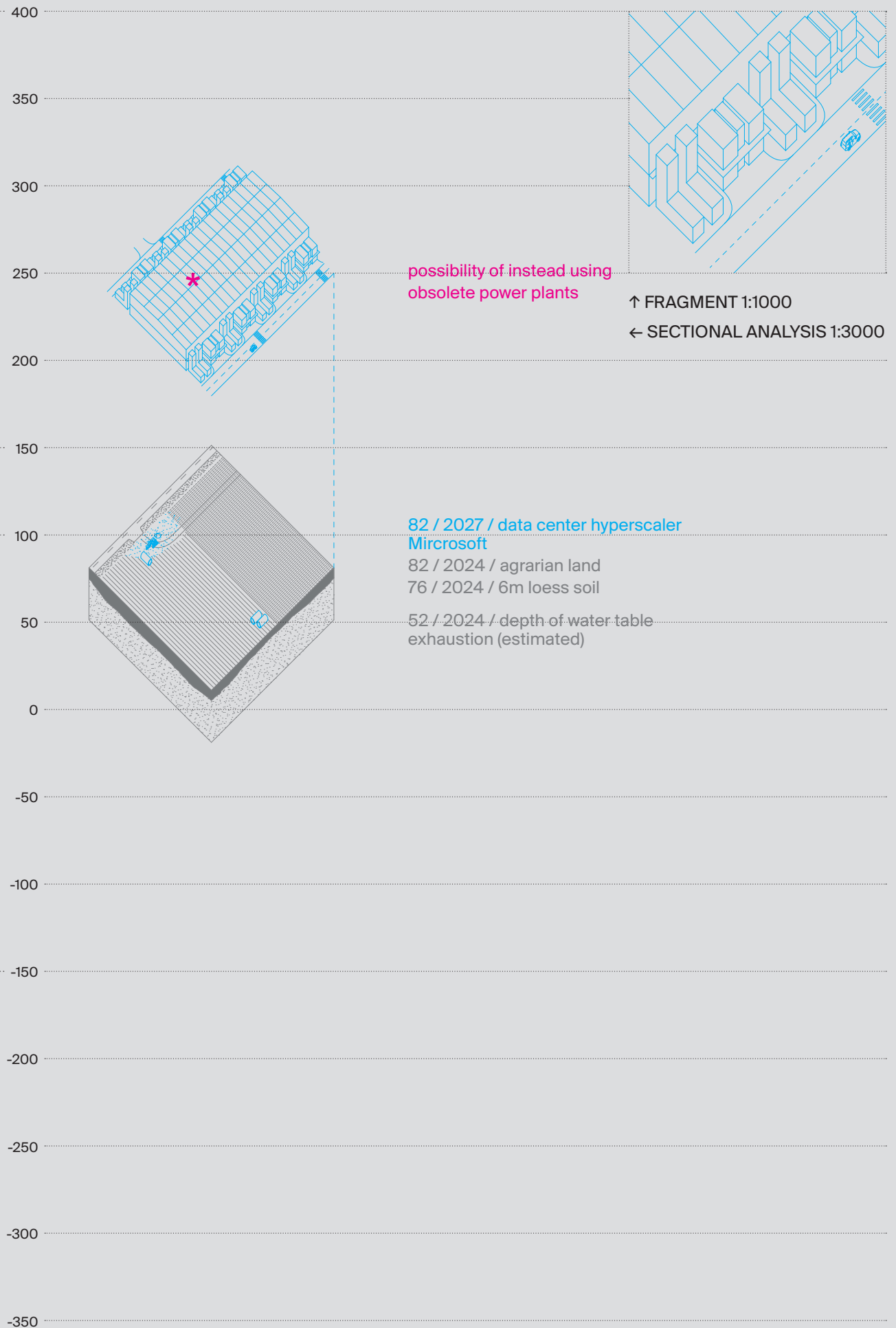
Torsten Stamm
Stadtverwaltung Bedbug

Dirk Jansen (BUND NRW)
Umwelt- und Naturschutzpolitik



ACTORS



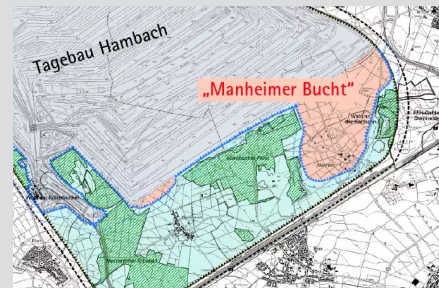


On our last day of field work, we return to the edge of the Hambach mine, to the future Bay of Manheim. As part of the zone that got saved from extraction, this landscape is frozen in the state ready to be dug away. Here, the highly engineered landscape becomes truly evident: In this zone right at the edge of the hole, hundreds of pumps prevent the open-pit mine from flooding, lowering the water table significantly around the mining site, even affecting groundwater levels in surrounding regions.¹¹⁶ Once extraction ceases, water tables are meant to gradually restore while the water level of the 400-meter-deep pit slowly rises. What risks does this unprecedented lake project bear? What if there isn't enough water to eventually fill the pit? Lots of uncertainties, that are countered by bold speculations and promising renderings. What is certain is that the undertaking is bound to an exceptional engineering effort.

The large area around Manheim is the last land endangered by brown coal mining in this region. The soils and forests are about to be sacrificed for the Bay of Manheim to provide the gravel inevitably needed for the stabilization of the slopes in the east of the mine of Hambach to prevent erosion.¹¹⁷ We ask Hendrik Stemmann of the Brown Coal Mine Planning Department about it: "Also from the point of view of the Brown Coal Committee, this is absolutely necessary", he says, "otherwise we simply wouldn't have the material"¹¹⁸. The Brown Coal Plan outlining the post-extraction landscape is waiting for approval.¹¹⁹ Dirk Jansen criticizes: "If you tell them about the Nature Restoration Law or something like that, they just look at you with wide eyes. 'What do we care?' So the situation at the moment is quite sobering."¹²⁰ A fight is needed to achieve forest conservation and reconnection in the south of the Hambach opencast mine. The land around Manheim is part of the Hambach Forst and similar in ecological value, inhabited by old oaks and beeches. This valuable landscape is about to be destroyed and eventually compensated with inferior agricultural land elsewhere.¹²²

On this windy Sunday, we are not alone out here. There is a crowd of around 250 people, creating a red line of protest, Dirk Jansen among them. He reminds us: "In politics, little or rarely happens overnight, you can't just sit in the trees, occupy the forest and things will change, forget it."¹²³ Since the very beginning he

116 "Rheinwassertransportleitung," BUND für Naturschutz und Umwelt in Deutschland, accessed December 4, 2024, <https://www.bund-nrw.de/braunkohle/hintergruende-und-publikationen/braunkohle-und-umwelt/braunkohle-und-wasser/braunkohle-restseen/>.



↑ Extract of the Brown Coal Plan

117 Hendrik Stemmann, in discussion with the authors, November 22, 2024.

118 Stemmann.

119 Stemmann.

120 Dirk Jansen, in discussion with the authors, November 21, 2024.

121 Jansen.

122 Jansen.

123 Dirk Jansen, in discussion with the authors, November 21, 2024.

↓ The Red Crowd Meeting Point



124 Jansen.

125 Jansen.

126 Jansen.



↑ The Contested Grounds

127 Erich Gussen, in discussion with the authors, November 23, 2024.

128 Hendrik Stemmann, in discussion with the authors, November 22, 2024.



↑ Less.

has been involved in the fights against the brown coal mining activities, that achieved the famous verdict of Garzweiler in 2013 and the stop of deforestation of 'Hambi' in 2018.¹²⁴ "If the entire region had resisted brown coal from the very start, then some opencast mines would not have existed at all. But that was never the case. In the end, it was always just us or the churches. And then later climate activists. But there was never much innovative drive emanating from the region itself. They just cashed in wonderfully."¹²⁵ This is his last fight, he says with a small smile.¹²⁶

At first, it seems that climate activists and farmers are on the same page in the fight against land consumption and for soil conservation. "What we are still concerned about, however, is the loss of agricultural land."¹²⁷ From the point of view of farmers, the reconnection of remaining forests would be again at the expense of agricultural land and the heritage of the *Bördelandschaft*. A particular livelihood came along with this flat and open landscape; for plants, animals and fungi adapted to it. We get the impression that human farming practices created both – a valuable heritage worth conservation and a collateral damage of former habitats. Absurdly enough, the narrative of the cleared landscape even serves the mining operator to promote their positive impact on the landscape: The recultivation and renaturation activities provide more ecologically diverse habitats compared to the prevailing *Bördelandschaft*.¹²⁸ To counter this, reparations by RWE only address the urgency for ecological responsibility with a bare minimum.

The little forest, the Sinful Grove, where the protesting crowd gathers, has been squatted already for six weeks. People are highly committed and full of energy. While the organizers negotiate with the police and RWE, they sing: 'We will not give up this land!' The fight for biotope and soil conservation competes with visions unleashed by the promise of the new lake that desire everything at once: a common lake, a harbour for water tourism, a museum in the refurbished church of Mannheim, a water biotope, a swimming solar park, a hydrogen power laboratory. And just to remember – territorial planning and architecture are complicit in this process of how the lake and the post-extraction landscape at large will take shape and will be governed.

SATELITE



IMAGE



SOURCE

↑ GOOGLE_MAPS
↑ NATURBAD_RHEINLAND

↑ SCAN_241124_MANHEIM_DEMO
↓ SCAN_241124_MANHEIM_PUMP

LOCATION

Bay of Mannheim
50170 Kerpen

CHRONICS

~ 10th century / Bürgewald
unknown / Expansion Agriculture
~ 2000 / Start of Draining for Mine
2024 / Forest Occupation
2025 / Final Planning Decision

TYPOLOGY

Construction / Renaturation Bay

AT STAKE

Local Tourism / Biotope Connections

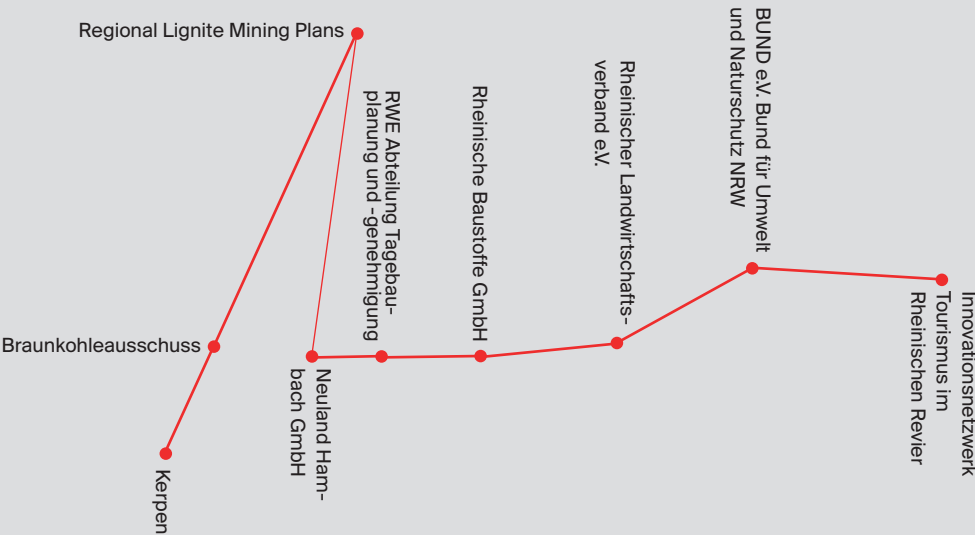
CONTACT

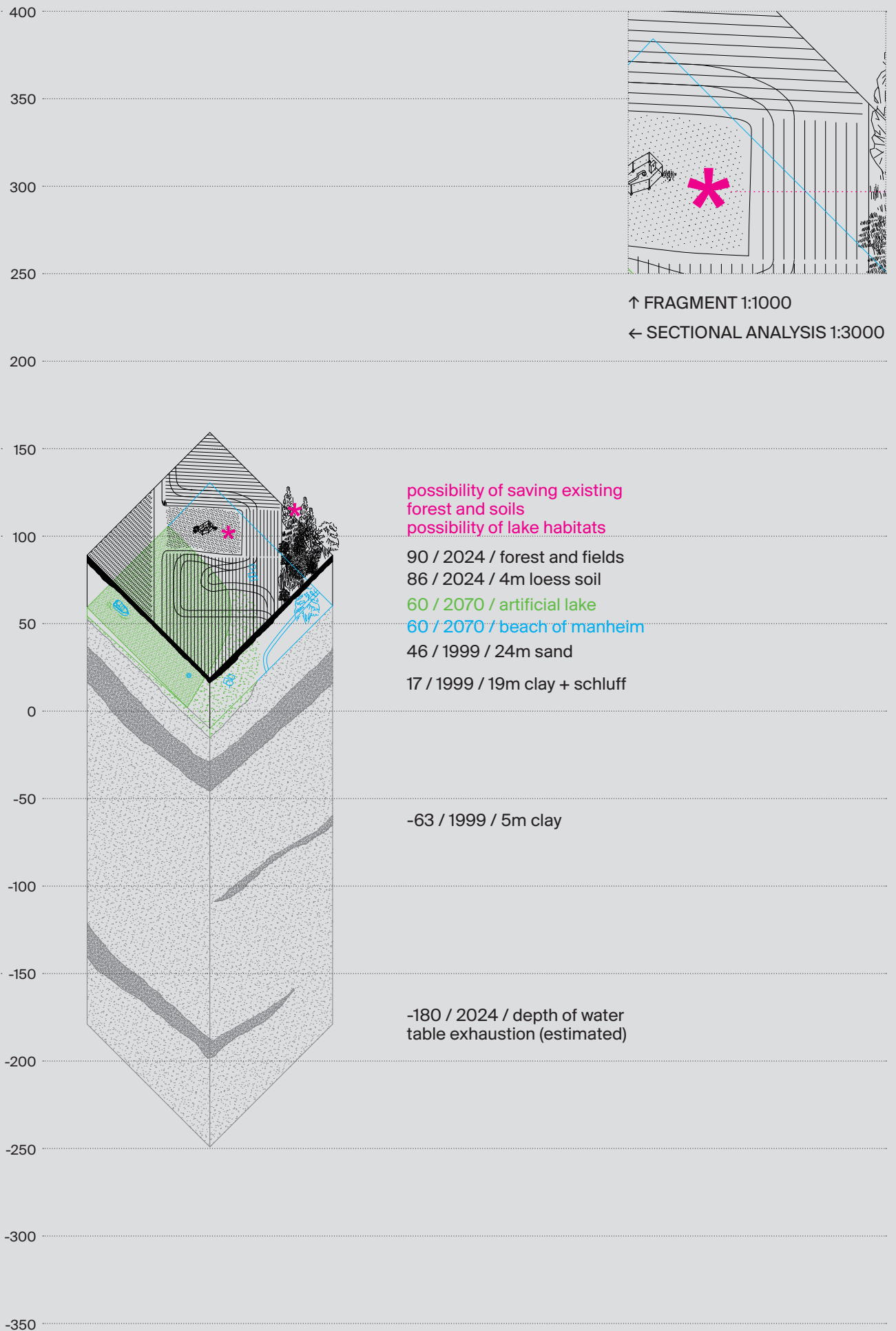
Dirk Jansen (BUND NRW)
Umwelt- und Naturschutzpolitik

Erich Gussen
Landwirtschafts-Verband e.V. NRW



ACTORS





Tunnel under it; fly over it.¹²⁹

129 Saloojee, "Field Notes on Repair: 3,"
Places Journal.

The traced post-extraction bugs end with a question that weaves through all the voices we listened to and places we visited. What is buried and memorized, and what is healing, emerging and thriving in this evolving landscape? Twisted modes of governance, ownership and design emerge as key drivers for potential change at these points of friction. These bugs, where things remain fluid and open to reconfiguration, serve as leverage points for reimagining practices of reparation and structural transition – entering the realm of beyond repair.

A feminist practice of storytelling as we incorporate it in our work also means to enter speculations and radical imagination. The findings throughout the bug field notes show how there are already places, alliances and practices that shape this post-extraction landscape. As points of surprise and openness, they are initial points for our imagination. Throughout the drawings and diagrams, annotations have already offered glimpses of what the concept of beyond repair could encompass. In the following, we delve deeper into the implications and possibilities for reshaping our approach to post-extraction landscapes.

Beyond reparation

To imagine a future beyond the current human-centered reparation efforts, we must pay attention to existing activities, actors, timescales and ethics that shape the evolving landscape. These factors play a crucial role in the reconfiguration of responsibilities, moving beyond the conventional bureaucratic and legislative frameworks of reparation. Activist organizations, initiatives and other stakeholders give evidence of a network of resistance and resilience that already challenges this in diverse ways and hints at potentials to move beyond reparation.

There are reciprocal relations of care and repair shaping this landscape. Reparation is typically a one-sided, human-controlled activity, but all living and nonliving actors in the post-extraction landscape respond to it in diverse ways. These responses, especially from non-humans, to changes of land, water and air caused by infrastructures – referred to as “feral effects”¹³⁰ – expose a gap in the reparation perspective: The Sophienhöhe emerges as a bug in the system of reparation, where intentional actions blur with feral effects out



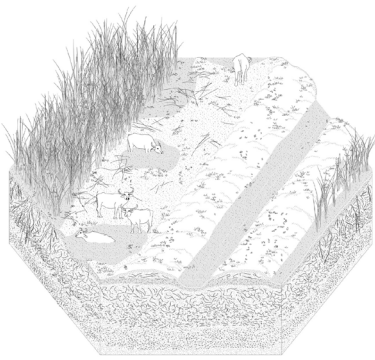
↑ Ferral Effects in the Mine of Hambach

130 Tsing et al., *Field Guide to the Patchy Anthropocene*, 3.

131 Krasny, "Critical Care. Architecture and Urbanism for a Broken Planet," 11.



↑ Fictional Site Plan: Turning the Game of Golf into a Critical Land Development Tool



↑ Wetland Farming as a Possibility to provide a Source of Renewable, Carbon-Capturing Construction Materials

of human control. Pioneers of plants, animals, mushrooms, and bacteria slowly take over a mountain of dumped earth as a disrupted and sparse habitat. Another kind of feral actor are chemicals in the ground that are dug up by extraction and can cause a constant stream of pollutants into the water table. In this context, Donna Haraway envisions possible futures of interspecies connectedness and "biological-cultural-political-technological recuperation and repair".¹³¹ Ultimately, these perspectives challenge to rethink reparation as an ongoing, interconnected process that transcends human control and embraces the broader ecological relationships at play.

Beneath the surface, there are layers of history. The drawings of the post-extraction bugs reveal the destructive power of pollutants underground or the irreplaceable value of unearthed archaeological findings, but also uncover ownerships reshuffled by extraction. If the extraction project is able to expropriate and redistribute owners over generations, couldn't it also be able to create new commons and modes of ownership? "The Bug of Golf Courses" shows how recultivated land can transform into a playground for a wealthy few, with the mining operator ready to assist with the groundwork. So we might as well imagine a restoration of the cultural landscape of wetlands that once thrived there or the installation of communal stewardships like community gardens and solidary agriculture. These approaches offer many ways to prevent further land degradation – a responsibility that should be anchored in the framework of reparation.

Building on this, "The Bug of Moved Mountains" explores further how reparation extends into long-term responsibilities. On the Sophienhöhe, reparation activities and maintenance will cease in the near future, but what will follow remains open. A foundation that holds the mandate for long-term maintenance based on values of a consistent ecologies could prevent this promising site from neglect or alternate forms of land degradation. The chance of such a foundation could be to reestablish practices of commoning, learning from the Hambach Forest as former commons. Alliances for interspecies care and self-initiated transformations could emerge in this undefined future.

When everything is gone, what remains to anchor a community? The mining industry leaves behind

ruination but also a culture of remembering. “The Bug of Taken Commons” is situated in the lost forest of Hambach, and simultaneously in the digital collection of personal histories by the project of the cultural association LVR. These snippets are entries of a blog that weave a collective memory out of side stories of extraction. The loss and damage of extraction keeps dominating the regional cultural identity in a way that risks to become a mere musealization of the past. But to enter a reconfigured relation to this ruination might also enable new cultural identities. In this way, the obsolescence of the vast mining infrastructure might turn out as promising potential: “The Bug of Energy Governance” traces how the highway abandoned due to mining is repurposed as renewable energy infrastructure. The process of dismantling and recoding the existing infrastructure can shift them from a dead point to a starting point. Reimagining buildings, machines, and railways of the brown coal extraction could mean decentering capitalist technologies to care and reproduction.¹³²

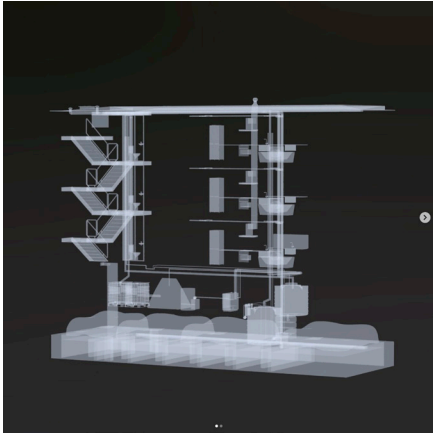
Beyond structural transition

While reparation efforts demand for an expanded view on the direct compensations for extraction, the limits of the structural transition challenge to imagine new ways to redirect its power and resources. Transforming it into a meaningful force for change requires recognizing the carbon paradigm as a critical site of intervention. Overcoming this paradigm demands more than just replacing fossil fuels with solar and wind energy; it requires breaking free from deeply entrenched habits around land use, energy governance, and consumption patterns. This is particularly urgent in the Rheinisches Revier, where land scarcity and degradation intensify the need for innovative solutions. “The Bug of Land Use” offers a critical perspective, urging to repurpose existing infrastructure to support new economic and technological landscapes. If these new approaches fail to creatively adapt existing structures, they risk perpetuating conventional development patterns that replace one form of exploitation with another. It is only by reimagining and reusing what already exists that the structural transition can genuinely move beyond the legacy of extraction and offer real potential for a more sustainable future.

132 Martín Arboleda, “Planetary Mine as an Archaeology of Labor Futures,” *Harvard Design Magazine*, no. 46 (2018): 93.



↑ Recoding the Existing Cooling Towers



↑ A Common and Decentralized Housing Infrastructure



↑ Flexible Housing Strategies

↓ Exploring New Modes of Living in Existing Buildings



This reimagination must extend to the realm of energy governance. “The Bug of Energy Governance” emphasizes the need for a more democratic and inclusive approach – one that empowers communities to take control of their energy future. Instead of focusing on isolated solutions like gearing up single family houses, we must consider alternative models, such as citizen energy projects, that promote collective ownership and shared responsibility for energy provision. Initiatives like the solar park in Niederzier and the wind farm in Bedburg, which are partially owned by municipalities, represent steps in the right direction. However, with RWE retaining the minimum majority, these projects fall short of challenging energy monopolies. The shift from a centralized to a decentralized energy system holds significant potential to foster new forms of energy governance, including breaking free from monopolistic control.

The special land trust model in Bürgewald, highlighted in “The Bug of Home Ownership”, offers a promising example of how communities could reclaim control over their energy and infrastructure. Bürgewald, one of the few villages spared from extraction and the only one repurchased by the municipality, enables the exploration of alternative energy and water systems. This ownership model prevents homeowners from turning to isolated solutions, fostering a more collective approach to resource management and infrastructure development. Additionally, alternative strategies for renovation are being explored, such as the concept of the Bauhütte, which would organize and reuse dismantled materials to maintain the village’s dilapidated houses. By imagining new modes of living and challenging heritage regulations, Bürgewald could become a valuable counterpoint to the dominant vision of single-family housing seen in most new settlements – an unconventional approach urgently needed in the structural transition.

This broader vision for energy governance and space production reveals the role of architecture as both a problem and a solution in the transition process. Architecture has long contributed to a society dependent on fossil fuels and resource extraction, often at the expense of the environment and marginalized communities. Yet, it also holds transformative potential to reshape our built environment. To harness this potential, architects, urban planners and designers

must recognize the leverage of both the formal design strategies and the political scope embedded in the production of space. Identifying “who cares,” “about what,” and “which grounds” might be the first step to action. The reconfiguration of the structural transition must unravel political-economic operations, land-use matrices and property relations to critically engage with the legacy of extraction.

This process must be paired with a recalibration of the funding strategies for structural transition. Despite the crucial role that ecology and culture play, these sectors receive the smallest budgets. The transition must take the funding apparatus specialized in economic development as site to center ecological, cultural and social concerns. “The Bug of Taken Commons” exemplifies the importance of creating a resilient network of actors and fostering a cultural identity beyond the extraction legacy. This approach seeks to counterbalance the economic interests that always seem to take the center stage. By engaging in participatory and collective practices, the structural transition could enable new ways of living together, rather than solely catering to the interests of powerful economic actors.

conclusion / towards a project

Coming back to our research question means to recall the traced dynamics and processes of the current territorial transition towards a post-extraction landscape and its contested practices of repair: Does the transition of the Rheinisches Revier perpetuate altered forms of extractive practices and land degradation, hindering repair in communities and habitats?

From our critical reading of reparation and structural transition, we derive the following key insights:

1. reparation remains in the realm of a legislative responsibility of compensation – rarely more than the bare minimum of an engineering act. The mining operator takes these efforts as a hallmark for their positive impact on the region, all while perpetuating an anthropocenic, capitalist, extractive and terraforming practice as usual. Reparation needs to include habitats and communities as complex ecologies, think with reciprocal relationships and feral effects, and expand on long-term timescales of restoration



↑ HouseEurope! is a European Citizens' Initiative advocating for new EU laws to make renovation and transformation easier, more affordable, and socially inclusive.



↑ Engaging Current and Future Users

and maintenance. Reappropriating and recoding what is left should be the starting point for a future landscape beyond extraction and repair.

2. structural transition as a framework of power and funding prioritizes economic growth over addressing deep-rooted socio-political, cultural, and ecological legacies of extraction. It perpetuates altered forms of land degradation under the guise of green progress. To genuinely break free from these cycles, the structural transition must transcend economic metrics and techno-fixes, moving beyond the replacement of fossil fuels with renewables. This requires a radical reimagination of deeply entrenched systems of land use, energy governance, and consumption.

In navigating these complexities, the transition of the Rheinisches Revier towards a post-extraction landscape holds the potential to reimagine shared resources and collective governance. The exploration of post-extraction bugs revealed multiple sites of intervention like the transformation of the village Bürge-wald that offers the possibility to rethink a common infrastructure and challenge maintenance and renovation strategies. The extraction site of the Manheim Bay calls for spatial forms that take the ongoing occupations and negotiations further and reclaim a landscape of commons. Out-dated infrastructures can become sites to center energy at the core of design, so the Rheinisches Revier enters a genuine paradigm shift.

These imaginations are ones to take further in our *projet de master*. Returning to the post-extraction bugs to reflect on this complex and overwhelming territory through small-scale actions to prevent, intervene or transform.

We would like to express our gratitude to Charlotte Malterre-Barthes for her trust, interest in our work and guidance throughout the process, as well as to Kathlyn Kao for her warm and challenging advice and precise corrections. We also thank Mattia Pretolani for the enriching exchange.

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Lastly, we thank our parents Gerd and Jutta, Joanna and Klaus for their encouragement during the course of this research.

We look forward to continuing this work with the supervision of Jo Tailieu and Mattia Pretolani. We hope to continue the enriching dialogue with Charlotte Malterre-Barthe and Kathlyn Kao.

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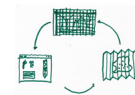
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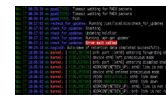
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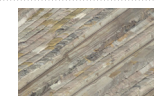
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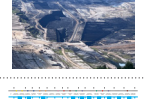
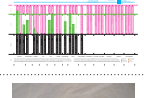
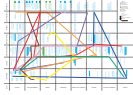
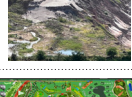
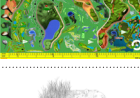
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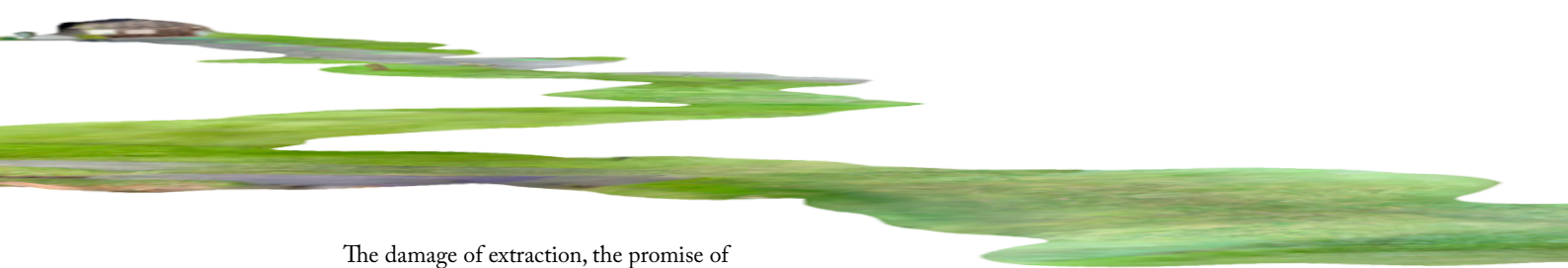


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The damage of extraction, the promise of repair, the seduction of a brandnew start: The Rheinisches Revier undergoes a transition to a landscape of post-extraction and renewable energy. For over a century, brown coal extraction has fueled local livelihoods and regional progress. But this comes at a cost: the loss and erasure of villages, cultural practices, and landscapes. The movement of vast amounts of soil creates artificial mountains and lakes. Reparation and structural transition are meant to fix everything, but do they just perpetuate altered forms of extractive practices and land degradation, hindering repair in communities and habitats? We trace these narratives and practices of repair and collect place-based stories that document our journeys and encounters with people and things. The *Post-Extraction Bugs* weave through this work - found places, matters of past and future mistakes, frictions of lived realities, blank spaces. They are not just errors to eliminate, but starting points for other imaginaries and practices.