

ENERGY TRANSITION INVENTORY

[terms, places, sensations, and objects
collected in Lusatia and Dresden that
help us investigate and imagine energy
transitions and post-extractivist futures]



IMPRINT

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This publication is based on the research studio **EXTRACTIVE PASTS, SUSTAINABLE FUTURES?**, organized by the Chair of Digital Cultures in collaboration with the Chair of Micro-Sociology and Techno-Social Interaction and the Department for Transformative Speculation at TU Dresden, March 11–18, 2024.

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This publication is available online:
<https://tu-dresden.de/gsw/slk/germanistik/digitalcultures/studium/research-studio-extractive-pasts-sustainable-futures>

Published March 29, 2024

Technische Universität Dresden



INTRO

How do imaginaries of the energy transition shape our present and how can we engage with and intervene in these imaginaries through our scholarly and artistic practice?

With the transition to renewable energy taking center stage in Germany's efforts to decarbonize, so does Lusatia, one of Germany's largest lignite mining regions. In anticipation of the year 2038 when coal mining will be phased out—without controversy—various actors are realigning forces for and reconfiguring their roles in Lusatia's post-mining future. Envisioned as Germany's green powerhouse, Lusatia will accommodate multiple research and regional development projects for solar and wind energy as well as green hydrogen production. Former coal mines turned into lakes shall boost the tourism industry and underline the new green image of the region. While visions are grand the transition process is riddled by uncertainties about how, when and by which means such a transition can be achieved. Conflicting sovereignties in the region, infrastructural monopolization, the slow pace of technological progress, unsettled communities, and a bleak landscape that will take decades to recover contest the transition imaginaries.

The research studio EXTRACTIVE PASTS, SUSTAINABLE FUTURES? convened 30 interdisciplinary researchers and artists to investigate Lusatia's transformation as it hits the ground. By visiting mining sites, solar parks, converted lakes, energy research centers and start-ups as well as learning about Sorbian history and culture—an ethnic minority of Slavic origin in the region—we got first-hand experience of the region's conversion and the role historic legacies play in influencing future infrastructural development. We engaged with company officials, city representatives, urban planners, energy researchers and artists from the region to understand their stakes in and perspectives on the transition. We documented sights, sounds, textures, and interactions with places, collected physical materials and captured sites through taking photos, recordings, sketches, and notes. By bringing together our respective methodologies, practices and viewpoints, this Energy Transition Inventory attempts at reconciling the multiple scales of activity that converge as "the energy transition". It is a collection of pieces that do not aim at making a whole, just as patchy and contradictory as the transition itself.

ENERGY TRANSITION INVENTORY

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ANTI-PLACES



Oli Singh



Standing Rock Sioux scholar Vine Deloria Jr. suggests that the standard Western view of history as temporal is fundamentally opposed to North American Indigenous modes of thinking. North American Indigenous thought, as he claims through his lifelong research into pan-North American Indigenous philosophies, is very often founded in a spatial mode of history. Temporal thinking produces an understanding of history in which place is unimportant; merely a backdrop for actors, ideas, and moments to play out in an unbroken chronology of events. Spatial thinking, however, puts the particular locality of place at the heart of history, emphasising experiential knowledges of the world in the immediacy of local relationality. Indigenous Americans, for Deloria, naturally look about them in order to understand their place in history (and in the world), not into an abstracted past or future. In the Western temporal mode, the euro-colonial concept of Manifest Destiny offers us a clear example of temporal thought: A place (like North America) acts as nothing more than the stage upon which an idea or an event (like European supremacy and colonialism) can spread onwards in an abstracted timeline. Temporal and spatial modes of understanding history produce, in this way, perceptibly different relationships to land: Either as tool and stage for the universal or as relation and cradle for the particular.

I am interested in this epistemic tradition as a framework for appraising the development of mines beyond places such as Deloria's home in the Standing Rock Sioux nation in North America. Particularly when faced with the creation of what I will refer to as anti-places in this piece: Places which have had their particular and complex locality transformed through devastation into the imminently replicable, controlled, and determinant landscape of the mine.

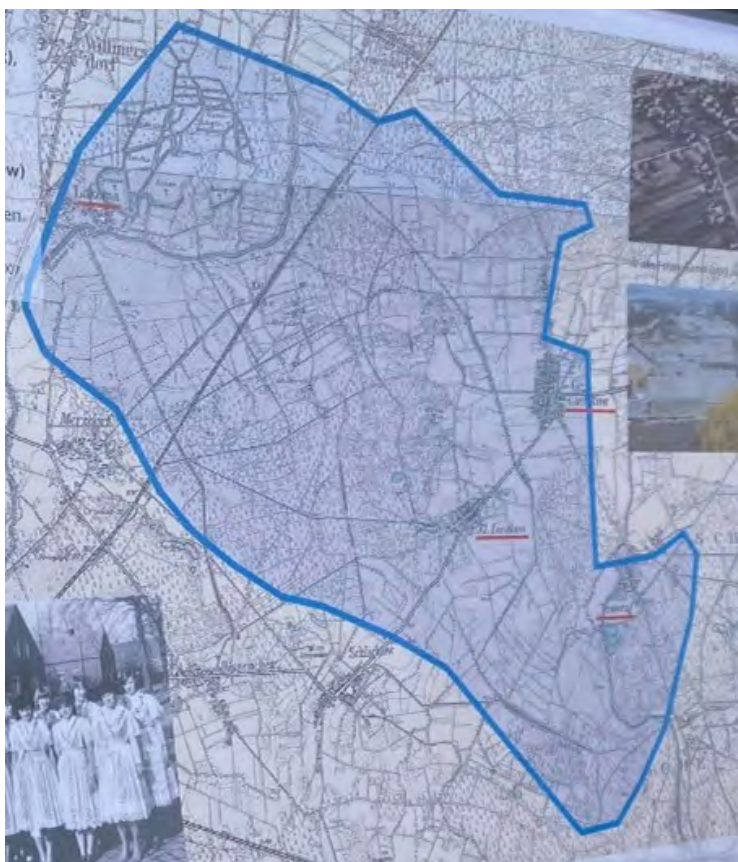
The irony of this piece is that I have, in a way, displaced myself by turning to the scholarship of a Standing Rock Sioux intellectual. However, I think that working with this framework of spatial thinking in the European context helps me to comprehend the scale of devastation which such extreme extractive practices represent. Besides, the emphasis on particularity in the epistemic tradition of spatiality and locality highlighted by Deloria is useful to me in that it does not attempt to enforce Sioux thought on, say, Germans or Sorbs (or the other way around). Rather, it pushes us (in a region whose socialist and capitalist histories are strictly temporal in Deloria's sense) to consider precisely the particularity of that place. For me, this is the power of spatial thinking when faced with annihilated landscapes.

Extractive industries such as the open-pit mining found throughout regions such as Lusatia are clearly demonstrative of the tool/stage conception of a place. In fact, I think that such extreme mining practices might be said to represent the "purest" relationship of Western temporal thinking with places: Dis-placing a place through extreme extractive practices which are abstractive to such an extent that true annihilation of place is achieved culturally, ecologically, and topographically. All traces of the place which made, and was made by, its inhabitants – human, animal, and geologic – are wiped away forever. The temporal mode sweeps through these places in the form of the mines, vaporising them into atomised units of themselves which can be used in the service of the "ideas" of capital growth and universal societal progress. The underground foundations of these now dispersed "anti-places" in their mined and atomised forms are burnt as fuel and spread across the land as fertiliser, sending them into the world as pollution which makes itself known to us by its presence in our lungs, bloodstreams, soils, and waterways. However, in de-placed post-extraction landscapes we face the inescapability of re-placing an utterly annihilated locality. Once the landscape is devoid of relational value to the temporal mode in the form of resources to "fuel" the march "forward" through abstract history we must face the void. Something within us seems unable to ignore these anti-places. The void in the landscape where spatial histories were once relationally made troubles us for some reason. We cannot just leave a hole where there was once a "place".

I believe that this indicates a spatial (re)turn in the critical tradition of Deloria. The very question of what “to do” in the face of this indicates a need to relate to the spatiality of these voids, these annihilated anti-places: Now that this place is devoid of all material value in relation to the march of “capital” and “progress” as ideas through history, what is this place here and now? Or what could it be? Bringing this place back into history spatially. Often, though, it seems our answer is simply to scrub the scars of this extractive relationality from the landscape with water management processes which disguise the devastation of the landscape only by spreading the burden across other spaces (i.e.: draining other waterscapes or dumping contaminated material). Turning these anti-places into lakes works only to terraform these anti-places back into existence to create abstracted neo-places, rendering their re-creation into recreation. Water softens the edges of dis-placement, crafting landscapes shaped by transitory recreational infrastructure in which we float above and around the place-that-once-was, not encouraged to enter into complex emplaced relationality with it, because to do so would require genuine consideration of Deloria’s spatial thinking and, so, to truly consider what it means to have annihilated a place in the name of an abstracted temporal history of “progress”. This terraforming of the void does not bring back the place: Inhabited, travelled, and rich in relation as it once was. In a sense, the temporal mode continues to reign over these anti-turned-neo-places.

For me, the question remains, then, in the spatial (re)turn: How do we, in our Western landscapes of extraction, relate to these anti-places in a tradition of spatial thought, such as that which Deloria highlights? Of course, Deloria’s work encourages us to look into locality to understand our place in history (and the world), and there are certainly active, living traditions of resistance and place-making right here in Lusatia. Look, for example, to the Sorbs or the anti-mining youth activist movements. Deloria’s thinking here, however, offered to me an incisive means of thinking about these post-extractive spaces as I entered them. What does it mean to turn these anti-places into transitory leisure landscapes, re-creating and maintaining this dis-placed place as a neo-place with an infrastructure which holds people in transit? In a sense, dis-placed landscapes become transitory nowhere-escapes where we might float, literally, in the void left behind by the march forward into the abstract history of the West. I wonder if this must really be our future? What does it mean for us to agree, explicitly or implicitly, to the development of such a means of relating to these anti-places? And how might we think differently about them if we consider their place in a spatial, rather than temporal, history?

1 Vine Deloria Jr., *Metaphysics of Modern Existence*, 2012



BANALITY



The Aesthetics of Banality: A collage of Otto Rindt's sketch from the 1970s, envisioning a recreational lake from a disused mining pit, alongside a picture of the present Cottbuser Ostsee – Germany's soon-to-be the largest artificial lake designed for leisure purposes.

"You will be able to swim in the lake after 10 years," says Steffen, our tour guide from Cottbus's City Planning Department. Plans are in place to develop three more artificial lakes east of the Cottbuser Ostsee, following the closure of the Jänschwalde mine. This repetitive obsession with repurposing disused open mine pits into idyllic lakes for recreational tourism is particularly captivating, as it captures our fascination with both romanticized nature and technological utopianism.

This approach, while conceived as a new landscape technology based on civil engineering and water management, has a long history. The idea of an idyllic lake for swimming and sailing, first proposed by German landscape architect, Otto Rindt, who played a key role in the design of Senftenberger See since the 1970s during the GDR era, was revisited over 50 years later, reappearing in the conception of the Cottbuser Ostsee.

The change from lignite to renewable energy sources further complicates the aesthetic picture. The proliferation of large-scale solar parks and wind turbines in former mining areas signifies the tangible transformation. However, a critical question arises: how do these aesthetics align with our socio-technical imaginaries of a sustainable future? A key argument here is the prevalence of an aesthetics of banality in these interventions. Banality, here, refers to a combination of unoriginality and the mundane. It manifests as the adoption of readily available, easily communicable solutions that can be applied repetitively, prioritizing efficiency over novelty. This paradoxical pursuit of efficiency-driven, unoriginal solutions stems from the need to optimize time and cost. The question then becomes: how does this banality become aesthetically prevailing?

Let's look at two more examples: LEAG, an energy enterprise controlled by Czech billionaire Daniel Kretinsky and the sole energy supplier in Lusatia, has embarked on the 'Gigawatt-Factory' project. Inspired by Elon Musk's Gigafactories, this initiative combines new types of renewable energy such as solar, wind power, and hydrogen. Part of the project is located on an abandoned military airfield in Welzow, where its runway is transformed into a vast array of photovoltaic panels – a vast, no-man's land of solar energy.

Similarly, Heliatek, a German renewable energy startup, has developed a new carbon-based chemical technology that converts light into energy. This technology has found an application in the production of bendable solar panels that can be formed into modular patterns on building facades.

Despite the technological capacity to produce transparent solar panels that resemble normal glass, the product retains the dark color commonly seen in conventional panels due to its efficiency-focused design and "greenwashing" potential.

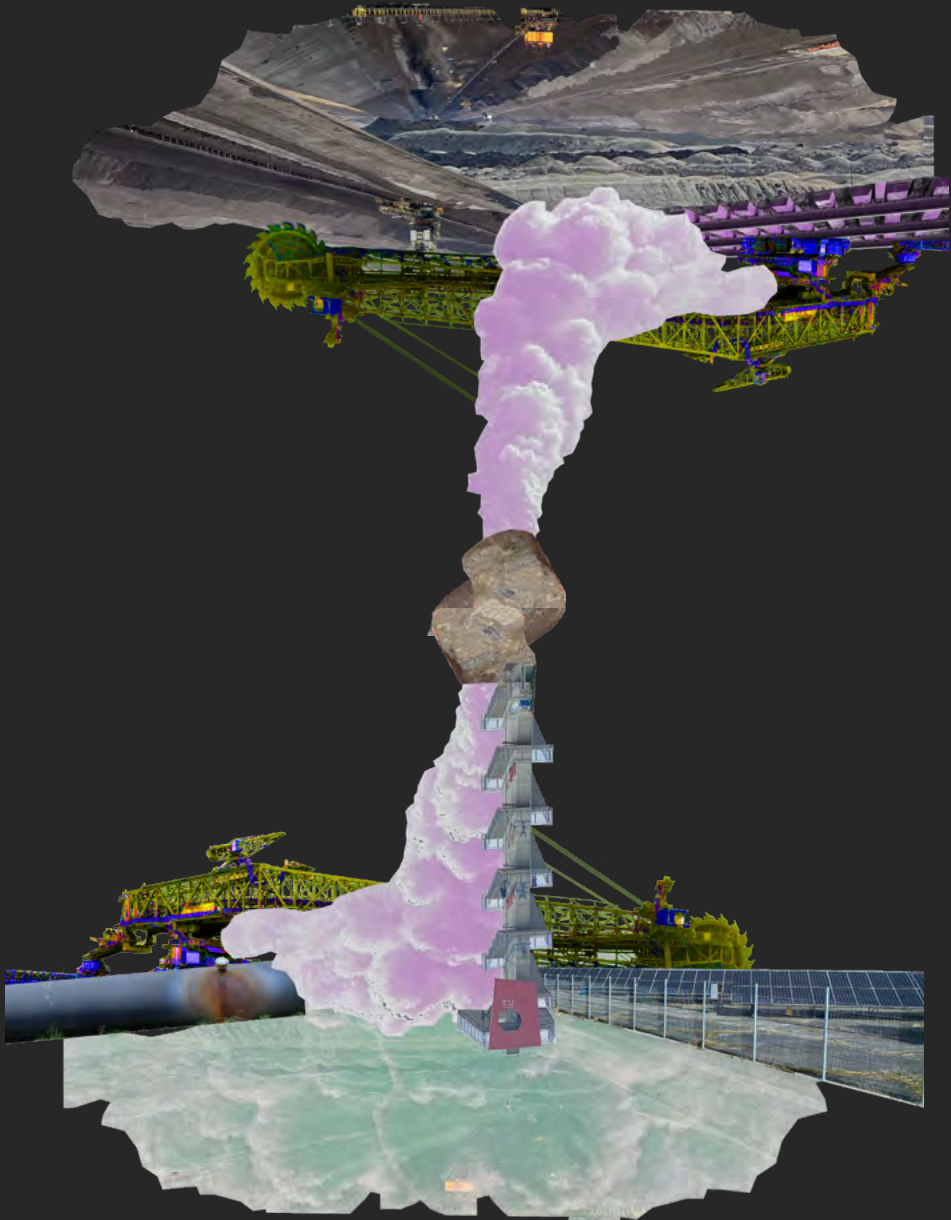


LEAG's Solarpark in Flugplatz Welzow

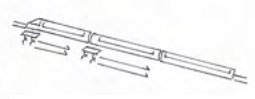
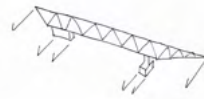
These examples, consisting of landscape and infrastructural transformations that are designed to be seen, prompt us to think critically about the (in)visibility of energy infrastructure and the aesthetics of energy transformation. They reflect an aesthetic characterized by two elements: First, a sense of familiarity, a commonplace quality that dulls the senses and hides the wonder of enchantment. Second, an employment of predictable repetitions – a reuse of existing knowledge. This results in an effect of "futuristic anemoia," a nostalgic longing for a restored landscape built on an invented past.

In short, the paradox at the heart of the energy transition is this: technological innovation promises to transform and replace mining-related technology, creating different "atmospheres," as Gernot Böhme suggests. However, these "atmospheres" often favor readily available solutions – an aesthetic of banality warped by oblivion, vague memory, and technofixes, creating an utopian view of a sustainable future that has not fully existed, and perhaps never will. This analysis calls for a critical examination of the aesthetics of the energy transition. By understanding these contradictions, we can strive to envision a sustainable future beyond banality, embracing scientific knowledge and engaging both aesthetic appreciation and connections to the land and water.

COMPRESSION



Jenny Neubig



Horizontal moving machines

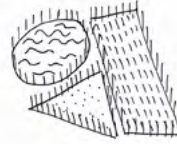
Time compression envolving in spatial spreading

A REFLECTION ON TIME COMPRESSION

The immense extraction of coal for the never-ending demand for energy is initially an abstract concept, until you actually experience it at the site of the coal mine in Lusatia. Dead biomass, which was converted into coal 17 million years ago, lies in the depths of sediment layers that have accumulated over the centuries. The scale and speed at which the 17 million year old coal are mined and transported becomes tangible as you walk through the mine, its vast expanse, huge machines and eternally long conveyor belts. Mountains of coal pile up at the edge of the mining area. Our guide, who leads us through the mine, says: "This pile is enough for about 3 days. 3 days and then it's all gone." A mountain of 17 million year old coal, which has been created over an impalpably long process, is consumed within 72 hours, creating a different kind of temporality.

While coal is still being actively mined in Welzow Süd, the former open-cast lignite mine Cottbus-Nord is being restored into the largest artificial lake in Germany.

At the same time, a 500 year old village like Mühlrose is being relocated to make way for the expansion of the Nochten open-cast mine, which is expected to cover the demand for coal until 2038, while coal is spreading to renewable energies. Travelling through Lusatia, you can see the many empty houses that illustrate the decline in population and demographic change. While Cottbus describes itself as a booming city and is planning new neighbourhoods such as 'Framework Plan Seevorstadt'. It seems as if everything is happening at once, as if everything is ageing faster. Time is under pressure. So time gets compressed. But what happens when you compress something and there is no limit, no stabilisation that can hold it? It gets out of control. It spreads sideways and expands spatially.



Can monofunctional spaces become multi-layered ?

SPATIALLY SPREADING

What could be thought of as a vertical operation, extracting coal from the depths, has evolved into a sprawling, horizontal endeavor. Enormous machines move mountains of earth, layer by layer, exposing the coal below.

The F60 moves horizontally across the landscape, expanding the mine, fuelled by the relentless demand for energy. In the background you can see power plants that continuously emit steam when burning coal to generate energy. Huge clouds of steam are pressed into the atmosphere and spread out.

How does time compression affect spatial spreading?

CONFLICT FREE AREAS?

The compression of time and the pressure of structural transformation is fuelling the spread of monofunctional areas. Whoever is quickest takes the most land. But nature and social processes are slow. How can these slow processes be implemented in this race?

At present, there are only monofunctional areas surrounded by fences. Fences around the mine, fences around the lake, fences around the nature conservation area. But what happens when there is no space left for future needs? Who will own the land? Will it be possible in future to turn these monofunctional spaces into multi-layered spaces?

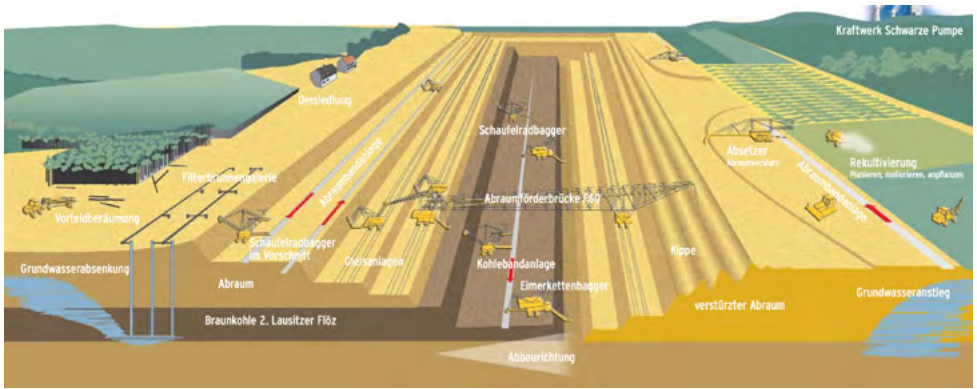
F60



Image taken during the Welzow-Süd mine tour of the F60 stretched out against the horizon.



A view of the F60 as taken from a stop on the tour next to the F60. Here, we were informed that three people worked in the office under the F60 to direct the machine.



Schematic depiction of Welzow Süd

The F60 is the mechanical behemoth which functions as the focal landmark of the Welzow-Süd open-pit lignite mine. This long metal apparatus stretches across the center of the mining area and forms the centripetal axis of the mine's activities. The F60's weighty presence makes the work of mining and its spatialized temporalities visible. Our tour of the lignite mine seemed to literally revolve around the F60. As the visitor truck drove around the operative mining area perimeter, the F60 was conspicuously featured as its central radius. We came out of the truck to appraise the full length of the F60 from a distance; we stood next to it on another stop. Our tour guide emphasized the F60 repeatedly, expecting us to be impressed by its length and size.

The F60 is an extended conveyor bridge which channels away the overburden produced by high-cut and low-cut excavators. These excavators cut into the walls of the mine in three pre-cut phases totaling about 148 meters before extracting coal. It moves the meters of overburden to the other end of the pit where a massive pile of glacier sand steadily grows into a small continent. Measuring 502 meters long and 204 m wide, the F60 is the largest of three successively developed conveyor bridge models manufactured by VEB TAKRAF Lauchhammer; the previous model F45 had a span of 225 m and boom of 125m. The gargantuan size of this machine is reflected in the three years taken to transport its individual parts and assemble them together in the Welzow-Süd mine from

1969 to 1972. It continues to hold the world record as the largest conveyor bridge and it is purportedly the "longest vehicle ever made... (and) the largest vehicle by physical dimensions ever made by mankind". The F60 in Welzow-Süd is one out of 5 machines of its kind only located in Lusatia and is expected to be operational until 2028.

The two ends of the F60 conveyor bridge are suspended by rails along the mine's benches created from the pre-cut phases of the mining process. The F60 moves along with the excavators attached to it that cut into the mine walls, together with the entire conveyor belt system which is repositioned inwards once a week. The 11000-tonne F60 moves 6 to 8 meters per minute on the rails. These rails are in turn shifted by rail-moving engines in snaking arrangements once or twice a week. In 2023, the F60 makes a turning point, physically marking the progress of the excavation – and exhaustion – of the mine.

The eventual destiny of the Welzow-Süd F60 after 2028 is unclear. But the status of other F60s in Lusatia, such as the one in Lichterfeld, point to its possible futures as a tourist attraction and abseiling platform which exploit the sheer scale of the machine and the landscape it has helped to carve out and dominate.

https://media.sodis.de/open/melt/Standort_Welzow_Sued.pdf, accessed March 2024

FUTURE- ORIENTED- FUTURES



Taylor Mitchell

"The plans include new residential and attractive commercial properties, an innovative campus as a think tank for future energy supply as well as a centre for education and government offices...characterised by innovation."
— City of Cottbus on the urban development between the city and the Cottbuser Ostsee

"The museum is now a laboratory; the laboratory a university; the government sits adjacent to the think tank; the think tank is now arbiter of the media. The think tank is that allover, ambient state—a sensibility—writ large, at planetary scale.

Call out this feeling for what it is. Not just a pattern or network, it's an aesthetic."
— Pamela M. Lee

The Cottbuser Ostsee project sees an open-pit lignite mine transformed into "the future largest artificial lake in Germany". While fossil fuels-turned-green-energy company LEAG "restores" the post-mining environment, the City of Cottbus promises further transformation around the lake: a multipurpose urban landscape fit for nature tourism, recreational sports, scientific inquiry and private investment. A 2016 planning report released by the city frames the project as an "opportunity to develop future-orientated infrastructure and attractions without the burden of previous tourist clichés." And while much of the planned infrastructure centers on (the tourist cliché of) sporting recreation, additional "future-oriented" features, the report says, will be integral to realizing the Cottbuser Ostsee brand. "Simply focusing on sports and recreation will make it hard to gain a foothold in the trans-regional market," it argues, and therefore "other distinguishing features will...have to be created to raise the lake's profile" such as "floating architecture" and "future-oriented, environmentally friendly and independent energy production". More recent plans promise a floating solar farm, a "green energy landscape" for wind and solar "embodying the change of energy generation", and a "think tank for future energy supply". Within the discourses and media

aesthetics moving between this planning process (which is, by definition, future-oriented) and the promise of infrastructure that will itself be "oriented" towards an even more distant future, a mood emerges, a movement (though not yet an energy).

Future-oriented-futures is a "think tank aesthetic",¹ a mood, and a constant movement attempting to balance contrasting temporalities: the processual materiality of the future-making present (data-making, mood-boarding, designing, building, pitching, powerpointing, circling the grey lake with a research studio in tow) and a more hopeful/sustainable/greener otherwise. It's stretching towards the promise/imaginary of the prototype, where a sustained optimism for Sustainability, as well as "the application of ever finer and more environmentally pervasive forms of calculation and computation",² extends this promise/imaginary, this future-otherwise, into a distant horizon, before snapping back, like an elastic band, to our troubled present. Through all this back and forth, we can't properly make out this horizon... but we're told (over and over): it's bright green, bejeweled with wind turbines and definitely not a mirage.

Drawing from works tracing the politics of elasticity by Shameem Black, Silvia Lindtner, Maria José de Abreu and Pamela M. Lee, perhaps future-oriented-futures as an object of inquiry could help us make sense of the political relations shaping the so-called Green Energy Transition. Tracing the elastic back and forth between future-oriented design and the imagined future, a process that is less conduit, than "boundlessly middle"³ could show us how such a movement might flexibly encompass seemingly contradictory political ideas—like rising enthusiasms for authoritarianism and the neoliberal "green capital denial"⁴ seen in Lusatia and globally.

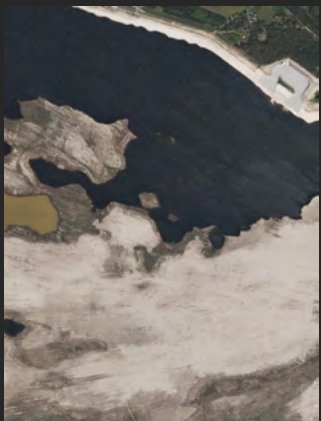
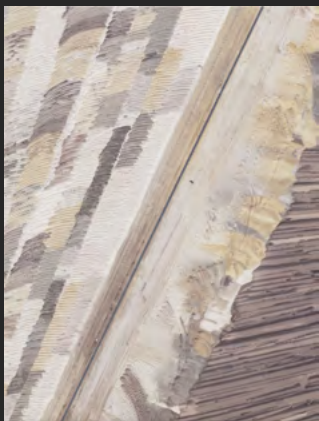
1 Pamela Lee, *Think Tank Aesthetics*, 2020

2 Orit Halpern, *The Smartness Mandate*, 2022, p. 245

3 Maria José de Abreu, *The Charismatic Gymnasium*, 2020, p. 131

4 Jesse Goldstein, *Planetary Improvement*, 2018

HYPERVISION



David Bauer

"According to a National Geographic TV program, the highest measured speed of a peregrine falcon is 389 km/h—a sensational skill mirrored by the sensational sensory precision of its eyesight. A peregrine's brain evolved to provide these creatures with hypervision capable of processing images at a higher frequency than human brains."

My brain is encased in a white construction helmet, its purposes as enigmatic as the landscapes we traverse. Twenty-five minutes, rocking side-to-side on the hard-shell seats in a sunshine-yellow Domsday Safari truck packed with international scholars and artists. In the window, the vast expanse of one of Europe's largest open-pit mines. Grey, brown, pale, black, vivid. Sorted. Red, ochre, yellow. All Sorted.

Noises fill the air as we disembark through a steep staircase into a high and hazy sky. "O wow. This is magnificent." Caterpillars and trucks circle humongous feet with wheels and endless tracks, and belts and stairs, moving colossal masses of sand from here to ... somewhere over there. "Holy..." In the background, a giant bucket-wheel excavator breaks into the "upper" layers of the sandy soils. Sand falls at an unnatural speed – too slow because it falls too deep. "To make free the coal!" the guide explains. Everything here is "to make free the coal". Giants with a single purpose. Sieving sandy moonscapes atop a subterranean forest.

After listening to noise and words and inner thoughts ("Giant steps is what you take, walking on the moon"), the gaze pivots up. And there in the distance—and here everything is at a distance—is something circling in the sky. "This are the Falcons. They live in F60". "F60" - as "TAKRAF Abraumförderbrücke F-60" - as in the "reclining Eiffel Tower", as in "the largest moving technical machines in the world." "Falcons, yes. And two pairs of wolves!" Falcons and wolves, ok. "Three pairs of Falcons and two pairs of wolves". On 108 km² of barren nothingness. And they live in this 500 m-long monster. And the crew cares about them. Cares deeply about them. Not many signs of life out here anyway, one remarks.

So, I think of Falcons-F60. The fastest animal in the world lives on the largest moving machine ever built by humans. More superlatives in this industrial Jurassic Park, that does not spare moments of awe at every bend the bus takes.

"Human brains evolved to comprehend anything above 60Hz (or flashes of light) per second as a solid stream of light. This rate is referred to as the Flicker Fusion Frequency (FFF), a crucial term in the psychophysics of vision. The Peregrine Falcon developed a faster FFF, 100 Hz per second, for avoiding obstacles and having a quicker reaction time while hunting."

I try to make my vision flicker momentarily and stir up my brain, which has seemingly fallen into a state of rest despite or because of the continuous spectacle we find ourselves in. And while I imagine being a falcon and struggle with the thought of being a falcon, I come to realize:

As displaced as it seems in this featureless, human desert, the falcon has another vision. It might not need its sharp and fast eyes, nor does it necessarily need its speed. All it needs is a distance to this world. Unfettered by the rules of the games down here, seeing together what cannot be experienced by those who wear boots.

Unrestricted and unhindered from any of the perimeters, it circles across the fences – the endless fences. Across the sandy shores of flooded lakes. Cerulean color, created by Lausitzer lime. Across the rails and pipes. The conveyor belts, that run at a deadly speed of 24 km/h, ready to rip off any hands, and heads, and for that matter any other available limb of trespassing or unruly visitors that go beyond this line. "Yes, this line".

It circles and crosses, untroubled by the warning signs indicating danger to life caused by unstable ground, landslides, and tsunamis. A treacherous landscape. Full of hidden pits.

It does not have to follow the winding roads either. Roads that have to submit to the logic of extraction and excavation. That have to fall in between, as so many things here have to fall in between. Into what was or is left.

Its vision unrestricted by the hedges, the dikes, by the shrubbery and young birch trees and the fences, it can see that the infrastructural sublime of endless PV-panels and open strip mines borders the boredom of uprooted rurality in Brandenburg at every corner.

Flying high and far, it simply crosses it all. The patchy, technical landscapes of meticulously separated functional zones that, due to the void of topography, remain unaware of each other.

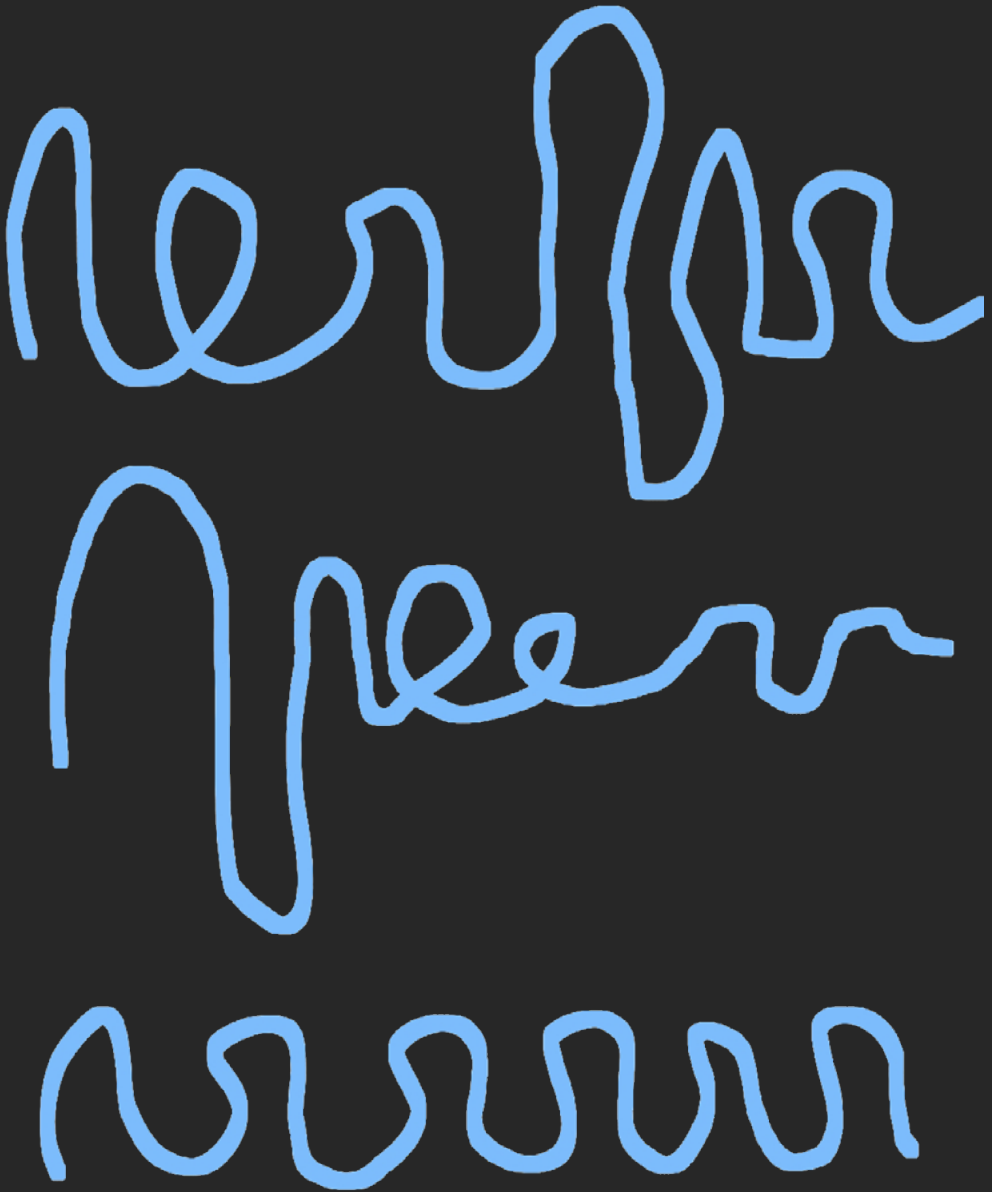
It can see past, present, future. Deep time. The old remaining factory towns. Raised by steam and red brick. To house workers, to mine for coal. For more coal. For more steam. For more brick. For more workers. Well, that is past.

It can see the inhuman scale of the remaining mines, filled with an exciting monotony of heaps and heaps of sieved sands in all colors of the geological rainbow.

It can see the strange order and geometry of dark shimmering solar panels. Probably, Chinese solar panels, probably forged with Chinese coal, hinting at Germany's green future. Just as the industrial hubs and racetracks—and again pipes, and rails— that are sprouting from the ground.

Down here, I cannot see this. Cannot understand this palimpsest. Cannot understand what is going on—all at once. So, the shutter of the camera flickers, and I take one picture after the other. To show it to friends.

LIGNITE
SNAKE



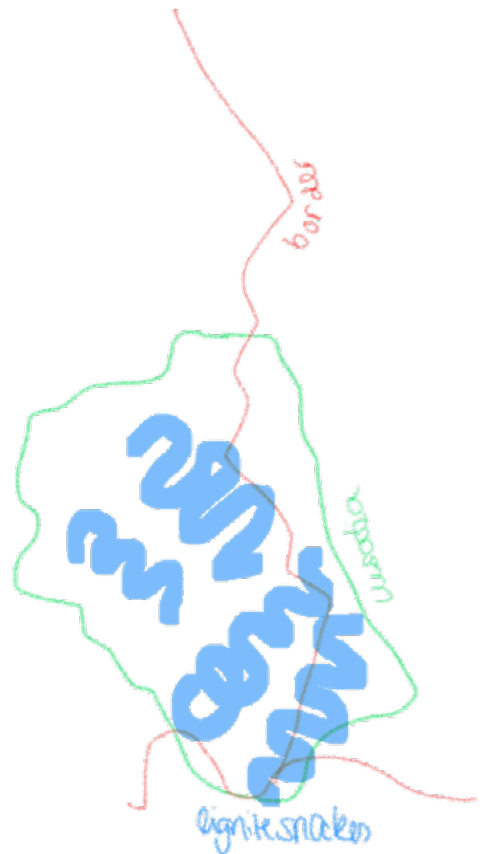
Juliana Lux

"Wie eine Schlange" – like a snake. This is how our tour guide at the open pit mine Welzow Süd describes the pattern in the landscape left behind by the F60, a conveyor or bridge used for strip mining in conjunction with excavators that (re-)moves the overburden to unearth the lignite. It is the longest and largest vehicle in the lignite mine and defines the horizon as we gaze across the open pit. I can't help but picture it slithering across Lusatia. Right before excavators take deadly bites into lignite and its colossal body leaves massive traces.

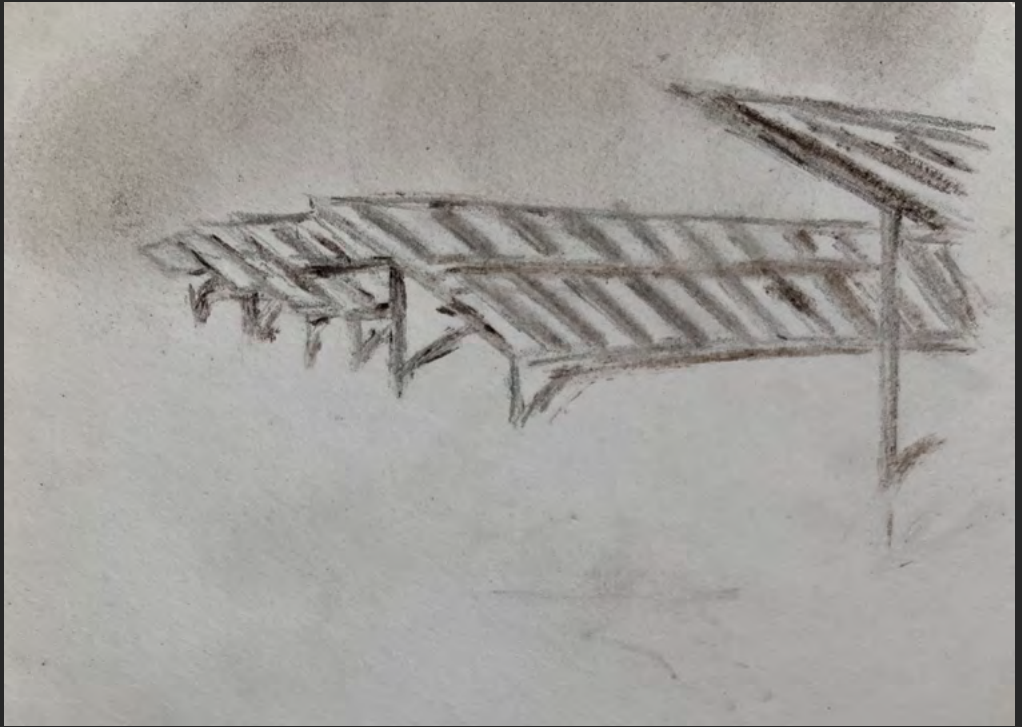
But the comparison is flawed: Snakes digest, lignite snakes displace. Snakes inhabit, lignite snakes extract. Snakes leave traces, lignite snakes transform entire landscapes. Snakes metabolize, lignite snakes devastate. The dissonance shines light on what feels so wrong about the zoomorphic image in my head: Thinking of the constructions surrounding the F60 as a snake somehow naturalizes and trivializes what's going on. I see a machine with desires, language, and volition (on the verge of) becoming a living being. No companies, no engineers, no consumers. Looking at a lignite snake rather than a mechanic conveyor belt obscured the way I saw the F60. An undulation that swallows everything in the way. Wavelike tracks where once were entire villages. The defining shape of post-mining areas. The F60 and its movement appeared to be part of the ecosystem of the mine and I need to remind myself that there was an ecosystem before the mine and that there will be one after the mine.

As the tour guide led me to think about the landscape in terms of the sentient beings it inhabits, my mind wanders from animated machines to migrating species. Swallows whose habitat was displaced, falcons who nest in the F60's structure out of necessity, wolves who are reappearing in the area after years of absence, and the many species whose existence is inherently shaped by and entangled with mining. During our days in Lower Lusatia, thinking about energy transition, their stories were few and not as present as those of humans, machines, and transforming technology.

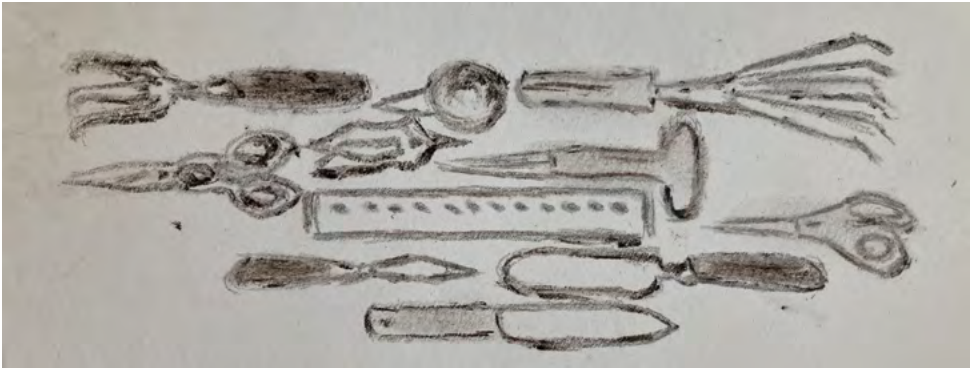
Thinking the energy transition in more-than-human terms is what the image of the lignite snake did for me. It confronted me with the imposing presence of gigantic machines, whose magnitude eludes



LIKE MUSHROOMS FROM THE GROUND



Nadia Christidi



July 3, 2045

Today is my birthday, but otherwise the day feels like a normal Monday. I woke up at 4:30. It was still dark outside. I wanted to drive over to the solar park, but my car wouldn't start. Yesterday was overcast and my panels must've not produced enough energy. I'll have to get them looked at. LEAG promised the latest upgrades would work, rain or shine.

I took the scenic route through town to mark my special day, even though it's a little bit longer. I was feeling leisurely and sentimental. On days like this, I go that way to remember life before the 'phase out.' Lace curtains in Lukas and Hannah's living room window remind me of our weekly dinners together that still bring tears to my eyes. I can almost hear their children laughing their way down the blue Karibu slide that stands in their yard. I'll have to come by and clean the slide, which is gathering dust, and tend to their overgrown bushes. They wouldn't have liked to see their house this way.

The town is eerily empty. I come back to the present and feel the weight of its silence. Almost everyone left when the mines shut down. We were promised a 'smooth transition' and new jobs by the 'green transition societies.' But the jobs never came and those that did were in nowhere near the numbers we thought. Tourism plans failed to take off because the acidity of the mines-turned-lakes just couldn't be managed. There's only a few of us gardeners out here now tending to LEAG's solar park sites. Gardening jobs were highly competitive and coveted when they first opened up; they offered good wages, an almost unheard-of pension, and the ability to stay at home. But benefits and hardships are sometimes one side of the same coin. There's a gardener who lives not so far from me in Welzow. I think his name is Max but he keeps to himself. Electricians come by every once and a while, but they are bussed out almost as quickly as they are bussed in.

When I arrived at the solar park, it was already 5:14. The sun was starting to rise. I checked my work chart. Today, I am scheduled to work on 'quadrant 7.' I gathered my gloves, hedge shears, and a wheelbarrow and made my way over. The grasses in the quadrant have been cracking through the pavement, sprouting everywhere as mines once did like mushrooms from the ground. The grasses need to be cut before they obstruct or interfere with the

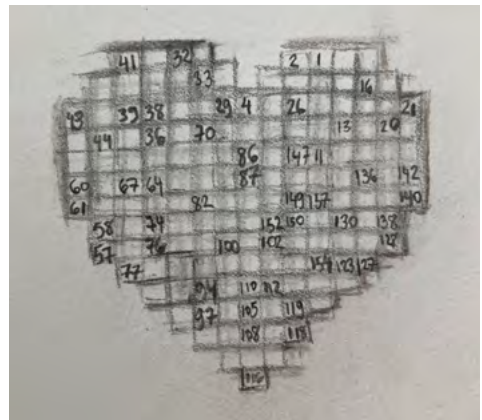
PVs. Last September that happened and we had to call in the electricians. The boss wasn't happy. I can't risk making her unhappy again.

There's a cool breeze but the sun feels warm as I trim and pile up the grasses. I stop from time to time to admire the forest around me, listening to the rustling of the pine trees. It's hard to imagine that these lands were not so long ago open mining pits. I'll have to collect some pine cones on my way home and harvest their nuts.

At noon, I take my 30-minute lunch break. I sit in the shade of a PV and enjoy my cold vegetable stew. I play the same Hidato puzzle I've been playing for years, then erase my markings so I can play it again. I've been getting better at solving the puzzle. Today, it takes me 12 minutes. Not my personal best. I'm a little distracted, I guess.

I return to trimming grasses after lunch. LEAG's autonomous truck will be here soon to pick up what I've trimmed and take it to the biomass energy plant. The truck comes by at 3 pm sharp. Once I've loaded the grasses, I take a walk around the grounds, looking out for any unwanted bird nests and wayward roots. I clock out at 3:14 and make my way back home.

This time, I cut through the forest. I'm a bit tired and ready for my nap. Tonight, I think I'll make a pie from berries from my garden, watch the news, and write to some friends. Lukas and Hannah's children are teenagers by now. How slow and fast time has passed since they all left.



(LOW-) CONFLICT AREAS



During our visit at solar park Welzow III, one of the three tour guides from the local energy giant LEAG called the former airport runway on which it was built a *low-conflict area*. This means, that the redevelopment of the 16.6-hectare area was deemed "uncontroversial" among the population in the region, because it is surrounded by forest and no settlement is directly adjacent. One of the other guide adds that the company owns a total of 33.000 hectares of low-conflict areas in Lusatia available for the conversion to renewable energy infrastructures. While it seems appropriate to repurpose developed areas to meet the demand of CO₂-free energy production, I wonder if it is appropriate to refer to these sites as being *low-conflict*.

All of the 27.000 solar modules at Welzow III were manufactured in China. They travelled a long way, and by doing so caused high CO₂ emissions. In turn, China still mainly produces energy in coal-fired plants. Materials needed to produce solar cells, such as iron, ore, copper, silver, and bauxite are extracted Brazil, Peru, Chile, Mexico, Argentina, and Guinea. So, does the use of Chinese solar modules in Lusatia not reproduce these conflicts, which are said to be nonexistent?

What's more, solar modules have a life span of approximately 25 to 30 years. Yet, our guides were not able to tell us about their recyclability. It seems that the increasing use of solar energy today defers potential conflicts around their decomposition into the future.

Closed or soon-to-be-decommissioned open-cast mines run by LEAG also count as low-conflict areas. For instance, the former open-pit mining operation Cottbus-Nord is seen as a unique opportunity to build a nature reserve and recreational area as well as a floating solar park. All of these infrastructural endeavours are said to be positive for the region, invite tourism and increase the quality of life for the residents. The municipality of Cottbus is invested in their plan "to create an innovative and climate protection-oriented urban landscape that will serve as a driving force for the whole of Cottbuser Ostsee in a balanced dialog between living, recreation, experience, research and business".¹ Of course, this project will require partial deforestation around the lake as well as the sealing of additional areas in order to build a harbour and a bike path around the lake.

Between 1970 and 2006, lignite mining in the region required the resettlement of five villages – Groß Lieskow, Tranitz, Klein Lieskow, Lakoma and Merzdorf – with a total displaced population of 790.² Does the marketing of a flooded mine as a low-conflict opportunity for a recreational area not conceal a conflict, meaning the sacrifice of communities in the recent past?

Merely scratching the surface of socio-political contentiousness in the area – that is to say, conflicts with and among humans – the term low-conflict does not even consider what counts as a conflict from other-than-human points of view.

Mining and the burning of lignite have harmed and continue to harm the environment as open-cast mines such as Welzow-Süd will stay operative until 2038. This entails deforestation, destruction of non-human habitat, interference with the water cycle, CO₂ emissions – to name just a few consequences directly conflicting with the interests of multispecies habitats. The labeling of such ecologically devastated and exploited areas as low-conflict, I argue, distracts from the environmental impact of extraction practices on Lusatia.

LEAG might consider its properties throughout Lusatia to be uncontested, easily accessible sites of renewable energy production. However, the complex socio-material layers of these areas indicates that they are anything but low-conflict.

¹ <https://cottbuser-ostsee.de/>, accessed March 2024

² LMBV, Welzow-Süd/Jänschwalde/Cottbus-Nord, 2015, p. 13

RE- CONVERSIONS



Naïmé Perrette, Jorrit Smit and Kristiane Fehrs

"The self-image of Lausitz as an 'energy region' is very deeply rooted. This identity is to be preserved even in times of the coal phase-out. Hydrogen technology lends itself to this."

Hy.land

Electrochemical reconversion encompasses the transformation of electrical into chemical energy, and back. In post-mining regions, reconversion describes the restructuring of the economy after extraction comes to a stop. Industrial sites and landscapes are being reconverted to recreate ecosystems or to become appealing touristic sites. The Cambridge Dictionary notes that reconversion is also the "process in which someone changes back to a religion or belief they previously followed". Hydrogen reconversions embody the promise of a green reconversion of the Lausitz landscape, culture and economy.

Hydrogen is the first atom in the periodic table, formed in the initial seconds after the Big Bang and the most abundant element in the universe. But in the 21st century's energy transition on planet Earth molecular hydrogen (H_2) is not simple or widely available at all. An engineer at the Zentrum für Energietechnik (ZET) unmasked molecular hydrogen as a 'highly processed product' that could only be produced 'green' if unimaginable quantities of (land for) renewable energy were available. Compared to the meticulously optimized process of burning lignite, studied in ZET for decades, the scientist could only be disappointed by the current low efficiencies of converting and reconverting electricity into hydrogen into electricity. What to think, then, of industrial and political plans to turn Lusatia into a hydrogen region and preserve its identity as Germany's (green) powerhouse?

~WET DREAMS~ (on dry Lusatian land)

Today, the Lusatian hydrogen economy exists in the form of infrastructural imaginaries of border-crossing pipelines, under- and over-ground storage, of yet-to-be-built electrolyzers (in projects like LEAG's GigaWatt factory) and yet-to-convert end-users (at industrial sites like Schwarze Pumpe). Not-yet-existing and to-be-retrofitted pipelines on countless conflicting maps tell outlandish stories of importing converted solar, wind and water in the shape of hydrogen gas. At the end of these speculative logistic chains energy companies in Europe market 'green hydrogen futures'.



Hydrogen import imaginary produced by Guidehouse for German Ministry of Economic Affairs and Climate Action, shown to us at LEAG's solar park.

The multitude of maps convey the illusion that these infrastructures are at the verge of conversion into materiality, and that a green hydrogen future is within reach. An ethnography of these emerging but intangible hydrogen infrastructures follows these speculative narratives as they circulate in industry congresses, policy documents, scientific articles and network meetings. One spends time reading texts, tables and graphs that calculate hydrogen futures and narrate or visualize future energy landscapes. This week our search for hydrogen in situ led us to the Schwarze Pumpe industrial park, where the hydrogen test plant Referenzkraftwerk Lausitz (RefLau) is supposed to be built. Our attempt to localize Lusatian hydrogen futures for now ended at RefLau's postbox, a stone's throw from a to-be-phased-out fossil fuel site.

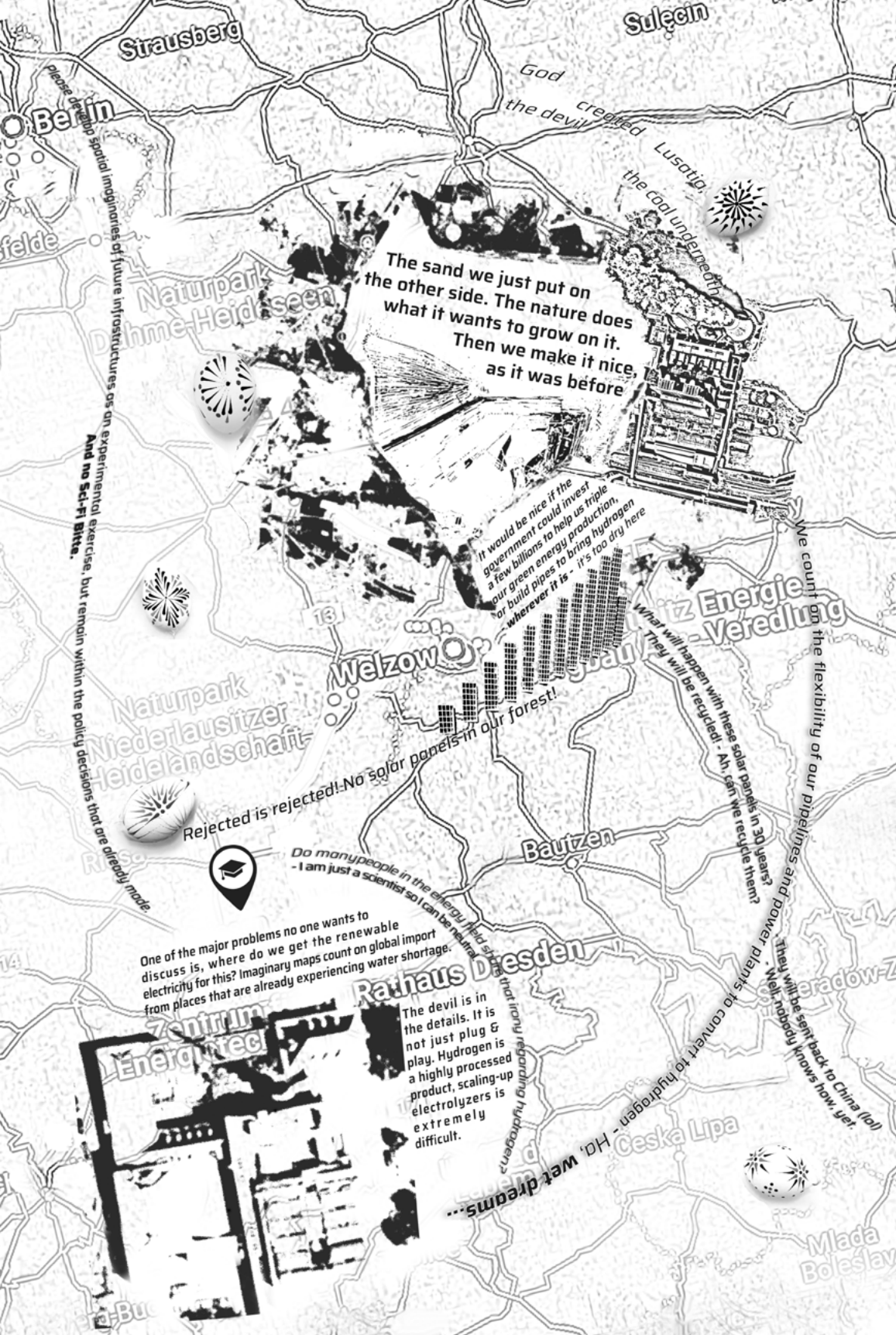


Infrastructural imaginaries consist of spatial storylines, visual representations and quantitative speculations that together demand one ought to believe them to maintain regional energy identities. Hydrogen prophets preach that H₂ will save the planet. In Lusatia they promise it will leave local land relations intact and secure the stability of Germany's industry if only one is willing to take a leap of faith. If only one is willing to invest, massively, in technologies and infrastructures that finally will lead to the conversion of fossil fuel based industrial sites and processes into hydrogen based ones.



Ethnographers, journalists, artists and other interrogators of the techno-scientific-industrial complex play a role in this epos of reconversion. Plans, projects and promises can be tested on what power, land and historical relations they assume, leave intact or change. Leakages in the seemingly bulletproof pipedreams of green capitalist futures can be employed to amplify lost voices, emphasize open-endedness, and explore alternative scenarios.





Strausberg

Sulecin

Berlin

God created the devil

Lusatia

felde

Naturpark Döhme-Heidelseen

The sand we just put on the other side. The nature does what it wants to grow on it. Then we make it nice, as it was before

please design spatial infrastructures of future infrastructures as an experimental exercise, but remain within the policy decisions that are already made. And no Sci-Fi Bitte.

It would be nice if the government could invest a few billions to help us triple our green energy production, or build pipes to bring hydrogen wherever it is... it's too dry here

We count on the flexibility of our pipelines and power plants to convert to hydrogen. They will be sent back to China (lol)

Energie-Veredlung

Naturpark Niederlausitzer Heide- und Heidelandschaft

Welzow

Bautzen

Rejected is rejected! No solar panels in our forest!

What will happen with these solar panels in 20 years? Ah, can we recycle them? Well, nobody knows now, yet.



Do many people in the energy job sector that turn regarding hydrogen? - I am just a scientist so I can be neutral

One of the major problems no one wants to discuss is, where do we get the renewable electricity for this? Imaginary maps count on global import from places that are already experiencing water shortage.

Rathaus Dresden

The devil is in the details. It is not just plug & play. Hydrogen is a highly processed product, scaling-up electrolyzers is extremely difficult.

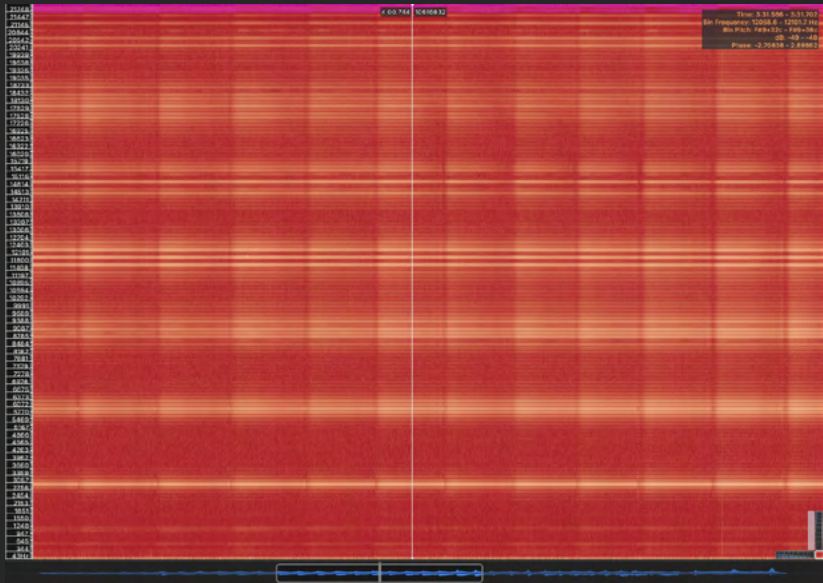
...wish d... wet dreams...

Ceska Lipa

Mlada Boleslav



RELATIONAL SONICALITY



Spectrogram of an excerpt of the recording, coils tracks only. The lighter the color, the louder the signal. X axis = time, Y axis = frequency (Hz).



Spectrum of a sample of the recording, coils tracks only. X axis = frequency (Hz), Y axis = power (dB)

The sound of the extraction process at the lignite mine Welzow Süd is thunderous and earth shattering. Custom-made bucket-wheel excavators – looking like gigantic iron monsters with shovels the size of a car – bite through the geologic layers, seeking for the combustible material. The monsters' tails transect entire landscapes transporting the extracted material on humming, hissing and howling conveyor belts to train carriages that move the freight to the nearby power plant Schwarze Pumpe. The site is unfathomably huge. I feel as small as an ant. The machines seem to segregate and organize every geological layer anew, I feel confused and disoriented. But the sheer dimension of the pit and the layered, constant booms from digging and other extraction processes at different locations within the pit are disorienting, too.

After lunch we find ourselves at the former airport of Welzow. Before entering the site we get instructed not to touch anything and that people with pacemakers should stay away from the transformer due to the immense electromagnetic radiation which is emitted by the facility. Curious about the radiation, I entered the site with my sound recorder, carrying with me not only condenser microphones, but also two coils which are capable of transforming electromagnetic fields into sound. We encounter strictly ordered rows of scaffolds holding stripes of solar power panels. The panels form a strip that stretches along the airport runway to the horizon. As a sonic reference to the immense dimension of the power plant, I deliberately record my footsteps, which mostly touch concrete ground, but sometimes tufts of grass. The sound quality of an environment is deemed satisfactory when you can hear both your footsteps and distant sounds clearly.¹ At first glance, what we encounter strongly contrasts with the experience I had at the mine. We are even able to hear birds and insects close-by in the grass. From afar woodpeckers are calling in the woods. Even the rustling sound of the wind in the trees and the grass can be perceived by the ear. My footsteps and the surrounding nature, my moving clothes, some handling noise and distant voices from our workshop group can also be heard. I activate the channels of the coils and suddenly the most present and dominant sound is the static one of the electromagnetic radiation of the power generating solar panels. Walking besides the panels I crossed 37 rows.

On the 08:49 long recording, the magnetic fields of each row can be heard by short interruptions of the drone sound. By listening, recording and making

electromagnetic emissions audible, I have tried to connect to the site of energy production by foregrounding the sonic experience of it.

In 1966 and as a way of giving aesthetic credence to environmental sound, former percussionist and sound artist Max Newhaus invited a handful of friends to join him for a walk through Manhattan, only by listening. Through this act, he and other sound artists, musicians, and researchers asked: What knowledge can be gained about a place and what kind of connection is enabled by foregrounding listening? With such questions in mind, I explored the two places in Lusatia.

The energy transition, I argue, will shift the spectrum of sonic emissions of power extraction to the range of infra- and ultrasound.² I base this observation on multiple field visits to energy infrastructures, not just in Lusatia but across Europe.³ Moreover, it will reach even further beyond the borders of the audible, creating new spaces of electromagnetic contamination. One could speculate that the green energy transition and the infrastructures it generates produce side-effects that aren't graspable within our range of hearing or our sensory capabilities. This means that we have to listen even more carefully than before and that we also need to consider the effects of green energy transitions that are out of hearing and even out of our perceptual range. There will be a need for specific tools to render these infrastructuring processes and future energy-territories tangible. What is more, the production of photovoltaic panels will also create audible effects on the other side of the planet, e.g. through silicon mining in China, Russia or Brazil which most likely produce sound environments similar to the one we experienced in Welzow Süd.



1 Raymund Murray Schafer, *The Soundscape: our sonic environment and the tuning of the world*, 1994, p. 212f.

2 André D. Thess / Philipp Lengsfeld, *Side Effects of wind Energy: Review of Three Topics - Status and Open Questions*, Sustainability, 2022

3 http://christophbrueנגel.com/72-Music/79-Turbulent_Currents

RENATURATION



Cottbuser Ostsee

Orit Halpern

Lusatia's lakeside district is supposedly the largest group of inland lakes in Europe. This landscape is entirely artificial. The lakes are produced through the flooding of former mining areas. The result is a vast deliberately produced landscape touted as a future economic and recreational zone. The plans include fisheries, floating solar parks, windmill farms, recreational sites for swimming and boating, and forests and biodiverse ecosystems. This abundance will emerge from the destroyed and depleted landscapes of coal mining that pervaded the region under the former GDR. From desert to diversity. From scarcity to abundance. From carbon extraction to prosperous sustainability. These are the rhetorics, and imaginaries that infuse contemporary reclamation, or as the German's label it: "renaturation" practices.

These zones thus appear the very apotheosis of a new post-scarcity and post-natural economy. They are also the zones of negotiating structural (post-socialist) and technological (post-industrial economies and post-carbon imaginaries) changes. This landscape thus promoted, for me, a series of ruminations upon how this place mirrors other places in the world, and this zone as a site for remediating and negotiating both geo-political and socio-technical challenges ideas of territory, economy, and nation.

Renaturation arguably could be said to be a new planetary governing logic. I say this because so many of the landscapes we now occupy are clearly human engineered, and many of them must negotiate histories of extraction, contamination, and threats from climate and biodiversity crises. Renaturation appears to be one response. Renaturation, I argue, comes replete with new forms of space, territory, economy, and time. While the landscape appears desolate, the discourse is abundantly positive in the master plans and future images of these former mining sites. The process of renaturation in Lusatia thus provides an interesting mirror image of other techniques and sites—for example Artificial Intelligence, Big Data, Smart Infrastructures, and financial instruments—that all provide more from less. This new vision of plenty, comes with its spatial forms most often identified by smart and green cities like Singapore (also built on reclaimed and renaturated landscapes), Dubai (now being 'greened'), and Hudson Yard, New York (optimized for water, energy, and information management). Closely identified with this new terraforming scale of technological habitats are new types of territories—such as Cottbus Ostsee, and other mega-infrastructures such as Katwijk, Netherlands and the Great Garuda, Indonesia, to name a few. There are also endless new mega structures, airports, and sea walls all constructed on the remnants of environmental degradation through industrial practice scattered throughout the world. This practice follows the global logic of continued extraction of minerals and carbon-based resources. Intense use of data and AI in geological modelling, better forms of recycling and a cyclical economy of waste materials, and increased optimization of material and chemical processes, will allow mines formerly imagined as exhausted to continue to produce growth and wealth indefinitely.¹

Renaturation also has its own temporality. Cyclical but statistical. Things will change, but in recursive cycles. The circular economy grounded in the use of waste materials and heat emissions for new landscapes, energy sources, and architectures as well as fantasies of geoengineering and carbon capture technologies to offset carbon emissions, are imagined to make extraction a resource. To move extraction from simply the removal of materials and taking from a landscape, into a benefit, a productive capacity, a new geoengineering ecology. Carbon energy extraction becomes an additive force rather than a subtractive one for economy and ecology. Ecology and economy are also linked through the Latin and Greek words "oeco" and "oikos", which means household or home, and has now come to mean habitat or environment.

Renaturation thus suggests a longer process by which economic and political questions become naturalized or normative through the literal collapse of the "natural" world with that of economy and technology (if we consider the built environment a technical project).

This brings us back to another term very proximate to renaturation, but not exactly—renaturalization. According to the German government² naturalization and renaturalization are the processes of being granted citizenship or re-granted citizenship in the case of dispossession (primarily for victims of National Socialism who were forcibly stripped of citizenship). This dual language—both renaturalizing and naturalizing people and landscapes—poses some final interesting questions therefore for what other possibilities renaturation as a process might denote. Would adding a "z" help us view these practices of terraforming and artificiality as also deeply political acts of making place for people and more than human life forms, and would it open the discussion away from normative assumptions about what is the best or nicest waterfront, to what types of life are welcomed and made at "home" so to speak? Could the remaking of environments in the wake of economies of extraction also perform new types of naturalization and citizenship making? And for whom? How might the emerging economies of addition and extension be re-imagined into other modes of envisioning cyborg forms of life, and new relations, not only between us and more than human species, but for nations. These are questions that such processes engender, particularly in zones such as Lusatia where histories of post-socialism and German nation building intersect with emerging information and energy economies.

1 Orit Halpern, *Planetary Intelligence*, 2021

2 https://www.bva.bund.de/EN/Services/Citizens/ID-Documents-Law/Citizenship/citizenship_node.html, accessed March 2024

SCENE



Baldeep Kaur

I. Shutter Speed

"If you have a pacemaker, keep a 5m distance."

In a new place, a new research tool could be the most reliable point of orientation. This was my first attempt at fieldwork using a digital camera. It helped me make sense of things, but it also affected my decisions about what to look at, and how. As the group moved from lignite mine to solar farm, the question getting louder inside my head was this: how easily does a place give itself to research? What tool does it respond to more than others?

After the grain of the lignite mine, the clean repeating slopes of the solar farm are a visual shock. This airport/ almost mine/solar system seen from above will be a sea of blue. Zoom out far enough and it could even be a lake with suspiciously clean-cut banks. I walk around, a little afraid, and pick a scene.



II. Samples

At one point in the lignite mine tour, our guide began filling plastic bags with clods of dark earth and giving them away. Take as much as you want, he said, excited and animated in his generosity. I held back and watched, trying to decide what I wanted to do and whether what I would do here should be different from what I would do if I were in Punjab, or on Native Lands. A siren droned somewhere behind me. Later, after the tour ended, I took out a tissue and gave my face and neck a good wipe with it. A yellow-brown residue came away immediately – a sample with my skin cells mixed in, which would yield no empirical data meaningful to any journal, but it gave me the opportunity to reflect on where I was and what was my place within this place.

I checked my phone again for a desperately awaited email. Each time I did this, I replayed the interview in my head, finding better proofs of expertise each time which were useless in retrospect. I had more to learn but I had good ideas and I had hoped to be accepted for my potential. If they give me the job, I thought, I'll ask them to buy me a microscope. For art. I thought about the dust that must have settled inside my nose and throat. I thought about how we were given hard hats but no masks. The tour was above ground the entire time, but the unlikely threat of a bad fall was easier to document for insurance than the long, slow violence of accumulating sediment that may or may not react. In a risk society, everything is evidence. You may not proceed without it.



III. Staging

*'Driving to a different spot. Pines just got taller.
The pile of coal is its own horizon.'*

Does a guided tour qualify as fieldwork? What's the view from the viewing platform? The industry of energy and its adjacent are heavily mechanized and riddled with techno-political intricacies that need some guidance, I suppose. The work of capitalism, after all, is alienation. At the same time, I am not only visiting a few hundred years old mine, but also the land that it yields to. How am I being guided through the (large) foreign context of a small place? If this place has been 'depeopled' by mining, and if I suspend disbelief to allow that claim, what is our role as researchers in 'repeopling' this place? How do we understand the context of these system transitions where people – villagers, engineers, employees, tour guides, researchers – are simply a detail to bargain with or a number to repurpose for other employments? Embedded within the time of the mine, are cycles of university funding, the height of the pines that tell you when mining started/ stopped, the efficient proximity of other resource regimes that will share or withhold resources from the mine depending on where they sit on the energy timeline. In a guided tour, the boundaries of field sites are cleanly marked. The guide, or the researcher's own instinct for when to reach for their camera, will mark the territory of analysis.

¹ "Direct quotes" and 'field notes'

IV. Exposure

'The tour is moving too fast for me to properly observe (myself?). There is a milk bottle making factory. Everyone is talking. I'm here.'



It's strange, feeling lost in a guided tour. Even the bus is a compass; there are instructions on which side has the best view and the switching is fast and fomo-inducing. The mine ticks away, its sweep ever horizontal and it's a struggle to hold all its contours. I try to understand where we are relative to where we were by following the sun, and that's when I see the birds. Falcons, I think, or eagles? My gaze quickly turns from sky to earth from that point on, I am looking for nests or sustenance in the sand and I can't find them. Maybe the birds too live far away and are just visiting. There are no insects, and it makes me sad. But the bus has lurched to a halt – I need to get off and turn objective.



If I am less than a dot relative to the solar system, what am I relative to this second sun in our sky?

V. Can you feel the future?

"In approximately 30 years, no more driving here, only swimming."

I had to chuckle at the thought of post-industrial Europe remaking itself in the image of the tropics. The guide continued the story about how his father went swimming in a rehabilitated mine-turned-lake and the acidity of the water burned his skin raw. But it's only a matter of time, he

said, because the lake is fine to swim in today. What happened to one generation is only part of what the next will/not endure.

Paving over a polluted pond with concrete, or pouring freshwater into a mined basin is fundamentally a textural transition. The public discourse on climate change in the West doesn't say much about how the crisis is felt through texture. June 2013 in Delhi, 40 degrees Celsius, 70% humidity, and the bottoms of my slippers melted as I crossed the street. Two years of reading histories of energy in the United States, in Russia, in Saudi, and then a work of fiction informs me that crude oil burns when it touches skin. At the funeral, I overhear the hushed tones of my grandmothers and learn that when a live wire touches the body of a farmer, it chars the skin and turns it black.

"In 1978, the idea of a lake was already here."



Last day of fieldwork, we are at the Lausitzer Ostsee and our tour is guided by an urban planner who works for the city of Cottbus. The ground is full of pinecones. The lake is not blue. The Spreewald is only 17km away, but the valuation regime of rehabilitation cannot imagine a wetland here, only wet or dry fixed assets. My exhaustion peaks at the inlet where the Spree gushes into the lake. Suddenly this is **ਜਗੋੜੇ ਦਾ ਪੁਲ, ਪੰਜਾਬ** and I am five, only slightly taller than the low brick wall of the bridge I am peering over, watching the water of the canal below me gush through the released lock. Then and now, the smell and sound of redirected water (futures) remains consistent. I see our guide standing off to the side by himself and I realize I have questions. I ask him what he thinks of the project and if he had funding and freedom, what would he do? If you could stop this future and start another, I wanted to know, what would you do?

What would you do?



SOLARCHY



LEAG's Solarpark Welzow III

Jonny Grünsch

Etymology: From Latin solar-, relating to or determined by the sun, and the Greek suffix -archy, denoting a type of rule or government

Definition: Rule over and through solar power

Antonym: Solar anarchy

In response to the social and ecological devastation wreaked by fossil cultures, solarities have been proposed as critical utopian politics for just energy transitions.¹ This politics consists of building worlds of solidarity and care in relation to, and energy derived from, the sun. They aim at disrupting the oppressive power relations of carbon colonialism, petrocapi-talism, or petropatriarchy. Accordingly, the energopolitical² imagination of solarities is anarchist.

In Lusatia, the political reality of the transition from fossil to solar energy looks very different. Mining companies like LEAG secure their local monopoly and global capital by building large-scale solar farms. New start-ups such as Heliathek develop top-secret, high-tech photovoltaic technology to dominate markets worldwide. Opposed to the anarchist promise, these real-existing solar economies entrench hierarchies and create new forms of domination; they embody *archist*³ energopolitics which seek to rule over and through solar power. Defined as such, solarchy adds a conceptual tool for negative critique to the utopian project of solarities. Such critical analysis of solar power relations yields two insights about energy transitions in Lusatia and beyond.

1) Building fences around sunlight

On the one hand, solarchy means ruling *over* solar power. In Lusatia, this is achieved by capitalizing on unfair advantages such as enclosing and controlling commons. At its core, solar power is simple: besides sunlight only a receiving technology (e.g. photovoltaic panel) as well as space for this receiver are needed. While sunlight in principle is universally and infinitely available, space and receiving technology are not. For instance, LEAG was able to set-up large scale solar farms, because it owns a lot of “low-conflict” real-estate, “a goldmine” as a company official told us. The first picture shows one of these low-conflict areas, an old military airport that LEAG’s legal predecessor appropriated through the underburdened lignite in the GDR. Similarly, Heliathek started as a publicly funded research project at TU Dresden, but then turned into a private company, owned by big corporations. Its low-weight, flexible, and organic photovoltaic technology, HeliaSol®, is protected by patents, the high-levels of expertise required, and last but not least secrecy: company policy prohibits taking pictures of the “magic” machines or even looking at it from up close. Solarchy is exercised by setting material and intellectual fences around the commons necessary for solar energy.

2) Sunshine out of their arse

Solarchy also means rules *through* solar power for instance by legitimizing domination. Because transitions from fossil to renewable energy are political imperatives, those who drive it or even appear to comply with it gain moral legitimacy. Owning a lot of land not only enables LEAG to build solar parks, but building solar parks also legitimizes that LEAG owns a lot of land. As shown on the second picture, Heliathek markets HeliaSol® not as more efficient (because it is not) but as more ubiquitously applicable than conventional photovoltaic panels. This has made HeliaSol® popular with large companies who can show off sustainability on the facades of their buildings, even though many continue extractive or polluting practices. Here, solarchy is achieved by shading this underburden and making these extractive and polluting companies appear as if sun shines out their arse.

INDEPENDENT.
GREEN.
FUTURE.

Limitless Clean & Green Electricity Everywhere



e-on ENGIE SAMSUNG BASF Loop

Screenshot of Heliatek's website

Unshading solar power; anarchizing energy transition

Maybe power and domination cannot be avoided in energy transition; maybe climate urgency requires or even justifies some solarchy. However, taking this as an affirmation of power or domination *tout court* amounts to saying that climate change mitigation is futile because some climate change is inevitable. If power is inevitable, we would do well not to hide it, but acknowledge and limit it as much as possible. As a critical term solarchy turns the spotlight on power, questions the legitimacy of hierarchies and calls for mitigating domination.

Solarchy critique also sharpens the positive, anarchist vision for solar power and energy transitions. The problems of controlling the commons in Lusatia is the mirror image of the anarchist cultural imagination for example embodied in solarpunk:

“A solarpunk ‘economy of the commons’ would dispense with both profiteering corporations and statist central planning in favour of worker-run cooperatives, collaborative exchange networks, common pool resources, and control of investment by local communities.”⁴

Anarchizing solar energy would mean to decentralize and recomunize the means of their production. Moreover, anarchism contributes to the debate about the cultural imagination around the infinity of the sun. Is infinite energy to be embraced as

overcoming scarcity in capitalist economies or to be resisted because it strengthens the imperative of limitless growth and productivity? An anarchist answer is to embrace post-scarcity abundance but resist the imperative to use it.

Finally, instead of a rigid form of political organization or static social theory, anarchism is best understood as an “ethical discourse about revolutionary practice”.⁵ This understanding benefits energy transitions by shifting the attention from future-oriented outcomes to present practice and process; from where we are going (renewable energy), to the question of how are going to get there. The main dialectical purpose of the term solarchy is to provoke creative, anarchic thinking (#Masterplan B) about this transitioning rather than succumb to the banal futures of capitalist realism or climate cynicism.

1 After Oil Collective, *Solarities*, 2022

2 Dominic Boyer, *Energopolitics*, 2019

3 Urusula Le Guin, *The Dispossessed*, 1998

4 <https://solarpunkanarchists.com/2016/05/27/what-is-solarpunk/>

5 David Graeber, *Fragments of an Anarchist Anthropology*, 2004

TREE TIME



Thiago Pinto Barbosa

“This is a 17-million-year old tree!”, says the guide at the lignite mine, handing us a small darkened piece of bark that he had disentangled from a large chunk of brown coal, found in a pit at the Welzow Süd open-cast mine. Lignite or brown coal is essentially the product of millions of years of accumulated peat. In Lusatia, lignite was formed between 5 and 25 million years ago along the geological line of an ice age glacier that melted down and compressed decaying organic matter. Back then, mushrooms hadn’t yet evolved to decompose organic materials as efficiently as they do now. In this geological timeframe lignite was formed.¹

I am moved by the deep temporality implied in what was once a tree and is now in my hand. The guide tells me I can take it home and hands me a plastic bag. “Leave it in this bag or put it in a glass jar, otherwise you will get dust everywhere”, he tells us, his face already showing dark spots of dust. How long will that piece of wood resist the workings of time? Will it succeed the decomposition of the plastic bag that wraps it, estimated to 1000 years? And what did that tree look like?

With the plastic bag in my hand, I watch how the machines—tractors and a monstrosly huge excavator—prepare the ground for the lignite extraction. It eats and spits out large chunks of overburden, breaking it in sand and stones that are then further processed and distributed by the two tractors. One of the tractors piles up slices of a grey, hard-looking material. I ask of what kind of stone that is. “Pieces of a house”, the guide tells me quietly. They will be removed later. What decades ago was a village and housed a community, is now a pile of bothersome material, revealing the not-so-deep history of the giant hole.

~

The large beech tree offers a shade that makes a popular picnic spot, Edith Penk tells us. The impressive size of its trunk indicates that it might be 500 years old. In a documentary about the displacement of sorbian communities and devastation of Lusatian landscapes because of the mining industry², the Sorbian activist picks up the so called ‘tree-guestbook’ that is kept in a glass jar placed by the roots. Picnickers, passers-by, wanderers, and dwellers leave a message—sometimes an ode to the tree or a small description of their joyful day, and sometimes an angry plea against its death sentence. After hugging the beech (her open arms not even

covering one side of the large tree trunk), Edith places a new, blank guestbook inside the glass and takes the filled guestbook home, where she stores several other older guestbooks with messages to the beech.

“The beech tree is gone. They must have done it overnight, next day there was nothing there”, she leaves an audio message to the film directors. 500 years gone overnight. That tree was symbol for Edith’s and her comrades’ activism against the expansion of lignite mines in Lusatia.

Trees—these immobile, tall, and vigorous living beings—give a sense of memory and temporal stability to a place that is threatened to be rapidly and radically transformed, made into to a space of and for machines that dig. In the resettlement of Neu Mühlrose/Miloraz—the latest of 137 villages swallowed by the lignite mine, and perhaps the final one before the coal phase-out—a large, dry tree-trunk was placed onto the new main square. Perhaps it reminds the dwellers of a once-living tree in their old home-village just 7km away. Or perhaps its deadness—visible and incontestable—reminds them of their displacement, a remnant of a long history of coal extractivism that will soon be in the past.

1 David Bielo, *White Rot Fungi Slowed Coal Formation*, Scientific American, 2012; However, this hypothesis has been debated, see Matthew P. Nielsen et al., *Delayed fungal evolution did not cause the Paleozoic peak in coal production*, Proceedings of the National Academy of Sciences, 2016

2 *Blaubeeren - cerne jagody*, short film by Maja Nagel and Julius Günzel, 2013



TURNING POINT



Sophie Hou

"This is the turning point," said the guide as we toured the Welzow Süd mine, pointing to a specific spot on the map. From 2012 onwards, the mine's expansion changed direction, and a new section was brought into production. The "turning point" is therefore both a very precise point on the map and in space, associated with a particular temporality : a new area will be mined over the following years, according to a well-defined schedule. It's a point of reference in space and at the same time a point of reference in time. The mine is a spatio-temporal object in its own right, with its own constraints and stages of exploitation, its own history and geography. It swallows the earth and drinks its water at its own relentless pace, spiraling outwards like a boa, which absorbs masses of soil into its swollen stomach, then spits them out and turns in another direction to continue its trajectory. The expression "turning point" caught my attention because it resonates with an expression commonly used to talk about the energy transition. As the energy transition is a process, it too involves successive stages, and breaks. In its broadest sense, it involves making changes to energy sources and consumption, and reducing greenhouse gas emissions. It implies profound changes in the political, technical, economic and social spheres. However, the turning point associated with mining, as referred to by the guide, is not so much a new inflection as a cyclical continuation of the same process. In the image of the snake, the mine slithers a little further into the earth, and reproduces its sand consumption and discharges.

Just after leaving the lignite mine, we visited Welzow III solar park. The contrast between these two energy production sites is striking! With its photovoltaic panels spread out in tidy rows, the space communicates uniformity, immobility and technological coolness, far from the image of the ground-eating beast of the mine. Here, there's no bustling machinery, no flow of sand and coal, nothing is moving. While the mine's machinery produces the occasional clatter and creak, the constant crackle of the inverter mingles with birdsong. The solar panels spread out and cover the land, but don't interact with the ground. Their materiality is totally foreign to the immediate environment. There is no relationship with the surrounding. The photovoltaic field may expand, but at its scale, it has no center of gravity, no turning point. The materials it needs are from the bowels of another beast, on the other side of the world.

The spatial and temporal nature of the turning point doesn't just apply to mining. The energy transition brings with it deadlines and benchmarks, objectives to be achieved over the next few years. These temporal deadlines are closely associated with spatial evolutions: the territories of an energy system based on renewables are not the same as those of fossil fuels. Thinking in terms of the energy transition means thinking about these territories in the making and the new spaces that will be consumed into the belly of the snake. A different snake than the one from the the mine, with a different, perhaps more complex shape.

UNTERBURDEN



Jona Möller & Karolina Zizkova

un | der | bur | den

/ˈʌndə(r)bʊɹdn/

↔ overburden

noun

1 mining: The material that lies below an area that lends itself to economical exploitation

- *Geological surveys revealed that the underburden of the lignite deposit consists partly of pyrite sands.*
- *The underburden was influenced by lowering the groundwater table on a regional scale since the late 1950's.*

2 geology: Something that gets mobilized due to the relocation of another material, relational concept that links resources with the surrounding materialities

- *By removing the material above the coal deposits (→ overburden), the minerals of the underburden are exposed to oxygen, releasing acid mine drainage after the mining operation.*
- *The underburden, together with the overburden and sideburden, defines the boundary conditions for the production of a 'natural resource'.*

3 materiality: Insufficient burden of rock in relation to external inputs (e.g. explosive charge, groundwater rise)

- *Due to the underburden of the explosives, the rock has blown-out prematurely, yielding less than expected.*
- *The underburden consists of unstable layers of sands that repeatedly cause landslides in areas affected by changing groundwater levels.*

4 environmental economics: Externalized costs that allow a resource deposit to become economically viable

- *Lusatia's lignite mines present an economically viable ratio of coal vs. overburden of around 1:6, only by excluding the underburden 'X': 1:6:X.*

5 the supernatural: Underground object of value assigned by the currently dominant economic and political paradigm

- *The Sorbian saying "Gott hat die Lausitz geschaffen, aber der Teufel die Kohle darunter", which translates to "God created Lusatia, but the devil put the coal underneath it", addresses the local underburden by referring to the trope of a 'resource curse'.*

6 ontology: (Implicit) assumption leading to further perpetuation

- *The underburden of the area's past makes this the perfect spot for a vast lake with an energy park on top.*
- *Underburden is sometimes used to highlight the notion of a doomed post-mining landscape, irrelevant to other uses or actors, which perpetuates extractive relationships with land and is often driven by restoration efforts focused on accumulation.*

verb

1 labor: To assign less work than someone or something is capable of

- *The boss has underburdened the team with responsibilities, leaving it feeling unfulfilled, as they wanted to devote themselves to more significant tasks.*
- *My job does not underburden me at all, I feel busy and constantly overloaded.*

2 justice: To carry unequal shares of responsibility both on local as well as global level

- *Relocating business to Cyprus or Luxemburg underburdens companies from the windfall taxes.*

WASHING AWAY



Corinna Studier

I wanted to say something, but it became blurry. "Do you remember what we were doing between visiting the tower and having lunch?" I asked him. He thought for a moment, then shook his head. Nothing - blank - the memory of a moment just an hour ago was gone, for both of us. I wondered why it had slipped away. In front of us was the view of the large lake that we had been visiting for a few hours. Was it our fuzzy group brain, where conversations, thoughts, and stories melting into each other? Were we just overwhelmed? Or was the scene just too - too mundane? Too slick? Our thoughts just sliding away with nothing to grasp onto?

We knew that swallowed by the water, underneath the smooth surface lies the gigantic crater of a coal mine. I tried hard to overlay my memories of the mine and the view in front of me. Just like putting two old slides on top of each other and holding them up to the light. "You're an architect, it's your job to imagine spaces," I told myself. It didn't work.

"Where we're driving right now, you can swim in twenty years," our tour guide in the bus was explaining the coal mine, two days ago. I saw bushes and pipes and was curious to drive deeper into the layers of soil. I understood everything clearly. But the images of sand, water, villages, trees, and so-called landscapes that had to move and had be removed were, slipping into each other without making sense.

In front of us, the lake: Swallowed by the watery smooth surface, lies the gigantic topography, the relief that was carved by circling machines. Washed away is the rough sand, the rusty pipes, the dirty coal, and hopefully with that one's own past. The offer is tempting: The lake swallows, and for the silent acceptance, there is endless vacation at the good old Ostsee for the tired worker. As smooth as the lake, so smooth will become the cycle paths (psychopaths), for rolling without resistance and without disturbance, where nothing sticks, no thought nor emotion, for eternal forgetting. The circles of the machine turning into circles around the lake into circles of the earth around the sun. For eternal energy provided by eternal sun beams hitting a clear and clean surface - once again. The water blue panels providing green energy just as green as the trees and leaves planted behind fences. Which just again keep inside what belongs inside and outside what's supposed to be outside. Everywhere slick, slippery, smooth surfaces that don't give hold to any thought, which don't disrupt and don't disturb - made in Germany.

The concept seems clear - another time another system. Everyone is nodding, looking at the plan, looking back to the lake, searching for the mine, but the memory already slips away.

SANDSMAKING

Just now, somebody said movement is life.
Can movement also be oblivion?
Movement, rhythm, reassurance, control.
Keeping busy, keeping productive,
we didn't lose, we aren't losers.
"Just a little bit more digging, please.
I'm closing it up, nobody will *eeever* notice!"
(What a good boy)

"When East and West were not together,"
- how he said it in broken English -
the mine was the materialization
of the holy pray on productivity:
the plan and the planning; the worker, the hero,
the pride, "das Proletariat":
"Dynamo", "Energie" forward into the future,
never *ever* into the past.
(State blesses you. Amen)

The mine was still there when
"East and West *came* together."
Much had to be forgotten, obscured, suppressed,
but the huge hole nobody could deny.
The hole was good, it was keeping busy.
Neatly planned, almost designed, shifting sand,
shifting it again, a sand making sense without thinking.
Coal up in the air - I don't care.

The movement, the machine, the man,
the flow of energy - was worth of something
(especially for somebody else)
still a tiny piece of the disrupted prayer:
into the future, but *never ever* into the past.



WELCOME TO ~~LAKE COMO~~ LAKOMA

The future master plan

Cottbus / Chósebus will become a lakeside city

An artificial landscape

developed with the future in mind.

the core open-cast mining,

should be landscaped

highly attractive landscape modelling,

kite surfers

for surfers and beach-goers,

perfect for bathers

The current industrial mining zone

is to be expanded into a

south-facing beach in the bay

a progressive use of resources.

innovative

surface design.

open-cast lignite mine

It is also the surf spot on the lake.

the optimal conditions

new ways of thinking and perspectives

The theme park encompasses a summer toboggan run

landscape destruction

Bethany Copsey

An alternate universe where there was a desire for a lake so strong that an entire industry was built around removing the coal layers, which was determined to be the simplest way to create a depression in the land big enough to accommodate the new lake and all of the numerous recreation activities that come along with it (kite surfing, bathing, cycling, surfing).

**What do you do
when you want to
create a huge lake?**

Simply remove all of the coal under the surface of the earth and put it somewhere else big enough to contain it (e.g., the atmosphere).

This idea is a response to the way the future visions are laid out in the brochure. The Cottbuser Ostsee project is projected in such a positive and idyllic manner that it seems as though it couldn't just be the back up plan, the clean-up job, the remediation strategy, or one of very limited options available to land that has borne such immense extraction. Instead, the plans describe a project that appears to be the fulfilment of a long-desired wish to have a recreational lake on this site. In this alternate world, the mining of coal is not the cause of the depression in the land but rather the means.

BIONOTES

Alex Hok-nang Tam is an independent curator and researcher in the field of contemporary art and heritage with a focus on social and environmental sustainability. He is currently undertaking a research project on artists' engagement with ecological restoration of post-mining landscapes, which delves into the concept of the Anthropocene, post-extractivism, and its implications for aesthetics.

Anja Thomas is a Masters student on the program Literature and Culture in Societal Change at TU Dresden. She graduated from Martin-Luther-University in Halle/Saale with a Bachelor of Arts in the subjects Intercultural European and American Studies, as well as Political Science. She lives in Leipzig, which is part of the Central German lignite mining area.

Baldeep Kaur is a doctoral candidate in the DFG-funded RTG 'minor cosmopolitanisms' at the University of Potsdam. They study how colonialism is repaired and maintained during phases of large-scale global transitions. Alongside their thesis, a longer-term project is to imagine velocities of academic work that nourish slow work and protect slow workers. Identifying speed as not only a property of work but a dimension that determines the work/er, they try to realize methods that anticipate failure and exhaustion.

Bethany Copsey is an MA student in Planetary Poetics at the Sandberg Institute in Amsterdam. With a background in soil science, she takes an interdisciplinary approach to ecological questions, particularly around soils and wetlands. She is a co-founder and member of RE-PEAT, which works to bring more awareness and appreciation to peatlands, with the understanding that this lays the foundation for greater restoration and conservation of peatlands in a way that centers ecological and social justice.

Christoph Brünggel is a transdisciplinary artist whose work spans across electronic music, sound art and visual art. He is interested in the fragility and instability as well as the ecology and the complex entanglements of the human and non-human world. His practice is strongly rooted in fieldwork, using on-site experiences and sensory knowledge as

catalysts for artistic work and reflection. He strives to explore forms of artistic mediation of specific, mostly socially ignored or unwanted places to raise awareness of their existence.

Corinna Studier (she/her) works at the intersection of architecture, urbanism, research, and art. She co-initiated "spätispäti," a collective that questions institutional learning structures and neoliberal space production through collective performative action and situated interventions. Between 2019 and 2023, she co-founded the planning office ARGE:. She has collaborated with organizations such as Floating University, Raumlabor Berlin, and Bauhaus Earth. Additionally, she is engaged in the initiative "An.ders Urania" against demolition. In 2024, she will teach at HCU in Hamburg. During the same year, she will develop an artistic research project aimed at depicting the complexity of a post-socialist peatland landscape through spatial and artistic methods, creating space for resonance.

David Bauer is a research associate at the Habitat Unit, Institute of Architecture at the Technical University of Berlin. The Habitat Unit is a globally networked research and teaching centre that develops new approaches, expertise and application-oriented tools relevant to global urbanisation and urban change processes. David focuses on urban studies and urban design with a strong focus on infrastructure and system design as a critical lever for the transformation towards sustainability and resilience. The methods practised emphasise a robust analytical approach to capture the multi-scalar complexity of contemporary urban-rural constellations.

Jenny Neubig trained as an architect at the Technical University of Dresden and the University of Strathclyde Glasgow. She works between architecture, urban planning, art and research and has collaborated with architecture firms and artist collectives in Berlin and Vienna. Together with Maura Schmitt, she founded the collective Lostandfound, which explores themes and ideas of the circular economy, urban metabolism and the transformation of lost places. Since the winter semester 2023/24 she has been a research assistant at the Chair of Housing and Design, Studio Löserlott at the TU Dresden.

Johanna Mehl (she/her) is a PhD candidate in cultural studies and design history at TU Dresden, where she holds a Saxon State fellowship and a research associate position at the Chair for Digital Cultures. As a scholar, designer, and educator she is interested in design as a knowledge culture and its entanglements with environmental history, cybernetics, systems theory, and media theory. Besides her artistic and curatorial practice, she has taught in the fields of digital media, culture studies, and design theory and history at various design schools across Europe.

Jona Möller (he/him) graduated in Landscape Architecture at Technical University Berlin, where he is currently working in the intersections between the fields of political ecology, STS and urbanism. For his Master's thesis work in Urban Design, he is investigating how water infrastructures connected to lignite mining are being transitioned into 'sustainable futures' through multispecies enviroing work. He gets excited when interdisciplinarity is at work, especially between the arts, design and the humanities. Jona co-founded the multidisciplinary research group *Kontaminiert Werden*, which collaboratively explores human-plant relationships in urban contexts.

Jonny Grünsch is a PhD candidate at the institute of social and cultural anthropology of the University of Halle and part of the *marie-curie* doctoral network C-URGE. He conducts activist research on justice in social-ecological transformation in the central German coal district. Through this research activism he is increasingly infuriated by the political landscape in Germany and transforming into a reluctant anarchist.

Jorrit Smit (he/him) is a Brussels-based STS researcher with a background in physical chemistry, philosophy and history of science. He is part of the Belgian *More than Enough* campaign and called for a more activist STS practice. Jorrit holds postdoctoral positions at Leiden University (CWTS), Rathenau Instituut and Vrije Universiteit Brussel (LSTS), where he studies how scientific practices are and have been shaped by techno-economic imaginaries of the energy transition and relations to fossil industries. An adjacent film project with *Naimé Perrette* deals with the ways in which hydrogen is reshaping energy, knowledge and land relations.

Juliana Lux (she/her) is currently working as a research fellow in Marburg, where she is thinking about industrial water and takes it to look at

postindustrial entanglements for her PhD research. She has studied her Bachelors in Cultural Research and Politics in Bremen and received her M.Sc. in Cultural Anthropology at Utrecht University.

Karolina Zizkova (she/her) is a PhD student at the Department of Environmental Studies, Masaryk University, and a junior researcher at the Institute of Sociology of the Czech Academy of Sciences. As an environmental anthropologist, she is interested in mining and land use topics from ecological economics and political ecology perspectives. She collaborates with the *Hraničář* Gallery on projects connecting artistic research and environmental issues, such as lithium mining and land recultivation.

Kristiane Fehrs (she/her) is a research assistant at the chair of Micro-Sociology and techno-social Interaction (Institute of Sociology) at Technische Universität Dresden since April 2023. Currently she is developing an ethnographic research project that deals with energy transition and the emergence of hydrogen infrastructures in former brown coal regions in Saxony. She studied at the Institute for European Ethnology at Humboldt University Berlin (M.A.) and 'Metropolitan Culture' (B.A.) at HafenCity University in Hamburg.

May Ee Wong is a postdoctoral researcher in the "Design and Aesthetics for Environmental Data" project at Aarhus University. Her current research examines the cultural politics of the planetary environmental transition through 'the island' as a key trope of renewable energy landscapes. She has contributed to *Climates: Architecture and the Planetary Imaginary* (2016) and *Words of Weather: A Glossary* (2022). She is also a member of the Singapore chapter of the International Association of Art Critics (AICA). <http://www.mayee Wong.com>.

Michaela Büsse is a postdoctoral researcher at Technische Universität Dresden at the Chair of Digital Cultures and as Interdisciplinary Navigator at the Department for Speculative Transformation responsible for the development of interdisciplinary research projects in the humanities and social science. In her research she focuses on sociomaterial transformations in the context of speculative urbanism, climate change mitigation, and energy transition. Drawing on environmental anthropology and feminist science and technology studies, she investigates how design practices and technologies govern environments and define who and what is being rendered inhuman.

Nadia Christidi is a PhD candidate in History, Anthropology, and Science, Technology, and Society at MIT and an arts practitioner. Her research explores how the future of water is being imagined and prepared for in cities facing water supply challenges, which are intensifying with climate change. Working at the intersection of art, research, and public pedagogy, Nadia has presented work and public programs at Beirut Art Center, SALT Galata, Kunsthaus Hamburg, Jameel Arts Centre, and Ocean Space. Nadia is currently a fellow with the Swiss National Science Foundation-funded project *Governing Through Design*, and was previously a TBA-21 Academy Ocean Fellow, a Jameel Water and Food Systems Lab Fellow, and an Art Jameel Arts Research and Writing Resident.

Naïmé Perrette (she/her) is a visual artist and filmmaker based in Brussels. She holds a Master in Cinema Animation from ENSAD (Paris) and was resident at Rijksakademie van Beeldende Kunsten in Amsterdam (2014-2015). She uses video, sculpture, installation and image to engage with the role of labor in identity construction and with the way societies map, consider and act on their territories. Her recent film *Both Ears to the Ground* focused on rupture points between mineral sedimentation, industrial extraction and daily life in an Ural mining town endangered by sinkholes. The collaborative project with Jorrit Smit will inquire about similar dynamics surrounding the hydrogen hype.

Oli Singh is a Masters student on the program Literature and Culture in Social Change at TU Dresden. He studied for a Bachelors in German, French, and Dutch at the University of Sheffield in England and subsequently spent four years living with his husband in Meanjin/Brisbane, Australia. They now live together in Leipzig.

Orit Halpern is Full Professor and Chair of Digital Cultures at Technische Universität Dresden. Her work bridges the histories of science, computing, and cybernetics with design. She completed her Ph.D. at Harvard. She has held numerous visiting scholar positions including at the Max Planck Institute for the History of Science in Berlin, IKKM Weimar, and at Duke University. She has also published widely in many venues including *Critical Inquiry*, *Grey Room*, and *Journal of Visual Culture*, and *E-Flux*. Her first book *Beautiful Data: A History of Vision and Reason* (Duke UP 2015) investigates histories of big data, design, and governmentality. Her newest book with Robert Mitchell (MIT Press

January 2023) is titled the *Smartness Mandate*. The book is a genealogy of our current obsession with smart technologies and artificial intelligence.

Sophie Hou is a lecturer in geography at the University of Paris 1 Panthéon Sorbonne (Paris, France). Her research work has been about energy in Russia, more precisely about the development of the natural gas networks in the Eastern regions of Russia. She is currently studying energy transition issues in Norway.

Taylor Mitchell is an incoming Ph.D. student in anthropology at Columbia University. Her research on neoliberalism and narrative has been published in *Cultural Politics* and she recently co-produced the online exhibition 'enduring environments' as part of the Australian Environments on Screen research project. She currently lives on unceded Wurundjeri Woi Wurrung land (Melbourne, Australia).

Thiago Pinto Barbosa is an anthropologist based in Berlin and a post-doc researcher and lecturer at the University of Leipzig. Thiago is interested in questions of science and power, especially in relation to categorizations of human diversity, social inequalities, memory, and the environment. Thiago studied anthropology and social sciences in Brazil, India, and Germany and obtained a PhD in social and cultural anthropology at the University of Bayreuth. Thiago's dissertation analysed how racializing theories and methods circulated from Germany to India. In Bayreuth, Thiago is also a member of the research group Anthropology of Global Inequalities.

The Energy Transition Inventory proposes new provocative and productive terms, places, narratives, sensations, and objects that help us investigate and imagine the energy transition in Lusatia.