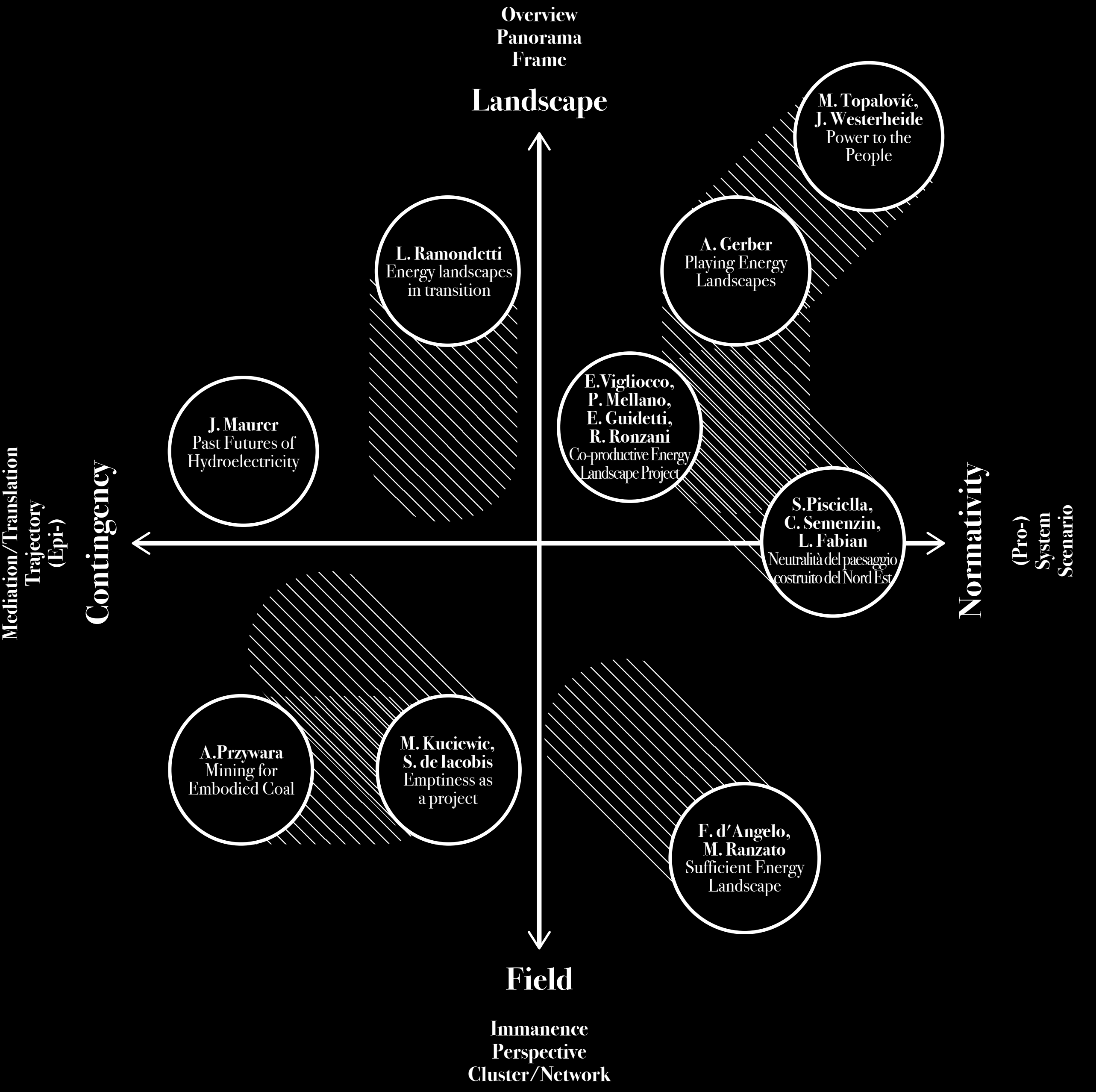
Cover image
Romande Energie's demonstration floating solar park on Lac des Toules.

Ardeth #13 contents


Overview
Panorama
Frame
Landscape
M. Topalović,
J. Westerheide
Power to the People
L. Ramondetti
Energy landscapes in transition
A. Gerber
Playing Energy Landscapes
E.Vigliocco,
P. Mellano,
E. Guidetti,
R. Ronzani
Co-productive Energy Landscape Project
J. Maurer
Past Futures of Hydroelectricity
Mediation/Translation
Trajectory
(Epi-)
Contingency
S.Pisciella,
C. Semenzin,
L. Fabian
Neutralità del paesaggio costruito del Nord Est
Normativity
(Pro-)
System
Scenario
A.Przywara
Mining for Embodied Coal
M. Kuciewic,
S. de Iacobis
Emptiness as a project
F. d'Angelo,
M. Ranzato
Sufficient Energy Landscape
Field
Immanence
Perspective
Cluster/Network

From Prometheus to Epimetheus
Da Prometeo a Epimeteo

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In a recent pamphlet, Peter Sloterdijk (2024) revisited the concept of "Promethean shame" originally developed during the Cold War by Günther Anders (1956). In Sloterdijk's updated version, Prometheus experiences not only shame for having exposed humanity to the *risk* of atomic war but also deep remorse for having *actually caused* a catastrophe: the relentless burning of underground forests, which depletes energy resources and accelerates global warming. In Sloterdijk's view, Prometheus' naïve generosity leads to remorse when the gift, once in the hands of the recipient, grows out of proportion. What was meant as a remedy for powerlessness transforms into a force of harm, far exceeding the initial disadvantages it was intended to address.

More precisely, what we are witnessing is a reversal: Prometheus, the forward-looking Titan, is forced to confront the past. His project-driven outlook is flipped backward and, like Benjamin's angel of history, he watches a pile of debris rising to the sky before his eyes. In essence, Prometheus, the *forethought*, transforms into his twin brother Epimetheus, the *afterthought*. The afterthought of Epimetheus is the

compelling repent that begins as soon as he opens Pandora's box (for more on this interpretation that exonerates Pandora, see, for example, Giulio Bonasone's engraving from the early 1500s.)

This brings out a particular relationship between past and future, as well as between history and project – one that also characterizes many contributions in this issue of "Ardeth". This is evident from the very first pages of the *Conversation* between **Sascha Roesler** and his interlocutors, **Kim Forster** and **Elke Beyer**, where they explicitly discuss the "effort to define the concept of 'energy landscape' from a perspective that is both historical and future-oriented." In line with this approach, in this introductory comment we explore whether and how a historical lens might offer insights into the future from a transdisciplinary perspective. Perhaps the reversal of Prometheus can indeed open up new ways of thinking about architectural design. We will return to this point later, but not before addressing some key questions.

The *problem* (as we shall call it) of energy landscapes is vast but not indeterminate: the looming environmental collapse is closely tied to how we design spatial transformations across all scales. This connection operates in two directions: from the climate and energy crisis to space construction and, conversely, from the design of the built environment to its effects on climate, energy resources, and the environment. Architectural design, therefore, presents both a challenge and an opportunity – one that we mus find a way to address.

In this issue, the curators have asked contributors, sometimes provocatively, to answer four important, radical, and in some ways almost *unattainable* questions, as they often presuppose a level of agency that seems beyond the reach of architects and urban planners. The four questions from the original call for papers have been revisited, albeit in a different order, in the editorial (with one notable change: "spaces of cohabitation" has become "relational landscapes"). This has resulted in the identification of four key thematic areas: the *spatio-temporal frameworks* of energy transition processes; the *net-zero criteria* for guiding the transition of cities; the *relational landscapes* that facilitate the integration of "political, infrastructural, social, and natural conditions"; and the *energy hinterlands* required for redistributing resources and energy production.

In light of the responses provided by the articles, we feel that there is another overarching question to be answered: *what entity, and at what level of authority, is truly capable of implementing these actions?* Who, for instance, would have the power to establish new connections and synergies for energy redistribution in a world riddled with severe geopolitical disruptions? Admittedly, to take a less rigid view, these goals do fall under the strategic aims of the European Union, as outlined in reports such as "The Future of European Competitiveness" (September 2024). Yet, this remains more of a guideline than a concrete policy. It's doubtful whether even individual sovereign states – mentioned in the *Conversation* – possess the necessary authority to drive such changes. So, what role can ar-

chitects and urban planners play? Can we define an active role for design and planning disciplines in tackling the energy crisis, considering that they operate on *local* transformations while the crisis itself is profoundly *global* in scale?

We can adopt two guiding approaches to navigate the *problem*, which will at least allow us to critically evaluate the outcomes presented in this issue. The first approach relates to the perspective from which energy landscapes are viewed. The term *landscape* carries numerous implications within this discourse, some of which are partially made explicit. In the editorial, the editors reference Burckhardt's "Why Is Landscape Beautiful?" and, in the *Conversation*, **Kim Forster** quotes the same author, noting that "Landscape" is a cultural concept with a wide variety of representations and perceptions that are increasingly being understood through an urban lens." One could also add, again citing Burckhardt, that the meaning of landscape "is to be found'in the mind's eye of those doing the looking" (Burckhardt, 2012: 133-34). The *scape/skopé/skopos* of the *land-scape* inevitably shapes the position from which the discourse is articulated – a position that is external to the object of the discourse itself. In line with this perspective, as mentioned, one of the key themes identified concerns the *spatio-temporal frameworks* through which the problem itself can be viewed as a landscape. The critical question that arises here is whether it is possible to reconcile this landscape outlook with a transformative project aimed at reintegrating and rebalancing a whole in the midst of energy dissipation and material degradation. This whole, however, does not present itself as an external object that can be neatly framed and observed from a distance; rather, it is an enveloping entity, a *hyperobject* (Morton, 2018), from which there is no way out.

In this context, it is worth recalling the series of epistemological critiques Bruno Latour has often directed at this scope-focused drive of the "moderns," introducing widely-embraced concepts like the "Oligopticon" (Latour, 2005) and, more recently, the "Critical Zone" (Latour, 2020). The Oligopticon suggests a shift in the observer's position – from a panoramic viewpoint that claims to synthesize *everything*, to an immersive, contingent position where one can see *some things* clearly, but only step by step, through trial and error. In the case of the Critical Zone, the structure of vision directly relates to the climate problem, proposing a topological reversal whereby the Earth's space is no longer a sphere open to infinity but a narrow membrane within which we are condemned to live (or die) without any possibility of escape: "the thin skin of the living Earth." Applying this somewhat claustrophobic perspective to our Problem, what would "energy landscapes" become? Are we still capable of *looking out* from a vantage point that affords a global view of these issues, or must we resign ourselves to addressing them in a contingent and fragmentary manner?

To begin with, we could attempt to place the concept of landscape in tension with other terms, such as "zone" (following Latour), or, within the

domain of urban design and architecture, revive Nicholaas John Habraken's notion of "field." For Habraken, a field is not merely the surrounding context of an architectural object, but rather the extension of dynamic interdependencies that architects should engage with, without claiming full authorship over them:

> The constant interaction between living and inert matter lends fields an organic quality and makes it impossible to separate inhabitation from intervention. In the connection between life and its physical shelter, there exists a continuum from an individual pulling a chair closer to the table to a town council deciding to expand the urban fabric. Fields are too encompassing, too durable and too complex to be simply considered artifacts produced by us. (Habraken, 2005: 36)

Habraken's field is social, material, organic, technological, and processual. Its multidimensionality makes it too complex to be fully comprehended or captured by any single project. Still, "for several generations, architects fervently believed that fields could be not only designed, but invented, and that the quality and the very perpetuation of fields depended on the design professions" (Ibid: 37). Habraken himself, with his theory of supports, sought to rethink and "invent" the new city (Habraken, 1974). If the notion of field retains relevance today, particularly in relation to our Problem, it is because it encapsulates a long-standing reflection – one that Habraken, over decades, tried to implement, ultimately confronting the limitations of his role as an architect and urban planner.

After exploring the shift from landscapes to fields, we thus arrive at the second distinction we aim to trace in this counter-reading: defining the *form of design project* through which we intend to engage with the problem. In the contributions to this issue, references to planning, urban design, and architectural design are interwoven. The question of planning resurfaces repeatedly – starting from the editorial, which quotes Burckhardt: "planning must be understood as a paradox, as it seeks to define a non-finite future state." The limitations of modern planning – systemic, vertical, authoritative, etc. – are well recognized. It would be easy to associate this *modus operandi* with the panoptic perspective we just discussed.

The discipline of planning itself has critiqued its own limitations, often from within. For instance, Robert Beauregard's *Planning Matter* (2015) draws on Latour to reconceptualize urbanism as a set of material and situated practices – "crafting good ideas by gathering people, knowledge, and material things (Ibid., p. 9)." Yet, even within this perspective, which Beauregard defines as "(new) materialist, critically realist, morally engaged, politically progressive, and pragmatic," the profession of urban planning remains explicitly anchored to the normativity of its discourse. As he puts it, "planning is always political. And since it is political, it is also normative (Ibid., pp. 10-11)." In contrast, the practices of architec-

tural design are often seen largely subordinate to external directives. For example, in Beauregard's text, architects are frequently depicted as responding to a client or developer, or working in tandem with a lawyer – again, hired by the client.

To sketch a different yet compatible version of the modernist genealogy of this division of labor, we can return to Habraken and his foundational essay *Supports*, where he draws a paradigmatic distinction between architects and planners. Writing in 1962, Habraken was polemically critiquing the mass housing system, which, in his view, was collapsing the roles of architects and urban planners into one blurry profession focused on mere organization and technical execution – in his view, the city had become one gigantic project. Habraken believed the distinction between these two figures should instead be emphasized and safeguarded, fostering a new way of conceiving the urban project. In his opinion, the difference between architect and urban planner – admittedly both designers – can only be seen in the light of what he calls the "natural relationship." As soon as this relationship is broken, the roles of these two experts fade into one another.

The natural relationship Habraken refers to, in terms that may seem somewhat anachronistic today, is the human-environment relationship that forms the essence of dwelling. This relationship makes it impossible to separate the subject-inhabitant from the dwelling, as together they form an agent of continuous transformation, shaping space over time. This dynamic interaction would be the foundational element of his later definition of field. Only when this natural relationship is respected do the complementary roles of the architect and urban planner allow for the development of truly sustainable projects. The architect, Habraken argues, is at the center of the housing process, while the urban planner remains outside, guiding and channeling it, overseeing, as it were, the growth of the organism.

This view reflects a degree of organicism that would ultimately reveal both the limits and strengths of these ideas. After the *Trente Glorieuses*, seeing the interactions between inhabitants and space as voluntary, virtuous and, above all, de-institutionalized often resulted in leaving proximity and residential spaces to the spontaneity of the market. However, the distinction between architect and urban planner remains useful in establishing two poles of design practice. On one hand, we see practices embedded *within the process*, *mediating* (between experts and non-experts, between technical figures and politicians, etc.) and primarily focusing on the *effectiveness* of the project itself. In this respect, Habraken even asserts that architects choose their profession not out of pity for the homeless, but because they have a desire to build. On the other hand, we find practices that start *outside the process*, guiding and channeling it according to a *normative* approach – driven by principles established *before* the process begins. As Habraken notes, the planner, when dealing with a living organism, can only succeed if he respects the nature of that organism.

The contents of this issue explore a range of experiences that combine these two categories of practice – one internal and effectiveness-oriented, the other external and norm-driven – in several ways. The distinctions we wish to consider are less about the scale of the projects and more about the relationship between what is designed and what is inherited as already existing. In cases where the "already existing" forms the core resource of the design proposal, the normative approach tends to be less applicable – or, at the very least, less compelling.

Broadly speaking, the distinction between the two practices can be understood as that between architects and urban planners, and many of the proposals we encountered point to reconciliation between these roles. For example, in the *Conversation*, there is an expressed need to integrate interventions "across architecture, urbanism, and even product design," aligning strategies for energy transition that focus on individual building self-sufficiency with those addressing larger scales. The articles also showcase various approaches: some authors adopt a territorial perspective, envisioning future scenarios (**Vigliocco et al.**) or critically examining plans (**Ramondetti**). Others, while not explicitly planning-focused, explore infrastructures and landscapes as outcomes of planned actions (**Maurer**), possibly framing them as objects of contestation (**Topalovic, Westerheide**). Several contributions, however, converge in emphasizing the tension between the planned dimension and the tangible architectural aspects of interventions – such as Pryzwara, who centers his hypothesis on *rubble*, and D'Angelo and Ranzato, who focus on energy exaptation efforts within neighborhoods. Additionally, some articles illustrate how the normative and adaptive dimensions can function as complementary approaches to scenario building (**Fabian, Pisciella, Semenzin**), or how past plans, as a byproduct, leave behind materials that serve as morphological resources for the energy transition (**Kuciewicz, de Iacobis**).

Ultimately, we can identify two polarities in architectural project work – which cannot necessarily be traced back to the dichotomy between design and planning – that reflect different attitudes towards time. The concept of "energy landscapes," as the Problem of how architects and urban planners can actively participate in the energy transition to address the climate crisis, must engage with both space and the interplay of past and future time. One set of attitudes aligns with an Epimethean approach, which looks backward to the *already built* environment, embracing its randomness as material to be rethought and adapted for new purposes (this brings up Stephen Jay Gould's concept of exaptation, here applied to built space). These cases prioritize local interventions, retrofitting, the horizontal production of energy networks, reuse of existing materials, and practices of maintenance and repair. The other set is seen in cases that are vision-oriented and forward-looking, in line with a Promethean perspective, focused less on existing rubble and more on setting up frameworks, guidelines, and overarching rules that seek to virtuously bring order to chaos in order to slow it down or even reverse it (negen-

tropy). In these cases, scenarios, guidelines, legislative proposals, and regulatory interventions take center stage.

In the *Conversation*, Sascha Roesler notes that "we are currently experiencing a pivotal change in architectural theory, where the category of the future is gradually taking on a dominant role, supplanting the category of history." However, we would like to offer a different perspective on this relationship between past and future in architectural projects. Here, we return – perhaps like Epimetheus? – to our starting point. While the challenge of the energy transition may propel us into the future, possibly pulling us along with it, this doesn't mean that the pile of debris of the past cannot present a valuable opportunity for the role we can play at this critical moment.

As you will see in the following pages, there are cases where revisiting existing architecture reveals new insights for the future: the embedded energy of bricks or the shape of a block unfold forward, suggesting exaptation possibilities for tomorrow's urban projects. This idea recalls Koselleck's concept of "futures past," but inverted – where the opportunity lies dormant and unclaimed, rather than as a "horizon of expectation" that was imagined but rarely realized. In another light, these returns to the (material) fragments of the past echo Walter Benjamin's *Theses on the Philosophy of History*, where each moment of the present offers a potential rupture toward redemption, connecting disparate temporalities that are not linearly linked and can be very distant. According to Benjamin (1968), it is not that the past sheds its light on the present or vice versa; it is rather that the past converges with the present in a *constellation*. In this sense, reconstructing past processes could unlock undisclosed futures that remain nested in a wall or an unfinished project – a very different paradigm from a transition solely based on innovation, technological optimization, and linear progress, which often mirrors an equally linear apocalyptic vision of the end.

Is the transition governable? And even if it were, could architecture truly design it? In the tension between the governability and ungovernability of this transition – or the emergence of crises – the impact of architectural projects on reality can be shaped by reactivating the effects of past, variously realized initiatives. Drawing on Benjamin's perspective, history is not a cumulative continuum but rather a pile of debris that can trigger a short circuit at any moment. This view resonates with the city's construction, seen as a fragmentary and rhizomatic network of incomplete and decaying systems that are constantly restructured and in need of energy. Within this framework, there may be opportunities to discover contingent forms of composition that can reconfigure themselves into entirely new arrangements – ones that were totally unforeseen when their original components were being systematically and programmatically designed.

In un recente pamphlet, Peter Sloterdijk ha radicalizzato la questione della "vergogna prometeica" evocata in tempi di Guerra Fredda da Günther Anders (*L'uomo è antiquato*, 1956). Nella versione aggiornata di Sloterdijk, Prometeo non prova soltanto vergogna per aver consentito all'umanità di *rischiare* la guerra atomica, ma un vero e proprio rimorso per aver *realizzato* un disastro, ovvero l'inarrestabile "incendio delle foreste sotterranee" che causa l'esaurimento delle risorse energetiche e il riscaldamento climatico: "La donazione ingenua sfocia in rimorso non appena il dono si gonfia a dismisura nelle mani di chi lo riceve [...] ciò che era stato pensato come rimedio all'impotenza si trasforma in una forza del male sproporzionata rispetto agli svantaggi iniziali a cui si voleva porre rimedio" (Sloterdijk, 2024: 39-40). A voler essere precisi, si tratta di un rovesciamento, più che di una radicalizzazione: Prometeo, il Titano che guarda sempre avanti, è costretto a voltarsi verso il passato e, come l'Angelo di Benjamin, vede un cumulo di rovine innalzarsi verso il cielo. In altre parole, Prometeo si è trasformato nel suo gemello Epimeteo ("quello che pensa dopo"), colui che aveva cominciato a pentirsi non appena aveva aperto il vaso di Pandora (a sostegno di questa versione del mito, che scagiona Pandora, si veda ad esempio l'incisione di Giulio Bonasone dei primi anni del '500).

Emerge qui una particolare relazione tra passato e futuro – e tra storia e progetto – che caratterizza molti passaggi anche di questo numero di "Ardeth", a partire dalle pagine della *Conversazione* tra Sascha Roesler e i suoi interlocutori Kim Forster ed Elke Beyer, dove viene espressamente dichiarato lo "sforzo di definire il concetto di *energy landscape* da una prospettiva tanto storica, quanto orientata al futuro". Seguendo il medesimo intento, ci chiederemo in questo commento introduttivo se, e in che modo, l'uso dello sguardo storico possa fornire degli spunti per la riflessione sull'avvenire, in un senso transdisciplinare: forse è possibile che il rovesciamento di Prometeo possa aprire altri modi di pensare il progetto. Sarà necessario tornare su questo punto, ma non prima di aver attraversato alcune questioni fondamentali.

Il *problema* (così lo chiameremo) degli *Energy Landscapes* è vasto, ma non indeterminato: lo scenario di collasso ambientale verso cui stiamo procedendo è strettamente legato al modo in cui progettiamo la trasformazione dello spazio, a tutte le scale. Questo legame si manifesta in due direzioni: dalla crisi climatica ed energetica verso i processi di costruzione dello spazio e, viceversa, dal progetto dello spazio costruito ai suoi effetti sul clima, l'ambiente e le risorse energetiche; dunque il progetto architettonico è tanto una criticità quanto un'opportunità, di cui dovremmo trovare il modo di farci carico. I curatori sollecitano, anche provocatoriamente, le risposte degli autori attraverso quattro grandi domande radicali, e in un certo senso persino *fuori portata*. Vale a dire che in molti casi esse presuppongono una potenza di azione che sembra al di sopra delle possibilità degli architetti e degli urbanisti. Le quattro domande della *call for papers* sono state recuperate, in diverso ordine, nell'editoriale

(con una variazione: gli "spazi di coabitazione" sono diventati "paesaggi relazionali"). Ne risultano quattro grandi campi di indirizzo ("temi-chiave"): gli *inquadramenti spazio-temporali* dei processi di transizione energetica; i criteri *net-zero* attraverso cui indirizzare la transizione delle città; i *paesaggi relazionali* che consentono l'integrazione molteplice tra "condizioni politiche, infrastrutturali, sociali e naturali"; gli *hinterland energetici* che dovrebbero consentire la redistribuzione delle risorse e della produzione di energia.

A valle delle risposte fornite dagli articoli, ci sembra che una domanda continui a incombere sui quattro temi: *quale soggetto, e a quale livello di autorità, è in grado di compiere queste azioni?* Chi, per esempio, avrebbe la forza di stabilire nuove connessioni e sinergie per la redistribuzione energetica, in un mondo come quello attuale, solcato da gravi dissesti di natura geopolitica? Certamente, ad essere meno severi, sappiamo che questi obiettivi ricadono nelle strategie dell'Unione Europea, come si può leggere per esempio nel rapporto UE *The future of European competitiveness* del settembre 2024 - ma anche in questo caso si tratta inevitabilmente di un indirizzo, più che di una politica. Probabilmente nemmeno i singoli Stati sovrani (che pure vengono evocati nella *Conversazione* di Sascha Roesler con Elke Beyer, Kim Förster and Daniela Russ) hanno questo potere. Che cosa possono dunque fare gli architetti e gli urbanisti? È possibile definire un ruolo attivo per le discipline del progetto in relazione alla crisi energetica, considerando che tali discipline riescono ad occuparsi *localmente* delle trasformazioni, mentre la consistenza della crisi è radicalmente *globale*?

Possiamo darci due linee di taglio del Problema, che ci consentano per lo meno di ripercorrere criticamente gli esiti di questo numero. La prima linea riguarda la prospettiva con cui si guarda ai "paesaggi dell'energia". Parlare di *paesaggio* in questo discorso ha moltissime implicazioni, che vengono anche parzialmente esplicitate. Nell'editoriale, i curatori citano il Burckhardt di "Why landscape is beautiful?" nell'editoriale e, ancora nella *Conversazione*, Kim Forster riprende lo stesso autore per notare che "il paesaggio è un concetto culturale con un'ampia varietà di rappresentazioni e percezioni che vengono sempre più intese attraverso una lente urbana". Si potrebbe precisare, citando ancora Burckhardt, che il significato di paesaggio "va trovato negli occhi della mente di chi guarda" (Burckhardt, 2012: 133-34). Lo *scape*/*skopé*/*skopos* del *land-scape* costituisce inevitabilmente la posizione sottintesa da cui si suppone venga enunciato il discorso: una posizione di esteriorità rispetto all'oggetto del discorso stesso. Coerentemente con questa attitudine paesaggistica, uno dei "temi-chiave" enunciati riguarda gli *inquadramenti spazio-temporali*, che sono appunto le cornici da cui è possibile guardare al Problema come a un paesaggio. La questione che qui sorge è se sia possibile conciliare lo sguardo del "paesaggio" con un progetto di trasformazione che aspira alla re-integrazione e al ri-equilibrio di un insieme in via di dissipazione energetica e di degenerazione materiale. Un insieme che, tuttavia, non si

presenta come un oggetto "là fuori" e incorniciabile, bensì come un'entità avvolgente, un *iperoggetto* (Morton, 2018) da cui non è possibile uscire. Vale a questo proposito ricordare brevemente la serie di critiche epistemologiche che Bruno Latour ha rivolto a questa pulsione scopica dei *moderni* in svariate occasioni, coniando definizioni fortunate, come "Oligopticon" (Latour, 2005) e, più recentemente "Critical Zone" (Latour, 2020). Il primo termine suggerisce uno spostamento dell'osservatore, da una posizione panoramica che pretende di cogliere *tutto* sinteticamente, a una posizione immersiva e contingente, in grado di vedere bene *qualcosa*, un passo alla volta e procedendo "a tentoni". Nel caso della *Critical Zone*, poi, la struttura della visione ha a che fare direttamente con il problema climatico e propone addirittura un rovesciamento topologico, tanto che lo spazio terrestre, da sfera aperta verso l'infinito, si muta in una sorta di membrana piuttosto ristretta entro la quale saremmo condannati a vivere (o a morire) senza alcuna possibilità di fuga: "The thin skin of the living Earth". Applicando questa prospettiva, un po' claustrofobica, al nostro Problema, che cosa diventerebbero i "paesaggi dell'energia"? Siamo ancora in grado di *affacciarci* da un punto di osservazione che ci consenta una visione globale delle questioni, oppure dobbiamo rassegnarci ad affrontarle in modo contingente e frammentario? Tanto per cominciare, potremmo provare a mettere in tensione il concetto di paesaggio con altri termini, come "zona" (seguendo Latour) oppure, rientrando nel dominio del progetto urbano e dell'architettura, recuperare la nozione di "campo" (*field*) proposta da Nicholaas John Habraken. Per Habraken il campo non è semplicemente un intorno o un contesto di qualche oggetto architettonico, bensì l'estensione di interdipendenze dinamiche di cui gli architetti dovrebbero interessarsi, senza pretendere di esserne gli artefici:

> La costante interazione tra materia viva e inerte conferisce ai *fields* una qualità organica e rende impossibile separare l'abitare dal costruire. Nella connessione tra la vita e il suo riparo fisico, esiste un *continuum* che va da un individuo che avvicina una sedia al tavolo a un'amministrazione comunale che decide di espandere il tessuto urbano. I campi sono troppo inglobanti, troppo durevoli e troppo complessi per essere considerati semplicemente artefatti prodotti da noi. (Habraken, 2005: 36).

Il campo di Habraken è sociale, materiale, organico, tecnologico e processuale. Questa sua multidimensionalità lo rende troppo complicato per essere afferrato attraverso un progetto: "Eppure, per diverse generazioni, gli architetti hanno creduto fermamente che i *fields* potessero essere non solo progettati, ma anche inventati, e che la qualità e la stessa perpetuazione dei campi dipendessero dalle professioni del progetto" (37). Habraken stesso, con la sua teoria dei supporti, aveva l'ambizione di ripensare e inventare la nuova città (Habraken, 1974). Se la definizione di *field* ha consistenza ancora oggi ed è pertinente per il nostro Problema, è proprio perché in essa si condensa tutta una lunga riflessione, che il suo autore

nei decenni ha seriamente tentato di volgere in pratica, scontrandosi con i propri limiti di architetto e urbanista.
Dopo aver tentato uno spostamento dai "paesaggi" ai "campi", arriviamo così al secondo discrimine che ci proponevamo di tracciare in questa contro-lettura. Si tratta di definire una linea di taglio che riguarda la *forma progettuale*, attraverso cui intendiamo intervenire sul Problema. Negli interventi di questo numero si intrecciano riferimenti alla pianificazione, al progetto urbano e a quello architettonico. La questione del *planning* ritorna a più riprese - già nell'editoriale, di nuovo citando Burckhardt: "*planning must be understood as a paradox, as it seeks to define a non-finite future state*". Il limite (sistemico, verticale, autoritativo, ecc.) della pianificazione "moderna" è già scontato: sarebbe facile associare a questo *modus operandi* la prospettiva "panottica" che abbiamo appena discusso. È la stessa disciplina del *planning* ad aver operato le critiche su questo aspetto, dall'interno: si pensi, per esempio al testo *Planning Matter* di Robert Beauregard (2015), che proprio attraverso Latour tenta di ricondurre l'urbanistica a un insieme di pratiche materiali e situate ("crafting good ideas by gathering people, knowledge, and material things" [9]). Tuttavia, anche in questa prospettiva, che l'autore definisce "(neo-) materialista, criticamente realista, moralmente impegnata, politicamente progressista e pragmatica", il mestiere dell'urbanista resta esplicitamente ancorato alla normatività del suo discorso: "il *planning* è sempre politico. E dal momento che è politico, è anche normativo". Per contro, le pratiche del progetto architettonico si prestano ad essere considerate come attività per lo più subordinate a un indirizzo esterno (per inciso, nel libro di Beauregard gli architetti sono sempre citati come rispondenti a un cliente, a un *developer*, o in coppia con un avvocato… del cliente). Per avere una versione diversa, ma compatibile, della genealogia modernista di questa divisione del lavoro, si potrebbe proprio tornare ad Habraken e al suo primo saggio, *Supports*, dove si trova una paradigmatica distinzione dei rapporti tra architetti e *planner*. Al tempo di questo scritto (1962) l'autore aveva come obiettivo polemico il sistema del *Mass Housing*, che a suo dire costringeva architetti e urbanisti a confondersi, in un mestiere di mera organizzazione ed esecuzione tecnica ("la città è diventata un unico progetto gigantesco" [ibid: 95]). Nella sua intenzione, la distinzione avrebbe invece dovuto essere rimarcata e tutelata, a tutto vantaggio di un nuovo modo di concepire il progetto urbano: "La differenza tra architetto e urbanista, entrambi 'artefici della forma', ma di natura assai diversa, risulta chiara solamente se la si analizza alla luce della 'relazione naturale'. Da quando questa relazione è stata interrotta, ben poche sono le differenze tra le attività di questi due esperti, che sono ridotti a un ruolo pressoché analogo". La "relazione naturale" a cui Habraken si riferisce, in termini che suonano oggi un po' anacronistici, è il rapporto "uomo-ambiente" che costituisce l'essenza dell'abitare. Un rapporto secondo il quale è impossibile separare il soggetto-abitante dall'abitazione, poiché i due termini costituiscono insieme un agente in continua

trasformazione, che manipola lo spazio nel tempo. Questo complesso dinamico sarà l'elemento fondativo della successiva definizione di *field*. Solo quando tale relazione naturale è rispettata, i ruoli complementari dell'architetto e dell'urbanista consentono lo sviluppo di progetti davvero sostenibili: "L'architetto si trova in posizione baricentrica all'interno del processo di costituzione delle abitazioni"; mentre "l'urbanista, al contrario, svolge il suo ruolo specifico al di fuori del processo. Egli guida il processo, lo incanala [...]. In un certo senso, provvede alla crescita dell'organismo [...]". Si ritrovano qui alcuni sintomi di un organicismo, che segnerà il limite e il successo di queste formulazioni: finiti i *Trenta Gloriosi*, considerare le interazioni degli abitanti con lo spazio come pratiche spontanee e virtuose– ma soprattutto de-istituzionalizzate – ha spesso avuto l'effetto di abbandonare lo spazio di prossimità e la residenza alla "spontaneità" del mercato. Eppure, questa distinzione tra architetto e urbanista può ancora esserci utile per stabilire due poli della pratica del progetto. Da un lato vediamo le pratiche che si pongono *all'interno del processo*, stabilendo una *mediazione* (tra la disciplina e i non-esperti, tra tecnica e politica, ecc.) e perseguendo un obiettivo che riguarda in primo luogo *l'efficacia* del progetto stesso. Dall'altro lato riconosciamo le pratiche che cominciano *al di fuori del processo*, per guidarlo, incanalarlo secondo un approccio *normativo* e dunque orientato da principi che vengono posti *prima* che il processo abbia inizio ("L'urbanista che ha a che fare con un organismo vivente può avere successo solo se rispetta la natura di questo organismo", scrive ancora Habraken [97]). I contenuti del numero si confrontano con uno spettro di esperienze che combinano queste due categorie di pratica, una interna e votata all'efficacia, l'altra esterna e orientata alla norma, in molti diversi modi. Le distinzioni che vorremmo tenere in conto non riguardano tanto la scala dei casi in gioco, quanto il rapporto tra ciò che viene progettato e ciò che viene acquisito come già esistente. I casi in cui il "già esistente" costituisce la risorsa principale della proposta progettuale sono anche quelli in cui l'approccio normativo sembra meno applicabile, o meno interessante.

In un senso molto generale, si potrebbe intendere la distinzione tra le due pratiche come quella tra architetti e urbanisti, ed è proprio in un senso di riconciliazione che procedono molte delle proposte che abbiamo incontrato. Nella *Conversazione*, per esempio, si afferma la necessità transcalare di tenere insieme gli interventi "attraverso l'architettura, l'urbanistica e persino il design di prodotto", riconciliando le strategie per la transizione energetica che guardano all'autosufficienza dei singoli edifici con quelle di più larga scala. Anche tra gli articoli, è possibile riconoscere delle inclinazioni diverse. Alcuni autori assumono un punto di vista territoriale che si propone di dare degli scenari al futuro (**Vigliocco** et al.) o di descrivere criticamente dei piani (**Ramondetti**). Altri, pur senza assumere una prospettiva chiaramente progettuale, si occupano di infrastrutture e paesaggi come casi che sono frutto di azioni pianificate (Maurer), magari per farne oggetti di contestazione (**Topalovic, Westerheide**). Ci sono

però diversi casi in cui gli articoli evidenziano la tensione tra dimensione pianificata e concretezza architettonica degli interventi (**Pryzwara**), che fa delle *macerie* l'oggetto principale della sua ipotesi) oppure mettono al centro del discorso operazioni di ex-aptation energetica di un quartiere (**D'Angelo, Ranzato**). È infine possibile leggere ipotesi in cui la dimensione "normativa" e quella "adattiva" definiscono due modi complementari di costruire scenari (**Fabian, Pisciella, Semenzin**), o in cui i piani del passato sono l'antefatto che deposita materiali al suolo, quasi come un effetto collaterale, costituendo delle vere proprie risorse morfologiche a disposizione della transizione energetica **(Kuciewicz, de Iacobis**).
Alla fine, sembra di poter riconoscere due polarità del progetto – non necessariamente riconducibili alla dicotomia tra *design* e *planning* – che hanno una diversa attitudine nei confronti del tempo. I "paesaggi dell'energia", intesi come il Problema di cosa possono fare gli architetti e gli urbanisti per incidere con i loro progetti e piani sulla crisi climatica, facendosi parte attiva della "transizione energetica", devono non solo confrontarsi con lo spazio, ma anche combinare il tempo passato e il tempo futuro. Un primo insieme di atteggiamenti potrebbe essere ricondotto a un modo "epimeteico" di condurre l'azione, che guarda innanzitutto indietro, al *già costruito*, accettandone l'accidentalità come materia da ripensare e cooptare per nuovi usi (viene in mente Stephen Jay Gould e la sua definizione di *ex-aptation*, qui applicata allo spazio costruito). Sono i casi in cui prevale l'attenzione per operazioni di intervento locale, *retrofitting*, produzione orizzontale di reti energetiche, recupero dei materiali esistenti, manutenzione e *repair*. Un secondo insieme è individuabile nei casi in cui si va verso una visione di piano, che vuole rilanciare in avanti, come Prometeo, senza indugiare troppo sulle "macerie", bensì tentando ancora di costruire dei quadri, degli indirizzi, delle regole più generali entro cui far ricadere virtuosamente il disordine – per frenarlo, o persino invertirne la tendenza (*Negentropy*). Sono i casi in cui vengono più chiaramente proposti scenari, linee guida, interventi a livello di legislazione e regolazioni.
In un passaggio della *Conversation* **Sascha Roesler** afferma che "stiamo vivendo un cambiamento cruciale nella teoria dell'architettura, in cui la categoria futuro sta gradualmente assumendo un ruolo dominante, sostituendo quella di storia". Tuttavia vorremmo dare voce a una considerazione di tono diverso, su questo rapporto tra passato e futuro per il progetto architettonico. Ed è qui che torniamo (come Epimeteo?) al punto da cui eravamo partiti. Per quanto la sfida della transizione energetica possa trascinarci verso il futuro, magari prendendoci alle spalle, non è detto che il "cumulo di macerie" non possa costituire una *chance* produttiva, per il ruolo che possiamo rivendicare in questo frangente.
Come si potrà leggere anche in queste pagine, ci sono casi in cui ripercorrere architetture già costruite nel passato rivela nuovi aspetti che riguardano il futuro: l'*embedded energy* dei mattoni, o la forma degli isolati, si dispiegano in avanti annunciando possibilità *ex-attive* per il

progetto urbano di domani. In una forma che ricorda i "futuri passati" di Koselleck, ma nel senso rovesciato di una opportunità restata implicita e non ancora cooptata (mentre in Kosellek i "futuri passati" hanno a che fare con degli "orizzonti di aspettativa", intesi come moventi che non si sono quasi mai realizzati). Per altri versi, questi ritorni ai frammenti (materiali) del passato potrebbero riportarci alle pagine di Benjamin de "Sul concetto di storia" (2006), secondo cui ogni istante del presente costituisce una possibile frattura verso una redenzione, tale da mettere in comunicazione temporalità diverse, anche distanti tra loro e certamente non conseguenti linearmente: "Non è che il passato getti la sua luce sul presente o che il presente getti la sua luce sul passato; l'immagine è piuttosto ciò in cui il passato viene a convergere con il presente in una costellazione" (Benjamin, 2006: 507). In questo senso ricostruire processi del passato potrebbe voler dire innescare futuri non ancora dischiusi, rimasti annidati in un muro, o in un progetto incompiuto: un paradigma molto diverso da quello di una "transizione" tutta costruita sul piano dell'innovazione, dell'ottimizzazione tecnologica e del progresso lineare - complementare a un altrettanto lineare annuncio apocalittico della fine. La transizione è governabile? E anche se lo fosse, sarebbe progettabile con l'architettura? Nella discrasia tra governabilità e ingovernabilità della transizione (o dell'emergere di crisi) si può costruire la presa dei progetti sulla realtà, attraverso la riattualizzazione degli effetti di progetti passati e variamente realizzati. Sempre seguendo Benjamin, la storia non sarebbe un *continuum cumulato*, bensì un ammasso di macerie che possono cortocircuitare in qualsiasi momento. Una concezione che trova riscontro nella costruzione della città, come insieme frammentario e rizomatico di sistemi incompleti e decadenti, in continua ristrutturazione e assetati di energia. All'interno dei quali forse è possibile trovare forme di composizione contingenti, capaci di riconfigurarsi secondo assetti del tutto inediti, e certamente non pensati all'epoca in cui le parti in gioco erano state originariamente oggetto di un *design* sistematico e programmatico.

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Spatial Agencies of Energy Transition
La spazialità della transizione energetica

Editorial

Sascha Roesler (1), Silvia Balzan (2), Lorenzo Fabian Stieger (3)

This “Ardeth” issue promotes the conceptual framework of “energy landscape” to question energy as cheap, abundant, and at the disposal of urban development; it critically examines concepts and methods for shaping future energy landscapes. Understanding energy transition as practice of broad spatial transformation, the issue looked for contributions that uncover the mutual dependency between energy and urbanization, analyzing the possible influences of settlement structures on promoting renewable energy production. The issue conceives *energy futures* as intrinsically tied to a broader discussion on space-making futures and highlights “the spatial elements through which urban energy systems evolve […] and the spatial consequences of [energy] transition” (Rutherford, Coutard, 2014: 1354). For example, how do different densities of the built fabric contribute to and limit the emergence of post-carbon energy landscapes?

The editors of this issue, **Sascha Roesler**, associate professor for theory of urbanization and urban environments, together with **Silvia Balzan** and **Lorenzo Fabian Stieger**, postdoctoral researchers, conduct

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a theory-driven, empirically and historically-informed comparative research on global forms of urbanization, in order to provide an evolutionary approach to architecture and urban design. By integrating the perspectives of "high" architecture and popular forms of construction, the Professorship fosters a cross-cultural understanding of architecture (as a discipline) and low-tech building methods. With its real-life problems and profile, the city is the centre of gravity in the Professorship's research interests. To foster sustainability in the built urban environment, both the real complexity of the contemporary city and the concepts that are currently available to improve it are scrutinized. The Associate Professorship for Theory of Urbanization and Urban Environments addresses the conflict-laden goals of sustainable development – in short, to provide at the same time for a green city, a growing city, and a just city (Campbell, 1996) – while exploring innovative sustainable concepts in theory and practice.

With such approaches in mind, the editors prompted contributions that offer a transdisciplinary view of energy landscapes, considering actors (companies, institutions, people), technologies (carbon-based and renewable), flows (of resources, energy, money), scales (from buildings to the globe), and patterns of urbanization. As the selected contributions in this issue show, the transdisciplinary view is also about critically scrutinizing energy and landscape concepts and examining how they are interrelated. Scholars in the field of urban and architectural design have contributed recent findings and novel methods at the intersection of archival, ethnographic, and design-driven approaches for studying energy landscapes in transition. The contributions of this issue explore new forms of energy governance and spatial regimes, propose alternative approaches to zoning regulations and building codes, and highlight inevitable challenges related to issues such as liability and safety.

The issue opens with a conversation and a visual commentary, which together represent the overarching framework of this special issue on energy landscapes. **Sascha Roesler**, **Elke Beyer**, **Kim Förster** – the recent initiators of the international "Network on Urban Energy Landscapes" – and **Daniela Russ** identify three main themes through *a meta-reflection* on the concept of the "energy landscape": first, the need to think about the energy transition in spatial terms and across different scales; second, the unprecedented challenges of the energy transition and the constraints of historical research in this context; and third, the role of cities as primary sites of energy consumption, alongside the inevitable realities of energy hinterlands.

The visual commentary by **Milica Topalović**, Chair of Architecture and Territorial Planning at ETH Zurich, and **Jan Westerheide** with photographs taken by artist **Bas Princen**, captures a physical model produced by students from the design research studio "Power to the People: Energy and Territory in the Rheinland." The design studio's inquiry focused on the German region of the Rheinisches Revier, which surrounds the Tage-

bau Hambach surface mine; it investigated the ownership and governance of energy sources during the energy transition and how communities can rally for alternatives to fossil fuel reliance.
Following this overarching framework, which combines conceptual with visual reflections, the collection of peer-reviewed articles consists of five essays and three visual essays, all of which deal with the dynamics of energy landscapes (in transition). The papers and essays contribute to a contemporary environmental theory in architecture and build on a number of core themes outlined in the original call for papers and further refined after submission. These themes encompass the spatio-temporal dynamics of energy transitions, new models for net zero cities, the agency of networked energy landscapes, and the socio-cultural dimensions of energy hinterlands. In light of the recent geopolitical situation surrounding the war in Ukraine, which has highlighted Europe's dependence on external energy sources, this issue focuses on European territories and calls for exploring new strategies of self-sufficiency that improve on those discussed in the past.

Spatio-temporal frameworks
The energy transition is inevitably processual and non-linear. It is a continuous process beyond the "net zero goal." As sociologist Lucius Burckhardt (2015) noted, planning must be understood as a paradox, as it seeks to define a non-finite future state. **Leonardo Ramondetti**'s article and the visual essay by **Elena Vigliocco**, **Paolo Mellano**, **Elena Guidetti**, and **Riccardo Ronzani** contribute to the thematic thread that explores spatiotemporal energy transition processes.
Ramondetti discusses the transformation of Ravenna's port on the Adriatic Sea coast of Italy into a landscape that supports green energy initiatives. He outlines the challenges of this transition, emphasizing the current technocentric approach, which focuses on technological solutions, in contrast to an ecocentric approach that prioritizes ecological considerations.
Through a visual essay, Vigliocco et al. portray the energy transition of Salento's Borgo Monteruga in Italy. They detail its evolution from a dormant site to an agrivoltaic landscape, which combines agriculture with solar energy production. The transformation is illustrated with a timeline segmented into four periods, each representing distinct landscapes and showing the influence of changing energy demands, both local and global, on Borgo Monteruga's solar landscape.

Net Zero Cities
Future energy landscapes will bring a new kind of political ecology of energy production, which will also entail a change in the perspective of social actors from energy consumers to energy producers. The globally discussed political goal of net zero emissions is only one aspect of a resource-conscious approach to energy, which goes hand in hand with the

pressing issue of climate change. Two contributions examine the role of urban dwellers as energy producers, owners of the infrastructure, and/or energy shareholders, as well as the state and other actors' roles as energy service providers concerning off-grid rights.

Fabrizio D'Angelo contributes to the issue with an in-depth discussion of a project in Rome's Ostiense area, engaging with the theme of reconceptualizing energy *efficiency* strategies into energy *sufficiency*. The ongoing research project PED4ALL aims to convert the Ostiense area into a positive energy district. It prioritizes the concept of energy sufficiency – a strategic shift from merely using energy efficiently to ensuring it meets all needs without excess. Importantly, the project moves away from a strictly technocratic focus on optimization, highlighting instead the need to alter the socio-spatial practices of Ostiense's residents as part of a broader energy transition strategy. D'Angelo critiques EU policies for their shortcomings, noting their focus on energy's economic and technical aspects rather than on the everyday behaviors of people who actualize energy transitions.

Andri Gerber's contribution examines models of net-zero cities, highlighting overlooked scale differences between individual buildings and broader urban contexts. To address this, the article suggests creating a simulation game that incorporates elements from past games to offer a playful yet educational experience. The game's rules aim to be user-friendly, bridging different scales by assigning energy-related data to various architectural and urban elements, representing the Swiss landscape in a simplified form for gameplay.

Relational landscapes

Following Ian McHarg's "Design with Nature" (1969), the exploration of energy production ecologies unveils the manifold intersections of political, infrastructural, social, and natural conditions. Two papers examine novel renewable and low-carbon energy production strategies in the context of the existing urbanization patterns and address the consequent tradeoffs between green, growing, and equitable urban development, also highlighting frictions between green technologies and ecosystems. The contributions present proto-ecological approaches in the context of the postwar socialist city of Warsaw (Poland). **Adam Pryzwara**'s contribution examines urban circular mining as a process that addresses the embodied energy in the built environment and turns urban landscapes into energy-producing spaces. The second, by the architecture collective CENTRALA (**Małgorzata Kuciewic** and **Simone de Iacobis**), uses historical insights to understand Warsaw's current necessities to adapt to the (changing) urban microclimates.

Pryzwara traces the emergence of a unique energy conservation paradigm in Warsaw's post-war urban landscape. Using original archival documents, he discusses the city administration's methods for assessing and utilizing the embodied energy in the rubble left after wartime de-

struction for Warsaw's post-war reconstruction economy. His historical analysis of energy conservation and reuse adds to current discussions on the circular economy in architecture by applying them within the context of energy landscapes.

Małgorzata Kuciewic and **Simone de Iacobis** explore how Warsaw's post-war urban design of open spaces has influenced living conditions and perceptions of the city, especially during heat waves. They argue that these spaces were intentionally designed by the Warsaw Reconstruction Office (1945-1949), headed by landscape architect Alina Scholtz, to manage the local microclimates. By contrast, they suggest that modern market-driven developments treat urban spaces as "voids," prioritizing the utilitarian potential of green and blue infrastructure as lucrative opportunities rather than for their climate-regulating functions.

Energy hinterlands

The most important aspect of the 20th-century energy system has been urban centers' dependency on the global "energy hinterland" (Hawkes, 1996). The remoteness of energy sources such as oil and natural gas has led to a global distribution network and the idea of energy abundance regardless of location. The contributions explore urban strategies related to decentralization and centralization.

Lorenzo Fabian, **Susanna Pisciella**, and **Chiara Semenzin**'s article addresses the theme of energy hinterlands by exploring the northeastern region of Triveneto. Informed by the European Green Deal and the Intergovernmental Panel on Climate Change (IPCC) trend projections, the article analyzes two potential scenarios for the future energy transition in the region. Given its unique geographic and settlement configuration, along with the current energy sector arrangement, the authors propose a centralized and vertically integrated one for the industrial sector and a decentralized and horizontal one for the residential landscape.

Closing the issue, **Jacqueline Maurer**'s essay delves into Swiss dams through a selection of visuals from documentary films and the author's photographs. These visuals critically analyze the narratives surrounding the planning and construction of hydropower infrastructures in Switzerland. They revisit Karl Sauer's 1930s study of Lake Sihl and Jean-Luc Godard's 1950s documentation of the Grande Dixence dam, which was instrumental in preventing electricity shortages in Switzerland. Maurer's photographs of the Grande Dixence dam engage in a dialogue with Godard's documentary, prompting a reflection on massive landscape infrastructures as objects of commercial tourism and their comprehensive cultural, economic, political, and environmental implications for natural resources.

This issue of "Ardeth" questions the prevailing focus in contemporary architecture on the self-sufficiency of individual buildings and is thus dedicated to a new understanding that embeds strategies of energy saving and production in the broader urban and territorial context. The papers

and visual essays of this issue promote a transversal view of energy landscapes, integrating the urban and architectural scales and the transition from energy consumption to production. To conceive of urban territories and the architectural project itself as sites of future energy production requires a new way of thinking about design, as urban scholar Dean Hawkes emphasized in 1996: "The city that produces all of the energy it needs for its buildings and the urban infrastructure is of course, only a vision. To take the first steps towards its realization would transform the agenda for research and practice in architecture more radically than any idea since the advent of the modern movement."

Questo numero di "Ardeth" discute il tema dei "paesaggi energetici" mettendo in discussione il concetto di energia come economica, abbondante e a disposizione dello sviluppo urbano, attraverso una critica dei concetti e dei metodi alla base della formazione dei paesaggi energetici del futuro.
Intendendo la transizione energetica come pratica di una più ampia trasformazione spaziale, questo numero colleziona contributi che esaminano la dipendenza reciproca tra energia e urbanizzazione, analizzando le possibili influenze delle strutture insediative nella produzione di energia rinnovabile. La collezione di scritti concepisce i possibili scenari energetici futuri come intrinsecamente legati ad una discussione più ampia sulla creazione futura di spazio, mettendo così in evidenza "gli elementi spaziali attraverso i quali i sistemi energetici urbani evolvono [...] e le conseguenze spaziali della [transizione energetica]" (Rutherford, Coutard, 2014: 1354). Ad esempio, come le diverse densità del tessuto edilizio contribuiscono e/o limitano l'emergere di paesaggi energetici "post-carbon"?
I curatori di questo numero, **Sascha Roesler**, professore associato per la teoria dell'urbanizzazione e degli ambienti urbani insieme a **Silvia Balzan** e **Lorenzo Fabian Stieger**, ricercatori post-dottorali, conducono una ricerca comparativa guidata dalla teoria sulle forme globali di urbanizzazione, empiricamente e storicamente informata, al fine di fornire un approccio evolutivo all'architettura e al progetto urbano. Integrando le prospettive dell'architettura ricercata con la costruzione più ordinaria, l'obiettivo del gruppo di ricerca è favorire la comprensione interculturale dell'architettura (come disciplina) e dei metodi di costruzione definiti low-tech. La città, con i suoi problemi, è il centro di gravità degli interessi di ricerca della cattedra. Per promuovere la sostenibilità nell'ambiente urbano costruito vengono esaminati sia la complessità reale della città contemporanea, sia i concetti attualmente disponibili per migliorarla. La cattedra di Teoria dell'Urbanizzazione e degli Ambienti Urbani affronta gli obiettivi a volte conflittuali dello sviluppo sostenibile – come fornire allo stesso tempo una città verde, una città in crescita e una città inclusi-

va (Campbell, 1996) – esplorando nozioni innovative di sostenibilità nella teoria e nella pratica.
Guidati da questo approccio, i curatori hanno sollecitato contributi che offrissero una visione transdisciplinare dei paesaggi energetici, considerando attori (aziende, istituzioni, persone), tecnologie (dipendenti dai combustibili fossili o basate su energie rinnovabili), flussi (di risorse, energia, denaro), scale (dall' edificio alla scala globale) e modelli di urbanizzazione. Come visibile nella selezione di articoli pubblicati in questo numero, la visione transdisciplinare richiede di ripensare criticamente le nozioni di energia e paesaggio, esaminando come essi siano interrelati.
Studiosi nel campo del design urbano e dell'architettura hanno contribuito con recenti ricerche e metodi innovativi che intersecano approcci archivistici, etnografici e basati sul design allo studio dei paesaggi energetici in transizione. I contributi di questo numero di "Ardeth" esplorano nuove forme di governance energetica e i relativi regimi di organizzazione dello spazio, propongono approcci alternativi alla regolamentazione delle zone e ai codici edilizi e mettono in evidenza le sfide inevitabili relative a questioni come la responsabilità e la sicurezza.
Il numero si apre con una conversazione e un saggio grafico, che insieme rappresentano il quadro generale di questo numero sui paesaggi energetici. **Sascha Roesler**, **Elke Beyer**, **Kim Förster** – che hanno recentemente fondato il "Network on Urban Energy Landscapes" – e **Daniela Russ** identificano tre temi principali attraverso una meta-riflessione sul concetto di "paesaggio energetico": in primo luogo, la necessità di pensare alla transizione energetica in termini spaziali e su diverse scale; in secondo luogo, le sfide senza precedenti della transizione energetica e i vincoli della ricerca storica in questo contesto; e in terzo luogo, il ruolo delle città come principali siti di consumo energetico, accanto alle realtà degli hinterland in cui l'energia è prodotta.
Il saggio grafico di **Milica Topalović**, docente all'ETH di Zurigo, e **Jan Westerheide** con fotografie scattate dall'artista **Bas Princen**, cattura un modello fisico elaborato dagli studenti del corso di progettazione "Power to the People: Energy and Territory in the Rheinland". L'indagine degli studenti si è concentrata sulla regione tedesca del Rheinisches Revier, che circonda la miniera di carbone di Tagebau Hambach, durante la sua transizione energetica. La ricerca ha investigato proprietà e governance delle fonti energetiche e come le comunità possano mobilitarsi per elaborare alternative alla dipendenza dai combustibili fossili.
A seguire queste prime riflessioni concettuali e visive, troviamo la raccolta di articoli peer-reviewed: cinque saggi testuali e tre saggi visivi che investigano le dinamiche dei paesaggi energetici (in transizione). I saggi contribuiscono a elaborare una teoria ambientale contemporanea in architettura a partire dai temi delineati nella call for papers. Questi temi comprendono le dinamiche spazio-temporali delle transizioni energetiche, i nuovi modelli di città a emissioni zero, l'agentività nei paesaggi energetici interconnessi e le dimensioni socio-culturali degli hinterland

energetici. Alla luce della recente situazione geopolitica riguardante la guerra in Ucraina, che ha messo in evidenza la dipendenza dell'Europa dalle fonti energetiche esterne, questo numero di "Ardeth" ha prevalentemente raccolto contributi legati ai territori europei, invitando a percorrere nuove strategie di autosufficienza che considerino le implicazioni di quelle discusse in passato.

Quadri spazio-temporali
La transizione energetica è inevitabilmente processuale e non lineare. È un processo continuo oltre l'obbiettivo "Net Zero". Come ha notato il sociologo Lucius Burckhardt, la pratica della pianificazione deve essere concettualizzata come un paradosso, poiché cerca di definire uno stato futuro che è per definizione non finito. L'articolo di **Leonardo Ramondetti** e il saggio grafico di **Elena Vigliocco**, **Paolo Mellano**, **Elena Guidetti** e **Riccardo Ronzani** contribuiscono al filone tematico che esplora i processi di transizione energetica spazio-temporali. **Ramondetti** discute la trasformazione in divenire del porto di Ravenna, sulla costa adriatica italiana, che ambisce a costituire un paesaggio che supporta iniziative di energia verde. **Ramondetti** delinea le sfide di questa transizione, enfatizzando l'attuale approccio tecnocentrico, che si concentra su soluzioni puramente tecnologiche, in contrasto con un approccio ecocentrico che prioritizza le considerazioni ecologiche.
Attraverso un saggio grafico, **Vigliocco et al.** ritraggono la transizione energetica di Borgo Monteruga, nel Salento. Il contributo illustra la transizione di un sito dormiente in un paesaggio agrivoltaico, che ibrida l'agricoltura con la produzione di energia solare. La trasformazione è illustrata con una timeline segmentata in quattro periodi, ognuno rappresentante paesaggi distinti e mostrando l'influenza delle mutevoli richieste energetiche, sia locali che globali, sul paesaggio solare di Borgo Monteruga.

Città a emissioni zero
I futuri paesaggi energetici si accompagnano a una nuova ecologia politica della produzione energetica, che comporterà anche un cambiamento nella prospettiva degli attori sociali, non più solo consumatori ma anche produttori di energia. L'obiettivo politico globale del paradigma delle emissioni zero può essere discusso come un approccio consapevole alle risorse energetiche, come reazione alla questione urgente del cambiamento climatico. Due contributi esaminano il ruolo degli abitanti come produttori di energia, quali nuovi proprietari dell'infrastruttura e/o azionisti energetici, e il ruolo dello Stato e di altri attori istituzionali come fornitori di servizi (energetici) nella cornice giuridica di una produzione off-grid.
Fabrizio D'Angelo contribuisce al numero con una discussione approfondita su un progetto nell'area di Ostiense a Roma, affrontando il tema del possibile passaggio concettuale e strategico dalla nozione di *efficienza*

energetica a quella di *sufficienza* energetica. Il progetto di ricerca PED4ALL, attualmente in corso, mira a convertire il quartiere Ostiense in un distretto energetico positivo dando priorità al concetto di *sufficienza* energetica, e così facendo promuovendo un cambiamento strategico dall'uso meramente *efficiente* dell'energia verso un uso che soddisfi le necessità senza eccessi. Il progetto si allontana da un focus strettamente tecnocratico sull'ottimizzazione, mettendo invece in evidenza la necessità di modificare le pratiche socio-spaziali dei residenti del quartiere Ostiense come parte di una strategia di transizione energetica più ampia. D'Angelo critica le lacune delle politiche dell'Unione Europea, tra le quali il focus sugli aspetti economici e tecnici della transizione energetica piuttosto che sui comportamenti quotidiani delle persone che effettivamente sono chiamate ad attuare la transizione energetica nel loro quotidiano.
Il contributo di **Andri Gerber** esamina modelli di città a emissioni zero, mettendo in luce la sfida di contemplare simultaneamente le differenze di scala tra edifici e contesti urbani più ampi. Per affrontare questo problema, l'articolo ipotizza un'esperienza ludico-educativa di un gioco di simulazione che incorpori elementi di giochi simulativi elaborati nel passato con l'attuale necessità di integrare e visualizzare diverse scale di ragionamento, assegnando dati energetici ai vari elementi architettonici e urbani che rappresentano il paesaggio svizzero in una forma semplificata per il gioco.

Paesaggi relazionali
Citando "Design with Nature" di Ian McHarg (1969), l'esplorazione delle ecologie di produzione energetica svela le molteplici intersezioni delle condizioni politiche, infrastrutturali, sociali e naturali. Due articoli esaminano nuove strategie di produzione di energia rinnovabile e a basse emissioni di carbonio nel contesto dei modelli di urbanizzazione esistenti e affrontano i conseguenti compromessi da fare per ottenere uno sviluppo urbano sostenibile, economicamente in crescita ed allo stesso tempo equo, evidenziando i potenziali attriti tra tecnologie sostenibili ed ecosistemi. I due articoli in questione presentano approcci proto-ecologici nel contesto della città socialista del dopoguerra di Varsavia (Polonia).
Il contributo di **Adam Pryzwara** esamina un esempio storico di economia urbana circolare: un processo che sfrutta l'energia incorporata nell'ambiente costruito e trasforma i paesaggi urbani in spazi di produzione energetica. Il secondo, del collettivo di architettura CENTRALA (**Małgorzata Kuciewic** e **Simone de Iacobis**), analizza esempi storici per comprendere le necessità attuali di Varsavia di adattarsi ai microclimi urbani in mutamento. **Pryzwara** traccia l'emergere di un paradigma unico di conservazione energetica nel paesaggio urbano del dopoguerra di Varsavia. Utilizzando documenti d'archivio originali, discute i metodi dell'amministrazione cittadina per valutare e utilizzare l'energia incorporata nelle macerie lasciate dalla distruzione bellica per l'economia della ricostruzione post-bellica di Varsavia. La sua analisi storica della

conservazione e del riuso energetico aggiunge alle discussioni attuali sull'economia circolare in architettura applicandole nel contesto dei paesaggi energetici.
Małgorzata Kuciewic e **Simone de Iacobis** esplorano come il design urbano degli spazi aperti di Varsavia nel dopoguerra abbia influenzato le condizioni di vita e le percezioni della città, specialmente durante le ondate di calore. Gli autori sostengono che questi spazi siano stati intenzionalmente progettati dall'Ufficio della Ricostruzione di Varsavia (1945-1949), guidato dall'architetto paesaggista Alina Scholtz, per gestire i microclimi locali. Al contrario, suggeriscono che gli sviluppi moderni, guidati dal mercato, trattino gli spazi urbani come "vuoti", prioritizzando il potenziale utilitario delle infrastrutture verdi e blu come opportunità lucrative piuttosto che per le loro funzioni di regolazione climatica.

Hinterland energetici
L'aspetto più importante del sistema energetico del XX secolo è stata la dipendenza dei centri urbani dagli "hinterland energetici" globali (Hawkes, 1996). La distanza delle fonti energetiche come petrolio e gas naturale ha portato a una rete di distribuzione globale e all'idea di abbondanza energetica indipendentemente dalla posizione. I contributi esplorano strategie urbane legate alla decentralizzazione e centralizzazione. L'articolo di **Lorenzo Fabian**, **Susanna Pisciella** e **Chiara Semenzin** affronta il tema degli hinterland energetici esplorando la regione nord-orientale del Triveneto. Prendendo le mosse dal Green Deal europeo e dalle proiezioni dell Intergovernmental Panel on Climate Change (IPCC), l'articolo analizza due potenziali scenari per la futura transizione energetica nella regione. Data la sua configurazione geografica e insediativa unica, insieme all'attuale assetto del settore energetico, gli autori propongono un modello centralizzato e verticalmente integrato per il settore industriale, e un modello decentralizzato e orizzontale per il paesaggio residenziale.
A chiudere il numero, l'articolo di **Jacqueline Maurer** mette a fuoco il paesaggio delle dighe svizzere attraverso una selezione di immagini da film documentari e fotografie originali dell'autrice. Queste immagini analizzano criticamente le narrazioni riguardanti la pianificazione e la costruzione delle infrastrutture idroelettriche in Svizzera e rivisitano sia lo studio di Karl Sauer degli anni Trenta del Novecento, sul Lago di Sihl, che la documentazione di Jean-Luc Godard degli anni Cinquanta del Novecento sulla diga di Grande Dixence, che è stata strumentale a prevenire la carenza di elettricità in Svizzera. Le fotografie di **Maurer** sulla diga di Grande Dixence dialogano con il documentario di Godard, sollecitando una riflessione sulle infrastrutture paesaggistiche massive come oggetti di turismo commerciale e sulle loro implicazioni culturali, economiche, politiche e ambientali per le risorse naturali.
In conclusione, questo numero di "Ardeth" mette in discussione il focus prevalente nell'architettura contemporanea sull'autosufficienza degli edifici individuali e si dedica così a una nuova comprensione che integra

strategie di risparmio e produzione energetica nel più ampio contesto urbano e territoriale. Gli articoli e i saggi visuali di questo numero promuovono una visione trasversale dei paesaggi energetici, integrando le scale urbane e architettoniche e la transizione dal consumo alla produzione di energia. Concepire i territori urbani e il progetto architettonico stesso come siti di produzione energetica futura richiede un nuovo modo di pensare il design, come ha sottolineato Dean Hawkes nel 1996: "La città che produce tutta l'energia di cui ha bisogno per i suoi edifici e l'infrastruttura urbana è, ovviamente, solo una visione. Fare i primi passi verso la sua realizzazione trasformerebbe l'agenda per la ricerca e la pratica in architettura più radicalmente di qualsiasi idea dall'avvento del movimento moderno".

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Spatializing the Energy Transition. Toward a Meta-Reflection on the Notion of Energy Landscape

Sascha Roesler in conversation with Elke Beyer, Kim Förster and Daniela Russ

Conversation

Edited by Sascha Roesler

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Abstract

In 2022, urban researchers and architectural historians Sascha Roesler, Kim Förster and Elke Beyer launched the international "Network on Urban Energy Landscapes." The following discussion for the "Ardeth" edition, to which historical sociologist Daniela Russ was also invited, revolves around three central aspects:

a) firstly, the need to think about the energy transition in spatial terms and across different scales, i.e., from the smallest to the largest manifestations of the built environment, which the notion of "energy landscape" seeks to encompass;

b) secondly, the unprecedented challenges posed by the future energy transition and the epistemological limits of historical research;

c) and thirdly, the special position of cities as centers of energy consumption and the inevitability of networked energy hinterlands.

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1 *Framing: Energy and landscape*

Sascha Roesler: I would like to start with the question of possible framings of the concept of the *energy landscape*. This concept is comprised of the terms *energy* and *landscape* and we should talk about why we now need to consider these two terms in tandem.
As part of the research and teaching activities at my chair in recent years, we have been endeavoring to define the concept of energy landscape from both a historical and a future-oriented perspective. In 2019, we taught a seminar for graduate students entitled "The City as Energy Landscape" together with Lorenzo Fabian Stieger and curated an exhibition with the same title one year later.

Fig. 1 - View of the Exhibition "The City as Energy Landscape", Accademia di Architettura (Mendrisio), Università della Svizzera italiana, September 14 - October 30, 2020. © Katja Jug, IG jk_katja_jug.

If we look at the history of ecological design, we can see that landscape architects such as Ian McHarg (1969), Anne Whiston Spirn (1984) and Michael Hough (1984) and urban planners such as Ralph Knowles (1974), Vladimir Matus (1988) and Dean Hawkes (1996) were becoming increasingly aware of the urban dimension of energy.
While architecture has in recent decades focused primarily on the self-sufficiency of individual buildings, the energy landscape approach emphasizes energy conservation and generation on a larger scale. Hough (1984) referenced the term "energy landscape" in promoting an "an ecological view that encompasses the total urban landscape" (9).
In the context of the present challenges posed by climate change and the energy transition, the concept of the energy landscape is fundamental to rethinking the relationship between design and energy at different scales, integrating new technological systems and built structures with natural

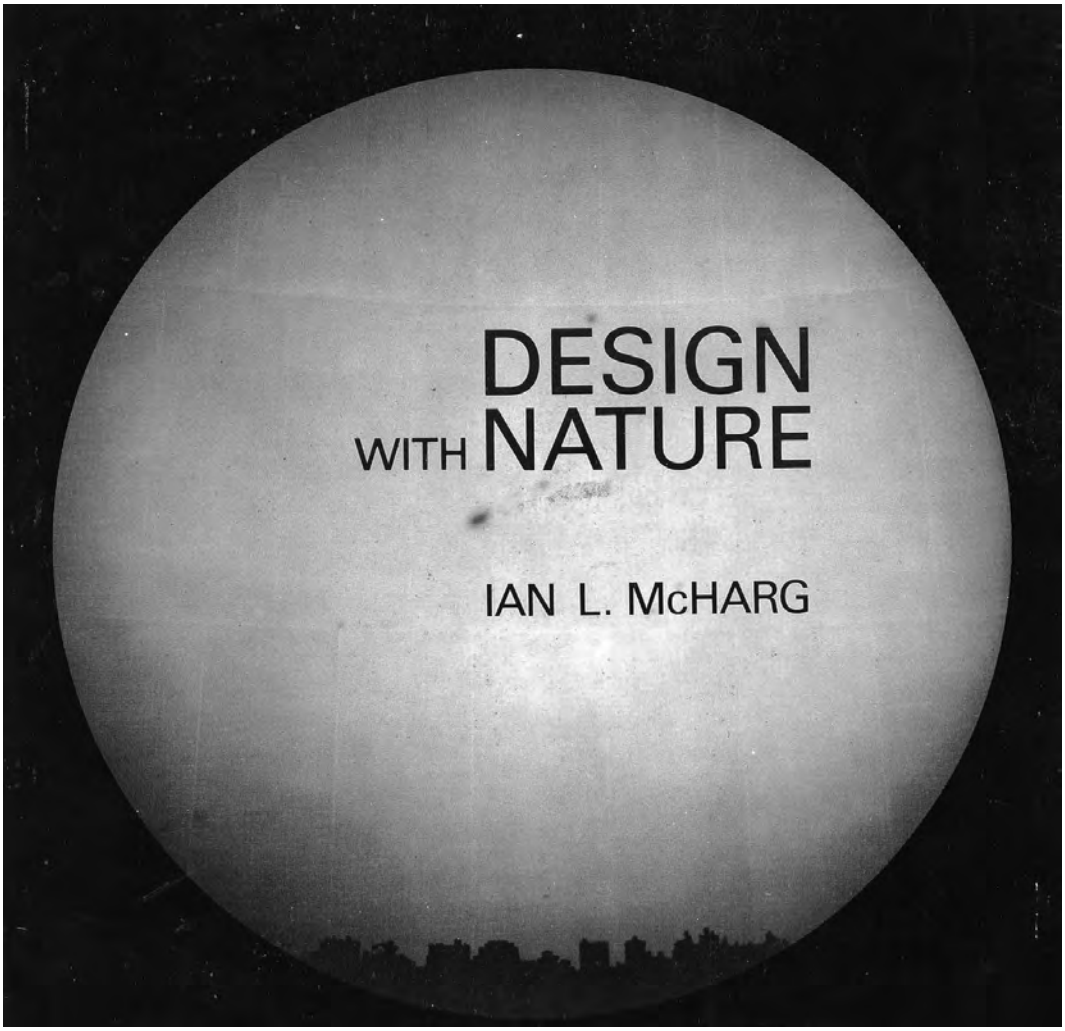


Fig. 2 - Cover of the book "Design with Nature" by Ian McHarg, 1969. © Natural History Press.

processes (Roesler, Kobi, Stieger, 2022). Viewed through the lens of land-climate dynamics, such an approach relies on the idea of the productive (rather than merely consumptive) urban environment, in which the built fabric, topography, soil, water bodies, green spaces and regional climatic conditions (determined by sun, wind, precipitation and seasonal temperatures) serve as potential parameters for energy production. We have termed this interplay between human-made energy infrastructures, urban fabric and natural processes in cities "energy-synergy" (Roesler, 2022).

Energy thinking and electrification

Daniela Russ: I come from the field of sociology, where neither *energy* nor *landscape* exist as theoretical concepts. Nevertheless, I believe that they go well together and tie in with the fundamental question of how the energetic and the material relate to each other. At the time of its in-

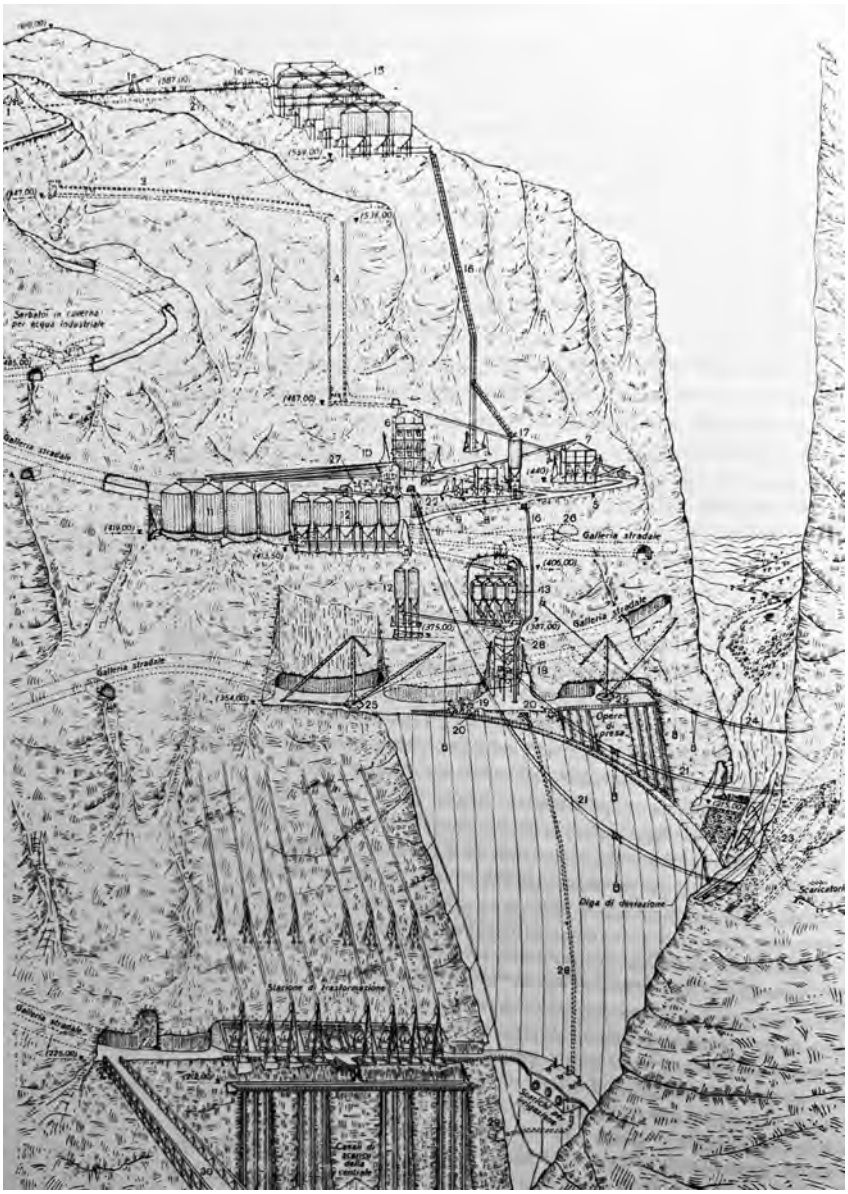


Fig. 3 - Vittorio Gregotti, illustration of the article "La forma del territorio", 1965. Source: Vittorio Gregotti (1965), *La Forma del territorio*, "Edilizia Moderna", nn. 87-88, p. 11.

ception in the early Nineteenth century, energy as a concept was directed against the mechanical worldview of moving bodies. In this respect, the concept of energy can be seen as a completely new form of materialism, which Anson Rabinbach (1990) termed "materialist idealism." It is striking that cement, for example, is discussed today within the framework of its energetic-material relationships, while historically, energy was conceived in opposition to such substance-based materiality. The idea that energy is the real material basis, that the world is materialist in a different way than previously assumed, was already prevalent among the

energeticists of the late Nineteenth century, like Aleksandr Bogdanov and Wilhelm Ostwald (1909). For them, energy relations were the only reality that mattered. Ecological economists like Nicholas Georgescu-Roegen criticize this energy reductionism: energy only ever comes in the form of a resource, it is always tied to a carrier, for example to coal, and beyond that, to an infrastructure (Georgescu-Roegen, 1971). In other words, energy thinking does not exist without material thinking. But it has taken a while to capture and formulate this idea so directly. The resistance of nature has historically been divided into energetic resistance and material resistance, and this division may continue to have an effect today.
In addition to the question of materiality, and this is my second point, I would like to emphasize the history of incorporating the energetic into the landscape.
This is particularly clear in the case of electricity, which was understood from the outset as a technology that, by being transmittable, could transform space. For Friedrich Engels, electrification entailed the possibility of overcoming the urban-rural divide.[1] Industry had initially been present in the countryside with water-powered factories before moving to the city with steam power. Electrification finally allowed it to be evenly distributed. It was about connecting industry with the landscape through these grids.
Those are my basic ideas for a more comprehensive history of energy: on the one hand, seeing energy as a certain kind of materiality and, on the other, the question of how this is manifested in the landscape.

1 - Letter from Friedrich Engels to Eduard Bernstein dated 27 February 1883 in K. Marx, F. Engels (1967), *Marx-Engels-Werke*, vol. 35 (January 1881-March 1883), Berlin, Dietz Verlag.

Kim Förster: The question of how *energy* and *landscape* can be conceptualized together is also a cultural issue. Recently, a group of scholars in the field of Energy Humanities emphasized the epistemology of thinking culturally about energy. Inspired by the American anthropologist Leslie White (1943), energy is now understood as permeating throughout all life. This also became the basis for examining the Twentieth century through the lens of *petrocultures* (Wilson, Carlson, Szeman, 2017). Energy resonates throughout all cultural forms of expression, not just literature and film, but also the built environment. The 1950s were a turning point that affected the entire material culture, right down to the scale of the building, the house, or the fireplace. The notion of energy landscapes places the architectural humanities at the center of an energy discourse that goes beyond the technologically feasible and the infrastructurally mediated (Calder, 2022; Förster, 2022).
On the other hand, also the idea of the landscape is shaped culturally. Landscape, as Lucius Burckhardt (2015) has shown, is a cultural concept with a wide variety of representations and perceptions that are increasingly being understood through an urban lens. André Corboz (1983) conceptualized *land*, or *territory*, as a palimpsest, although the historical traces of energy regimes did not receive much attention. One could say that metropolitanization in the Nineteenth century and suburbanization

in the post-war period of the Twentieth century now represent the actual core of our modern understanding of landscape.
Daniela, what you said about connecting industry with landscape is of course an important topic, conceived economically and ecologically in environmental history today (Cronon, 1991). One of the current focuses of my own research and teaching is the Hope Cement Works in the UK, which were founded in the 1920s to supply the North of England, and which in the 1940s were concerned with precisely this question of aesthetic placement within the newly established Peak District national park. An entire range of measures was taken to conceal these cement works, e.g., by Geoffrey Jellicoe, the doyen of British landscape architecture, who planned the planting of thousands of trees. And yet, this example actually shows that energy landscapes not only mediate between infrastructure networks and aesthetic regimes. From an environmental perspective, linking energy, material, and extraction issues is of central importance.

Elke Beyer: I think your reference, Kim, to the individual house is very important because it makes us think about how the home or the spaces in which we spend our day-to-day lives function in the context of larger energy landscapes. It's not just about the building envelope but also about the multi-scalar interfaces with electricity grids and heating networks that come together in a building. This is what we – along with David Bauer and our students at TU Berlin – investigated in the context of a research-oriented urban design studio on urban energy landscapes, building an understanding of historical energy transitions in the Berlin-Brandenburg region, present-day infrastructural transformation, and future scenarios.[2]

Relational landscapes and embodied energy

SR: As mentioned above, electrification is a process that bridges the gap between urban and rural areas, while at the same time having a dematerializing effect. What interests me in connection with the concept of energy landscapes is the question to what extent the local specificity of landscapes needs to be taken into account again. The current debate on the energy transition is forcing us to rethink the relationship between local resources and broader landscapes. How do you see this?

DR: I agree. Historically, electrification brings an abstract space into play to a much greater extent than steam power, for example. Electric current is not simply available in nature to be used; it requires human work to make a current flow through wires. But it also has to work with a certain landscape: with locally available fuels like peat, with waterfalls and rivers, or – from today's perspective – with local patterns of wind and solar power. Grids do not transcend this locality, but they mediate it in a certain way.

2 - Bauer, D. et al. (in print), *Power Flows and Transformation, Portraits of Berlin-Brandenburg Energy Spaces*, Berlin, Jovis.

EB: What makes the term energy landscape so productive is that it calls upon us to embrace a different understanding of landscape. Instead of seeing a supposedly self-contained, geographically defined unit, we are invited to develop a much more relational concept of landscape. The term *reciprocity* as applied by Jane Hutton (2020) to material movements is of course important here, because both infrastructure and the extraction of resources are mutually inscribed in landscapes and cities. Territoriality plays a major role if we imagine energy consumption and energy regimes as a system of relations that do not necessarily imply just one geographically defined landscape or region, but rather connect many and diverse locations with one another. This is certainly an argument for a differentiated understanding of infrastructural networks within urbanization processes. I also think that those geographical spaces that are seen as objects of transformation take on a different meaning when they are understood as part of the reciprocal transformation of different geographical spaces.
In addition, the scale of the landscape seems appropriate for developing an understanding of the damage ultimately caused by electricity consumption, something that is otherwise experienced as dematerialized or *black-boxed*. Looking at the landscape can help us visualize the extent of the changes on a scale to which our visual perception is accustomed. That is the reason why these impressive photos of open-cast mining areas appear more disturbing than a list of figures. The extent of the environmental degradation, or the extent of externalization and environmental injustice, becomes apparent through a human-eye view of the landscape, however mediated; an environmental degradation that can be found in many parts of the world and is directly linked to energy regimes and consumption in Europe and in urban centers in other countries. In this respect, it is important to include these near or distant landscapes as a field of action and to make it clear that this scale of action is inevitably present. The current practices of consuming energy have an enormous impact on planetary scale and this can be very much ignored, when it comes to our everyday comfort, daily habits and routines. This entire field should be opened up to active and creative intervention, through architecture, urban planning, and even product design, all of which tie in with the cultures of energy consumption and may trigger changes that result in effects at a landscape scale.

KF: After all, the notion of energy landscape is also about the politics of the landscape itself. The power lines, which span the entire territory go hand in hand with a fairly invisible grid. The question is how we must change our thinking when, for example, it comes to the redistribution of wind energy from the North Sea in different parts of Europe. These are issues where visibility plays a role and is also a political factor. Up until now, power generation has not taken place at home, i.e. on our doorsteps, and therefore also involves a completely different visibility policy.

The task of actively making social and environmental relations of energy infrastructure visible is therefore very important. In the Energy Humanities, this is understood as dismantling our energy unconsciousness. Architecture history took petroleum and cement for granted throughout the Twentieth century and, like the *road novel* or the *road movie* of the postwar decade, framed it heroically – and not in relation to fossil fuels and energy landscapes in general (Barber, 2022).
What Elke said concerns a politicized concept of the landscape, developed along the lines of extraction and consumption, similar to what Jane Hutton (2020) has compellingly expressed as "reciprocal landscapes." In her book, Hutton describes how – not only on a national but also on a global scale – various materials used in New York's parks over the last 200 years were supplied and used: from fertilizers to building materials, tropical timber for the High Line, steel from Pennsylvania as substructure for parklands, stones excavated and laid by prisoners. Very different aspects of an understanding of landscape come into play here, labor and degradation, as well as design and construction. These various reciprocal relationships are central to the concept of the energy landscape, both in the built and the extracted sense.

2 *Future studies on energy and society*

SR: I would now like to take a look at the various forms of knowledge about the future in the context of the unprecedented challenges posed by the energy transition. I see an area of tension between agile technological development on the one hand and the attempt to do justice to this development in our research on the other. What is the primary significance of research on energy in the humanities and more specifically in historical research today? I am concerned with the extent to which historical research on earlier energy transitions can make a significant contribution to shaping future energy landscapes. As argued by historian Dipesh Chakrabarty, the unprecedented character of the climate crisis "puts the future beyond the grasp of historical sensibility" (2009: 197).
In my opinion, we are currently experiencing a pivotal change in architectural theory, in which the category *future* is gradually taking on a dominant role, replacing that of the category *history*. It is about the future of buildings and cities, to which an incredible degree of relevance is attributed through rhetorical figures on net-zero emissions (such as "by 2050 we must have achieved this or that goal"). And of course certain new instruments, laboratories, etc., play a systematic role in the scientific anticipation of the future. In the context of these developments, the theoretical question of the *future* should be clearly posed.

DR: I agree that we can't *learn* from past energy transitions, at least not in the sense that they would offer us *tools* that we could use. To me, historical research is not about finding recipes, but about understanding the present in terms of how it developed out of the past: how did we get here?

But there is one particular respect in which I do find it interesting to study past energy transitions: the history of the Soviet electrification is important to me because it allows me to understand the present moment as a continuation of the past. The idea of a fully electrified world was already present in Soviet imaginings of modernity in the 1920s and 1930s. In this sense, it is actually very close to our own present. And from the perspective of this Soviet history of ideas, the extensive use of oil looks like a small detour, so to speak, one that was always limited and that everyone always knew would be limited. Rather than a series of transitions, we can see a single long arc of electrification. Historical research can show how old ideas are manifested in the new.

KF: We assume that electrification is necessary, that electricity is ultimately the form of energy of the future, especially in light of digitalization and its energy requirements. To achieve this, more electricity needs to be produced – with systems we don't have so far. I think that's the central question, to what extent can we actually imagine a future and what does that mean for the future of construction? To what extent building can actually be changed when we know that the construction industry invariably requires vast amounts of materials and energy. Are we looking at a building transition towards non-extractive architecture that revolves around regenerative and compostable solar materials that also bind carbon dioxide, even if only for a limited period of time? Or will this transition focus on non-demolition, reuse, maintenance and repair, as is currently being discussed? According to Vaclav Smil (2017) there are only points of overlap between the various energy systems that society has historically appropriated and that also affect the question of the future.
The promise associated with green technologies is of course also an issue that we need to consider historically. Why, despite knowing better, can we ultimately not look back on a success story? This is something I learned from the eco-projects of the IBA Berlin 1984/87, where the team under Margrit Kennedy at one point proposed that all new and retrofitted IBA projects be designed along environmentally friendly lines, which was then however rendered politically impossible (Förster, 2019). This is of course a counterfactual historical question.

EB: Looking at historical processes of change in energy regimes, it becomes very clear that they are characterized by conflicts over whose practices, concerns and alternative ideas of economic efficiency are considered legitimate – and whose are not. The historical study of which logic is packaged as inevitable, progressive, scientifically proven or simply common sense in certain situations by certain interest groups, for example, also has great potential for contributing to the denaturalization of such logics, both in retrospect and with a view to the future. It may make it possible for us to grasp "conflicting rationalities," to use a term from

Southern planning theory coined by Vanessa Watson and her colleagues (de Satgé, Watson, 2018).
Electrification is a really interesting example for understanding which actors were or are active in such conflicts, which forces they align with, and which strategies they deploy to bring about such comprehensive transformation processes. These range from the private sector to municipal and state actors and include active educational or propaganda material, so to speak, aimed at influencing potential consumers and encouraging and enabling them to use certain energy sources. Just think of the cookery books published by the manufacturers of electric cookers and other appliances since the interwar period, teaching housewives how to use such and such an electric cooker, which of course had to be manufactured, bought and plugged into a socket somewhere.
Considering potentially conflicting rationalities, one can also work strongly towards the future by trying to break open the black boxes of infrastructural arrangements, highlighting the conflicts of interest they may hide, for example in relation to energy regimes, in order to perhaps start intervening critically and in unexpected places.
Navigating across many fractures and lines of conflict appears to be unavoidable in the energy transition in general. But there are so many experiences that may remain singular and invisible – and bringing them together is the task of critical historical and contemporary urban research. So my ideal would be to be able to bring both perspectives – past and present transitions – together. Of course, it is not always possible to go into the full breadth and depth, to leap across different time periods while at the same time keeping an equally close eye on archives and current developments. But it is desirable to foster a conversation between these different fields.

SR: The built environment is already full of examples that epitomize the future. In my daily observations of technologies and the built environment, I see many developments that I believe are shaping or at least anticipating the future. Of course, our critical concepts that reflect these developments are not simply dictated by practice but should also be derived from it. So how do historical and empirical research relate to each other in this context, while also integrating a new type of future studies in architecture and urban planning?

DR: I think it has never been more important to reflect on the concepts than it is today, precisely because everything is changing so quickly. I also work from a sociological perspective on questions of ownership in a renewable energy system with all the components it entails: generation, storage, algorithms, etc. And I would say that the description of renewables as inherently decentralized and democratic that has been propagated since the 1970s is questionable to say the least. Instead, we should look at today's financial markets, including the ownership structure. There is now a very strong connection between asset managers and re-

newable energy (Brett, 2024). This is where I would say that sociological, historical, and architecture research is very much needed. I see a danger in what you have described, namely that the idea of a decarbonized future will become so dominant that people will focus solely on this goal. This risks suppressing a reflection that questions the new things that are being built here. That's how I see it with regard to the emerging energy system: we may no longer have the old energy companies, but instead other businesses that are just as opposed to democratically controlled energy production.

KF: The point you raise, Sascha, is the well-known contradiction between practice and theory that architecture is struggling with and which is currently being called into question both in the curricula and in architectural practices. I would prefer to see it as an opportunity to think more comprehensively about energy landscapes – not only to keep an eye on design or clients as the central players, but also, as Daniela described, to think democratically within the given possibilities. So what potential does the energy transition actually offer? I think this is also an urban question: Who owns this public or privatized electricity grid and who sets the prices in it? How is it measured and who still has access to it? Where are the users when it comes to ownership?

Energy landscapes of cities

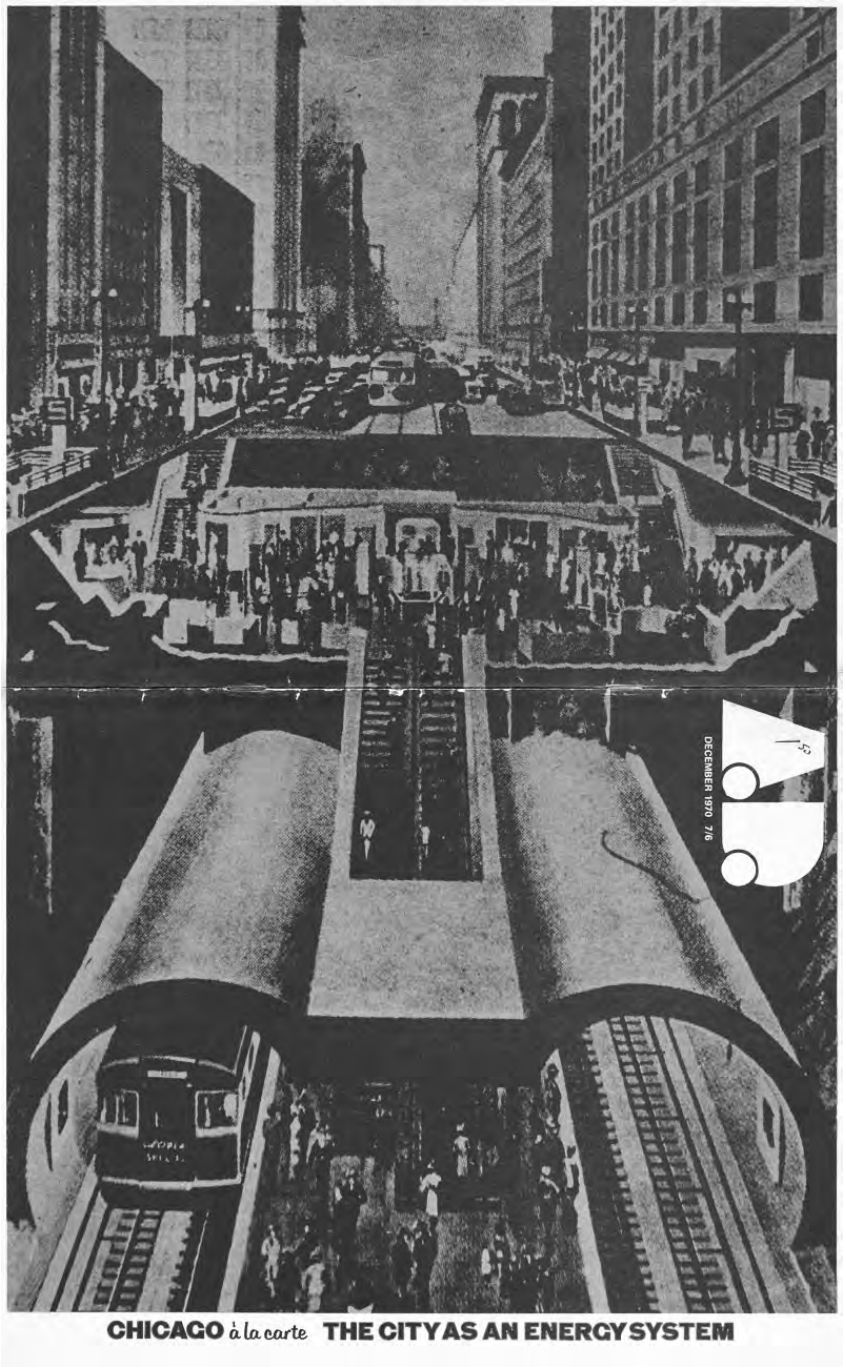
3

SR: As a last step, I would now like to talk about urban energy landscapes and the specific challenges of cities. As you know, around 80 per cent of the primary energy produced worldwide is consumed in cities. As dense structures, cities are the main consumers of energy. In my research, the question of how cities can be transformed into sites of production is a crucial one. They shouldn't just be energy consumers in the future, but also centers of production. Can the urban be seen as a blueprint for energy landscapes in general?

Urban renewal and repair

DR: If the city is thought of as an energy producer, it must also be thought of as a storage facility. This function is more difficult to realize. This is the systematic, not really expressed problem of the new energy grids. It is also linked to the unpredictable openness of the future; you never know how you will store it and for how long you will actually need it. I would also say that new spaces will emerge: whether that means storing hydrogen in salt caverns or something similar remains to be seen. That would be a completely different space which would then take on a very functional significance for an electricity grid. At the level of energy producers or grid stabilizers, I would say that the space will change.
EB: It's not just about creating completely new systems, but also about

Fig. 4 - AD special issue on "Chicago à la carte. The City as an Energy System", edited by Alvin Boyarsky, December 1970. © Alvin Boyarsky / AD.



maintaining, caring for and rebuilding existing systems with a critical understanding. This is where I see the great potential of the currently much-discussed concept of *repair*, or the idea of a reparative approach. In the context of the city, it makes sense to work with the concept of repair, because – rather than completely reinventing something – repair requires you to first understand how it really works, and what part you may want to improve. Enabling repair also means disclosing the sources and technologies, i.e., open source thinking, to which critical research can make a major contribution in the context of financial mechanisms or commoning models, for example. Repair relates to the question of who ultimately benefits from certain developments and who does not, and who has the opportunity to interact or make changes.

3 - "The Great Repair" is a project curated by Arch+ at the Academy of the Arts, Berlin, ETH Zurich and University of Luxemburg.

DR: It's difficult to think of converting the energy grids as type of a repair. But I still find it intriguing to think about what it could mean…

KF: There are very differently inflected terms for repair, as "The Great Repair" exhibition first shown at Akademie der Künste in Berlin in the fall of 2023 has highlighted.[3] Maintenance can also mean maintaining the existing socio-economic and political conditions.
A key question here is also to what extent it is actually possible to think and act differently in terms of energy transition in the existing building stock. In the well-known examples of the IBA Berlin 1984/87, the solar panels of Block 103 in Kreuzberg were state-of-the-art. They were owned collectively, but at the same time, they had to be operated by someone, similar to all the other eco-tech modules. The Social Democratic Berlin Senate had at the time been investing in job creation schemes, but apart from IBUS Architekten there just wasn't much solar engineering expertise yet. Moreover, at the same time, while aiming to be off-grid, they still needed a diesel generator as backup for energy bottlenecks. The example of Block 103 provides evidence for all the lines of conflict present in this careful urban renewal.

SR: The concept of repair is a processual one, which means that it is about continuous maintenance, but also conversion and further construction and so on. It is therefore also about the tension between the energy transition as goal and as process, between political goals and the day-to-day transformation of the city. Net zero emissions is the new overarching goal that is now being discussed worldwide. It's fascinating how the big cities are now proclaiming this as a goal; Munich for example wants to reach net zero emissions already by 2030. However, if we conceive the energy transition as a process, then the goal of net zero emissions can never be achieved.

DR: My impression is that it's just a carbon accounting term. It's perhaps most interesting in what it does not say: That a city would have to produce enough renewables, day and night, 24/7, in every millisecond to

achieve *gross zero*. This means that what is actually triggered is just the flow of money into some renewable asset, which then makes it net zero. I think that the *Net Zero City* is an interesting phenomenon, but I don't think that it's a theoretical term.

KF: I would also take a critical view of net zero as a political instrument. Even if reducing carbon emissions – sooner rather than later – is part of this vision, and achieving climate justice is the objective, the supposed ability to plan is calming rather than disturbing. At an architectural scale, however, existing concepts fall short of net zero or do not provide for it at all. And from a planetary perspective, we would need negative emissions: absorbing, sequestering or storing carbon on a huge scale, which seems impossible within the limited window of opportunity that remains.
To some extent, this echoes the criticism of the various certification systems that already exist today. Along with students, we carried out research on the 1980s energy projects in Milton Keynes as one of the places of origin of the British BREEAM certification scheme, comparable to the American LEED scheme, the Swiss Minergie and the German Passivhaus. The fact that the first energy certification scheme was introduced in the UK under the Thatcher government is actually indicative of the very mechanisms we are discussing here. The energy projects incorporated by the urban development corporation of Milton Keynes shows that the promise of solar savings on energy bills at the end of the year cannot be the promise of this homeowner subsidy. So the single-family home appears to be the critical flaw here. There have been attempts to build whole subdivisions heated by passive solar, but these have proved to be politically unfeasible.
In retrospect, this historical example shows that a wide range of different urban development policies were sought, including cooperative schemes, that were also related to land and ownership, while ultimately, the promise of energy use at block or settlement level was not fulfilled.
Net zero should offer completely different approaches today, beyond a construction program: tackling building and living in the here and now and promoting existing neighborhood facilities and infrastructures.

EB: I always try to convey to my students that it's great to look at the energy balance of a building when it's in operation. But it's better to also look at the energy balance in terms of the production of the materials and the energy that went into it, and what is ultimately sacrificed during demolition. Similarly, it is not enough to look at the energy balance of a city as a closed operation unit in a given short time span, because the question remains as to how these renewable energies are generated in the first place, what raw materials are needed to produce the technological systems, how they are operated, maintained and replaced, and what kind of interdependencies this creates. The concept of urban energy

landscapes, in a truly relational sense, also has the potential to generate a more comprehensive picture that is not yet reflected in the isolated energy and resource balances of buildings and cities.
When we talk about urban energy landscapes, it means that we are not only focusing on dense settlement areas, but also incorporating a different concept of urbanization that includes the hinterland when we talk about the urban. In other words, the term highlights that we no longer really have an alternative to the urban, only different forms and different intensities of use of territories.

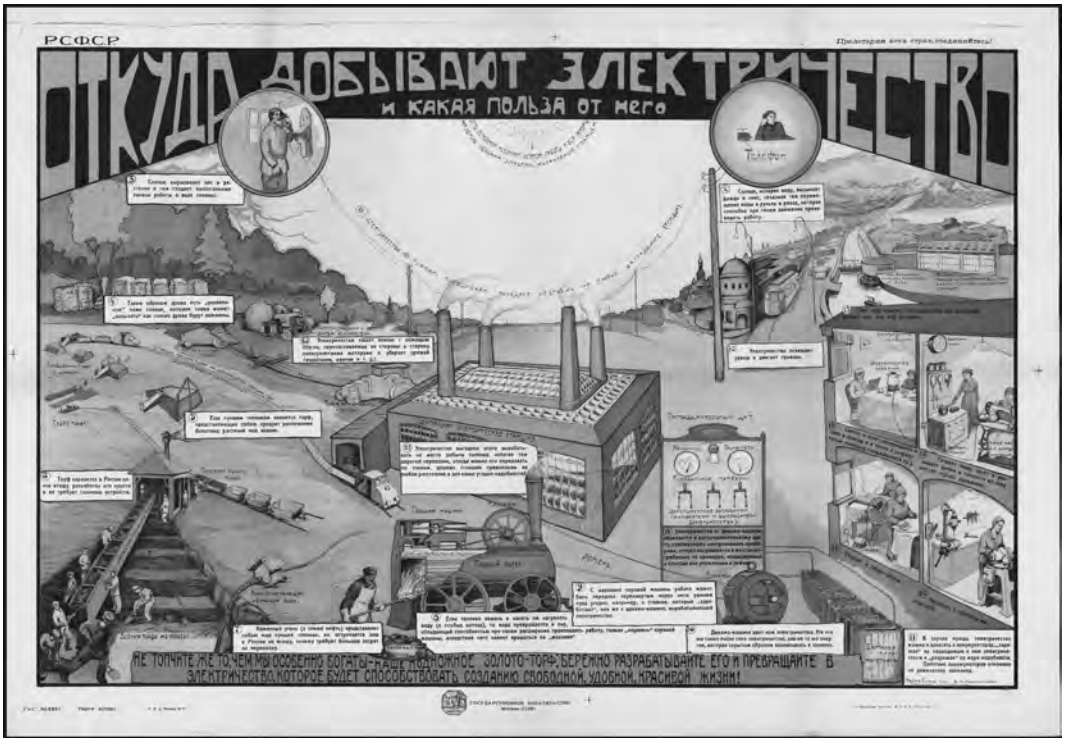


Fig. 5 - "Otkud dobyvaet elektrichestvo i kakaia pol'za ot nego [Where does electricity come from and what does it do for us?]", Propaganda poster in favour of the electrification by artist I.M. Sakharova, Moscow 1921. © National Digital Library (NEB), Russia.

District heating

DR: During my research, I realized that the Soviets had their own understanding of heat economy and heat in the city. You could call this technology district heating, and it was just as important as electrification. "Toplifikaciia" (figure 5) is one of the most interesting urban energy phenomena of the Soviet Union. The system was urban by necessity and did not supply the hinterland, because the heat could not be transported over a large area. This was possible because there were no property boundaries; everything belonged to the city or the state, which had eminent domain.

EB: However, modulation or rather the impossibility of modulation was often a central problem with these Soviet systems. The overall system worked on the basis that all heating devices in the apartments were always radiating at full capacity in order to consume the energy of burning coal in the heating plants, otherwise the system would overheat somewhere – thus establishing excessive energy consumption by design. Beyond the local infrastructure, I would also make the connection to the hinterland again by including the resources that were burned to heat the water that circulated in the heating systems.

DR: In the Soviet school of energy economics, which I am currently researching in more detail, there was an attempt to think very locally. Of course, not every town is situated near a coal deposit, but the scientists at the time started with charting locally available resources. That's how they came to use peat, for example. And this is where I see a certain difference to the idea of simply extracting resources at random sites. It was at least entertained as a theoretical idea, although it wasn't always politically feasible, and at some point, of course, the nearby energy resources ran out. Some engineers tried to work against the idea of a global energy hinterland, even if they didn't succeed or the systems weren't particularly efficient.

SR: District heating networks were an export hit for the Soviet Union. Soviet experts brought the technology to China and Eastern European countries. As far as I know, Warsaw has the second largest district heating system after Moscow; it is still the backbone of the city's energy network. We went to Warsaw with our students and analyzed the different facets of the energy landscape, including energy poverty and the idea of democratic access to energy. In this context, the ambivalence that technical solutions for the energy transition can harbor became clear to me. In Zurich, district heating is being promoted as part of the green energy transition; a district heating system is currently being built to which my own neighborhood is also connected. In Warsaw, on the other hand, district heating is part of the problem that needs to be solved in the coming decades. The Warsaw district heating system, which runs on coal and natural gas, is a highly inefficient system that has been privatized. It is quite clear that it will simply become obsolete at some point.
So I think we also need to analyze the immense ambivalence of these technical solutions. What does it mean to drive the energy transition in an existing city with existing infrastructure, like Warsaw, where a district heating system is already in place? And does the energy transition mean optimizing this system, like the huge underground and above-ground pipelines, or is a completely new system being designed for future Warsaw? I think that the question of how we can work with existing urban structures as a resource is an open one.

KF: One aspect of district heating is the energy base, as it is currently fueled by fossil fuels, and a switch to renewables. In Switzerland, waste heat from waste incineration plants is the preferred alternative. Co-processing also provides the fuel for kiln combustion in the cement industry, where it has been communicated and promoted as a supposedly environmentally friendly solution since the 1980s. The justification for this is based on the assumption that the waste is produced anyway and could generate a level of energy intensity comparable to fossil fuels. Of course, this does not eliminate the emissions, and in addition, highly toxic waste materials are co-processed. This will hopefully be different in an urban context, but again fuel substitution is approached as a technological fix for filter systems, while the question is, what kind of future imaginary is reproduced if we initially avoid waste, but then view it as a fuel and economize on it.

New energy communities

SR: There is a new development emerging today, known as "microgrids." Homeowners can create new types of electricity generation grids, thanks of course to the use of internet technologies, and in principle create something like their own community, beyond the opposition between private and public. They are technology-driven and offer possibilities that didn't exist in the 1970s and the 1980s. Interesting new forms of ownership are emerging, e.g., energy commons that are accessible to larger groups, but not to everyone. This would be another topic to discuss in connection with the urban energy transition.

Fig. 6 - Patrick Schnell, a participant in the Brooklyn Microgrid, with solar panels on his roof in Gowanus, New York 2017. © Kevin Hagen for "The New York Times".

DR: That's exactly the question I'm currently facing: what collectivization could mean – not just legally as ownership, but also as the democratization of the energy transition. After all, this example from Warsaw shows what a difference it makes whether or not people get to decide on a system. I would say that the establishment of energy systems was never a democratic process but was fundamentally always planned at a national or corporate level. This concerns the centralization of energy, as was the case in the Soviet Union, where a system was planned for everyone from the top down. What democratization might look like in practice is an open question for me.
At the moment, I think there are far too many demands for democratization, self-sufficiency and independence, which the new renewable technologies cannot fulfill. In this context, it is interesting to ask ourselves how to think about collectivization. I would suggest that we need to look beyond these small-scale solutions that pretend to be self-sufficient with a power plant on the balcony. It is easy to forget that nobody really disconnects from the grid – everybody needs backup plants and spare capacity. And even in the case of these small community projects, the microgrids, I would be surprised if they were self-sufficient every second of the year. In addition, looking beyond electricity production, small communities cannot fully take on the manufacture and repair of these devices themselves.

EB: I would largely agree with you there. But I still think it's important to take a closer look at grassroots approaches to see what potential is ultimately available. After all, the big operators are the ones who are going to install solar power on their sites: they are major players on the financial market and investors who are also involved. Ultimately, the question of how individuals or communities can be empowered to make decisions about their own energy consumption habits, mediated in some way by the systems, remains very important. How can this be implemented? Via geothermal probes installed in individual houses or via wind farms collectively owned by a village?

DR: Yes, but at least in Germany, I doubt that these projects make up a large share of renewable development.

EB: I share your skepticism, but we shouldn't give up on this vision for the future. Otherwise, what you're saying is: "Ok, we're basically leaving it to the same players who previously ran the energy industry on a large scale," and all you can do is shrug your shoulders in regret.

DR: My point is that we need to think about collectivization at a higher level, at the level of the energy system, and not just at the level of single wind farms operated by villages. Because somebody regulates the grid, somebody has to build the storage capacity, somebody owns the

algorithms on which everyone depends. And you can't be satisfied with wind farms if you really want to achieve democratization; you have to tackle the systemic issue, which is bigger. That would be a different kind of energy community. With these decentralized solutions, you give up a certain amount of control over the big power issues. And what might a larger collectivization look like that takes the systemic level into account?

KF: However, I am not quite sure where this would take place in real life, across Europe, at an urban and territorial scale. The case of the German "Energiewende" towards renewables, promoted by Herman Scheer (2022), has been discussed as energy democracy. Both Dominic Boyer and Ashely Dawson (2016) have recently revisited bottom-up energy initiatives. Where would you locate this kind of collectivization? Who would be in charge?

DR: Good question. Well, I can only tell you where to look. It is often not a piece of the grid located in the city that you can buy back. I don't think that would be possible in any way other than through political regulation. In any case, if there is a digital grid in the future, it would be important for the conditions, i.e., how the algorithms are used, how the scarce renewable energy is distributed, to also be decided democratically. I would say that there are basically no real political forms for this so far, except in national politics. And even that is of course too small in a certain sense, because almost no single European country will ever be energetically self-sufficient. I think that more research needs to be done in this direction.

SR: Nice closing words. Thank you all for these meta-reflections on the concept of the energy landscape!

Bios

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energy landscape • energy transition • corpo-rate land-scape

Power to the People

Milica Topalović (1),
Jan Westerheide (2)

Abstract
Who owns energy sources and governs the energy transition? How can people mobilize for alternatives to fossil dependencies? There is no better place to ask these questions in Germany than the Rheinisches Revier, the region around the surface mine Tagebau Hambach, where the advancing coal mines and the desire for cheap energy have shaped the territory for over a century. The region has recently emerged as one of the battlegrounds of the global climate struggle, culminating in the occupation and eviction of the hamlet of Lützerath in early 2023.
The multinational energy corporation RWE (formerly the Rhein-Westfälische Elektrizitätswerke AG) governs all vital processes in the region, from geological structures to social realities and imaginaries, making it omnipresent in every aspect of life. Even as mining operations are being phased out in favor of renewable energy as part of Germany's intended *Kohleausstieg 2030*, RWE remains in control of energy transition: in this corporate landscape, wind and solar parks are simply added to coal-fired power plants, based on the unchanged rationale of increasing profits that characterizes the extraction of coal. Fridays for Future, Alle

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ARDETH #13

Dörfer bleiben[1], and other activist and citizen organizations continue their struggle across the region, contesting the corporate greenwashing which deepens capital's control of the land as well as perpetuates the interconnected crises of climate change, social polarization, cultural erasure, and ecological exhaustion. They demand not just an immediate exit from coal but also a democratically controlled and socially just transition to renewable energy. The world of ecological energy commons, democratically governed, can emerge. Power to the people!

1 - Alle Dörfer bleiben ("All villages stay") is the name of an alliance of affected people to fight together against forced resettlement and climate destruction by lignite open-cast mining areas in Germany. For more information see: www.alle-doerfer-bleiben.de (Accessed 19 June 2024).

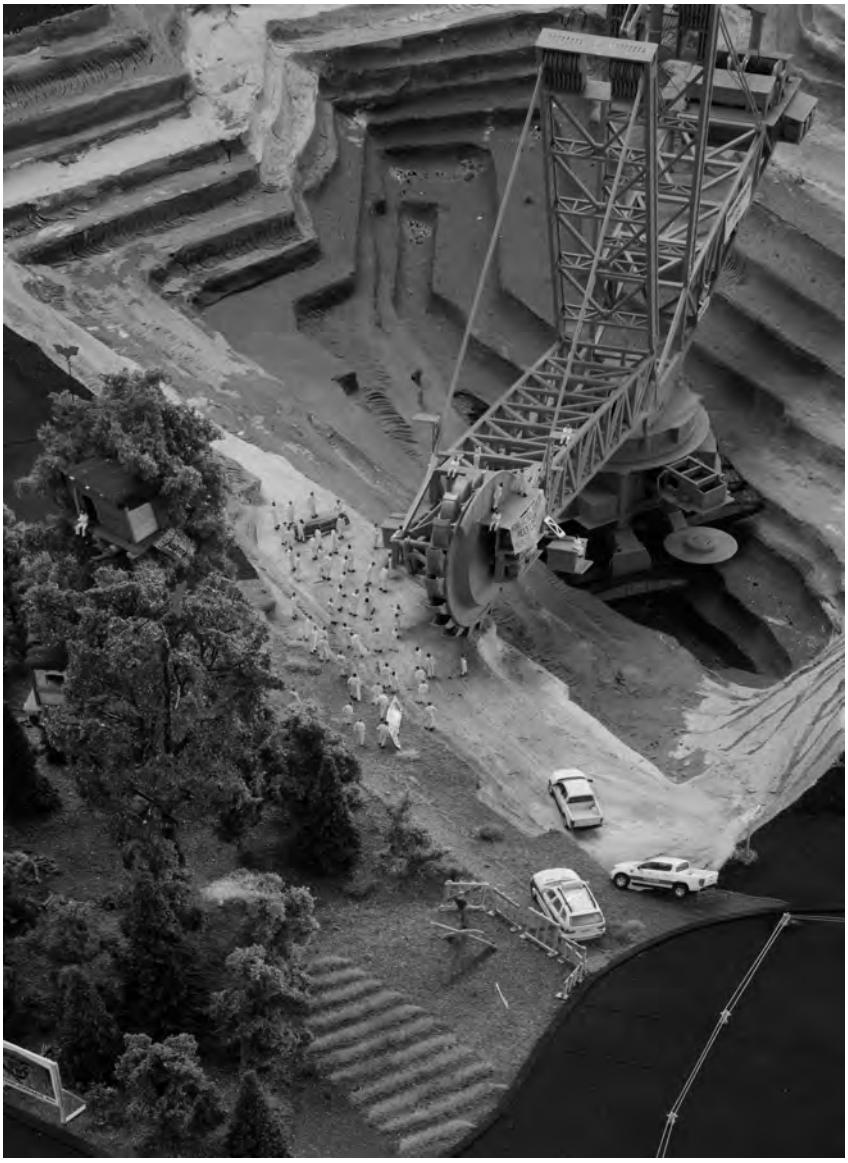
Fig. 1 – The territorial model of the project *Power to the People*.

In the *Power to the People* project, presented in the form of a territorial model, students of the chair of Architecture of Territory at ETH Zürich have portrayed stories of struggle as opportunities for a just energy transition and the social and ecological repair of the land. The model of the Rheinisches Revier, a 5,000 square kilometer coal mining region with a population of nearly 2.5 million residents, showcases miniature scenes illustrating stories of struggle for the social and ecological repair of the area.
To ensure the expansion of the open-cast mines, German mining law allows the energy corporation RWE to destroy entire landscapes, demolish villages, and relocate residents. The village of Morschenich-Alt had been slated for demolition since 1978; however, political pressure by various groups and the work of activists saved it from destruction in 2020. The prolonged uncertainty has led to the village's near total depopulation, with resettlements continuing to this day. RWE remains in control of life in the village as the owner of all land and buildings; as an employer for the remaining inhabitants; and even as a public utility company providing for the village's heating with brown coal.
Project: Filippo Biasca-Caroni, Martin Kohlberger

Fig. 2 – Morschenich-Alt: The Power of an Energy Corporation.

Fig. 3 – Morschenich-Neu: Reproducing Dependency.

Like most municipalities in the Rheinische Revier, Merzenich, which includes the village of Morschenich-Neu, is a shareholder of the energy corporation RWE, thereby tying its public finances to the economic fortunes of the German multinational. To resettle the inhabitants of Morschenich from the old part to the new part of the village, the municipality worked in close collaboration with RWE, who was allowed to purchase the land. RWE owns nearly half of the stock in the utility operating the new central wood pellet heating system in Morschenich-Neu, cementing the corporation's multi-pronged influence.
Project: Filippo Biasca-Caroni, Martin Kohlberger



Hambacher Forst is the remnant of a vast woodland that was gradually cleared to make way for the Hambach open-cast mine. Since 2012, the forest has been occupied by activists who helped bring public attention to its impending destruction. In addition to on-the-ground activism, several lawsuits were filed against RWE by the environmental association B.U.N.D. on behalf of *Myotis bechsteinii*, an endangered bat species present in the forest, and to object to the expropriation of a property owned by B.U.N.D. right at the edge of the mine. These strategies contributed to the rescue of the forest in 2020, when a federal agreement was reached to preserve it.
Project: Elisa Nadas, Ella Bacchetta, Charis Gersl, Silvano Ursella

Fig. 4 – Hambacher Forst: How to Save a Forest.

Since the 1980s, to protect their villages, residents have been fighting the expansion of the Garzweiler open-cast mine with little to no attention from politicians and the media. Their struggle was noticed only in 2017, when climate activists from all over Europe occupied the endangered hamlet of Lützerath, turning it into a symbol of the global climate struggle. Lützerath served as a place of gathering and knowledge exchange for numerous activist groups, helping forge a connection between local movements and global networks of resistance. The hamlet of Lützerath was cleared by the police in January 2023.
Project: Elisa Nadas, Ella Bacchetta, Charis Gersl, Silvano Ursella

Fig. 5 – Lützerath: Networks of Resistance b.

Once mining operations come to a projected end at the Hambach open-cast mine in 2030, groundwater will begin to slowly rise again, flooding the great crater in a natural process taking hundreds of years. The pressure to accelerate this process is high, as different actors wish to enable an economic exploitation of the artificial lakes. RWE plans to build underground pipelines from the Rhine to the pit, allegedly allowing it to fill up in only 40 years. This would create Germany's second largest lake by volume. The feasibility of the project and its long-term environmental effects are severely disputed.

As owner of the land, RWE is also able to shape the nature of the post-mining landscapes. One example is Sophienhöhe, the world's largest artificial hill, made up of excavated material from the Hambach open-cast mine. A new forest was planted to renaturalize the hill and to compensate for the loss of the old forest. To date, RWE has reforested an area totaling about 80 square kilometers around Rheinische Revier, far short of what has been lost to the mines. Too compact and infertile to sustain a forest, the mineral substrate from the mining pit has to be enriched with nitrogen and topsoil over several years to create a sustainable soil for plants to grow.
Project: Elisa Nadas, Ella Bacchetta, Charis Gersl, Silvano Ursella

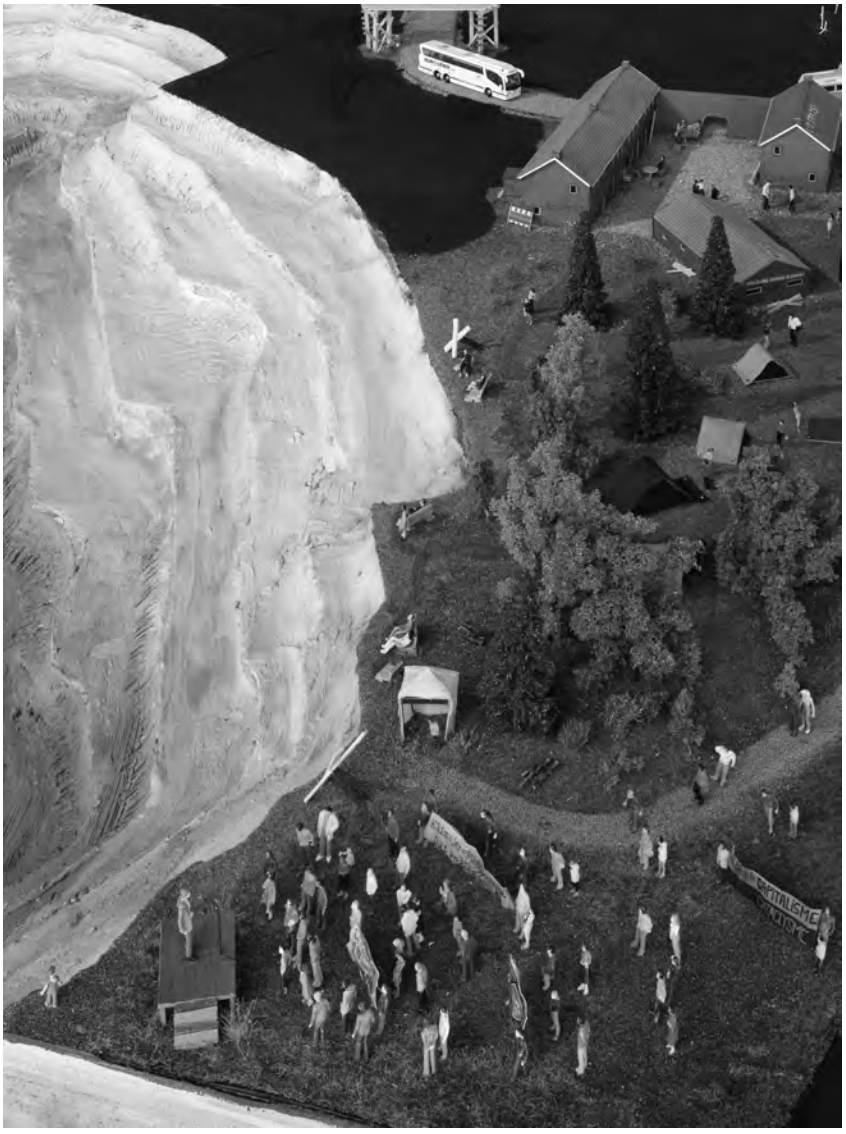


Fig. 6 – Hambach Mine: The Lake Project and Limits to Renaturation.

Water infrastructure is integral to RWE's brown coal extraction operations. To keep the mines dry, groundwater is tirelessly pumped out from a depth of over 500 meters through a network of more than 1,500 pumps. However, the drop in groundwater levels is not confined to the mines and their immediate surroundings. A so-called drawdown funnel centers on the mines, lowering the groundwater table as far away as in the Netherlands.
Activists in the region perceive the mines' water drainage infrastructure as a symbol of RWE's corporate exploitation of the region. Their resistance includes tactics such as setting fire to the power supply of groundwater pumps. By targeting the drainage infrastructure, they seek to disrupt the daily operations and processes of RWE, aiming to make a resounding statement against the company's actions.
Project: Nora Hauser and Andela Pejic

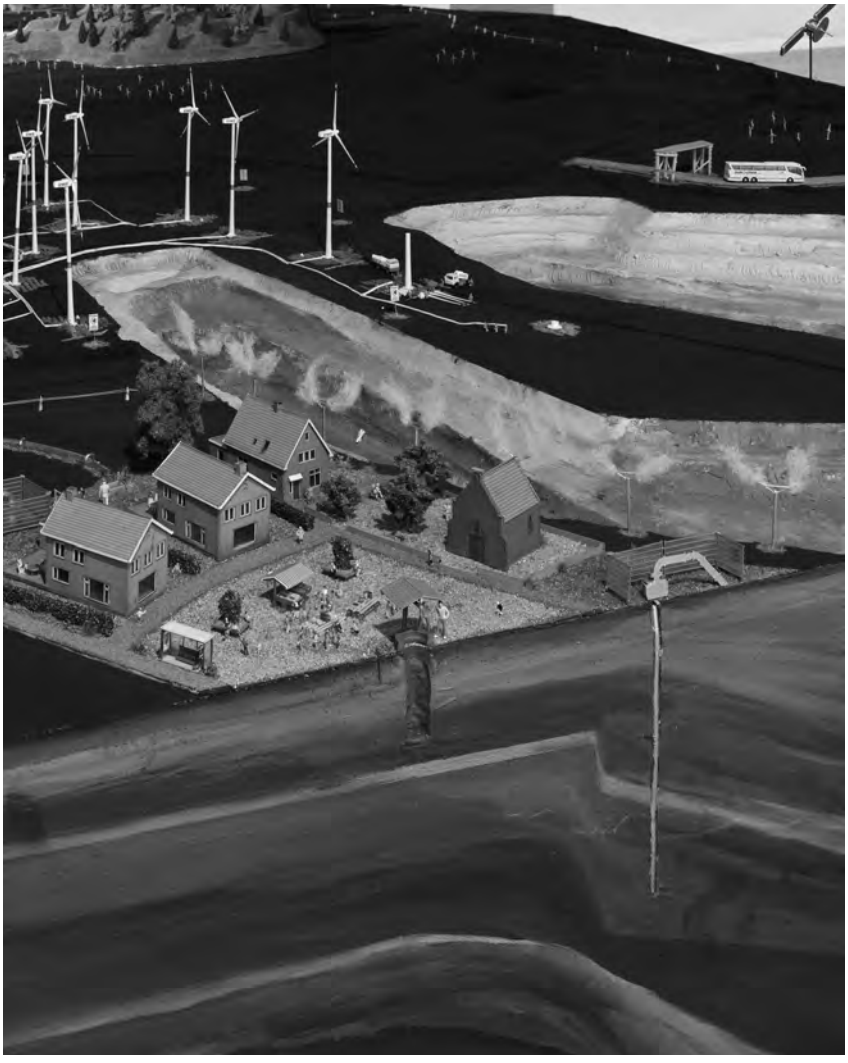


Fig. 7 – Hambach Mine: How to Blow Up a Water Pump.

After groundwater is pumped up to keep the mine dry, it is used to cool the power plants and to operate an extensive sprinkler system along the edges of the pit, intended to prevent the spread of dust. The supply of drinking water for the neighboring municipalities can no longer be guaranteed as aquifers run dry; instead, they become dependent on the supply of treated water provided by RWE. The impact of drainage extends to the regional wetland ecosystems which, to be preserved, must be artificially hydrated.
Project: Nora Hauser and Andela Pejic

Fig. 8 – Rheinisches Revier: Brown Coal Water Cycle.

Fig. 9 – Königshovener Höhe: Controlling the Energy Transition.

The wind farm at Königshovener Höhe is located on the recultivated lands of the Garzweiler open-cast mine. Devoid of vegetation and settlements, the post-mining landscape provides optimal conditions for the construction of wind farms. RWE maintains ownership of the land, enabling the company to build and manage its own wind turbines. In this way, the fossil energy corporation characterized by a questionable social and environmental record, secures its place as a leading protagonist of the energy transition.
Project: Jerome Ammann

Acknowledgements
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Teaching team: Professor Milica Topalović, Jan Westerheide, Muriz Djurdjevic, Dorothee Hahn, and Felix Hergert.
Model team: Professor Milica Topalović, Jakob Walter, Jan Westerheide, and Leslie Meyer with student assistants Till Blaser, Amélie Lambert, and Yufei Li and students Jérome Ammann, Ella Bacchetta, Filippo Biasca-Caroni, Charis Gersl, Nora Hauser, Martin Kohlberger, Elisa Nadas, Andela Pejic, and Silvano Ursella.
The model was first presented at the exhibition *The Great Repair* at the Akademie der Künste in Berlin (14 October 2023-14 January 2024) and most recently at the iteration of the exhibition in Paris at the Pavillon de l'Arsenal (7 March–5 May 2024).
All photographs shown in the visual essay are by Bas Princen and were originally taken in color.

energy landscapes • energy transitions • ports • Ravenna

Energy Landscapes in Transition.
The Port of Ravenna

Leonardo Ramondetti

Abstract

This article investigates how the current energy transition is driving a radical reconfiguration of the Port of Ravenna. Once a powerhouse of gas extraction and processing in the Adriatic Sea, this site is set to become the largest sustainability hub in the Mediterranean. However, this green transformation has major implications for its surroundings and environment. The result will be a novel ecosystem which fuses land and sea into a landscape for energy production and exploitation. However, the controversies this process sparks call for a reflection on the expertise required to engage with large-scale spatial transformations brought about by the energy transition, as well as alternative approaches to the current debate on energy and infrastructure landscapes.

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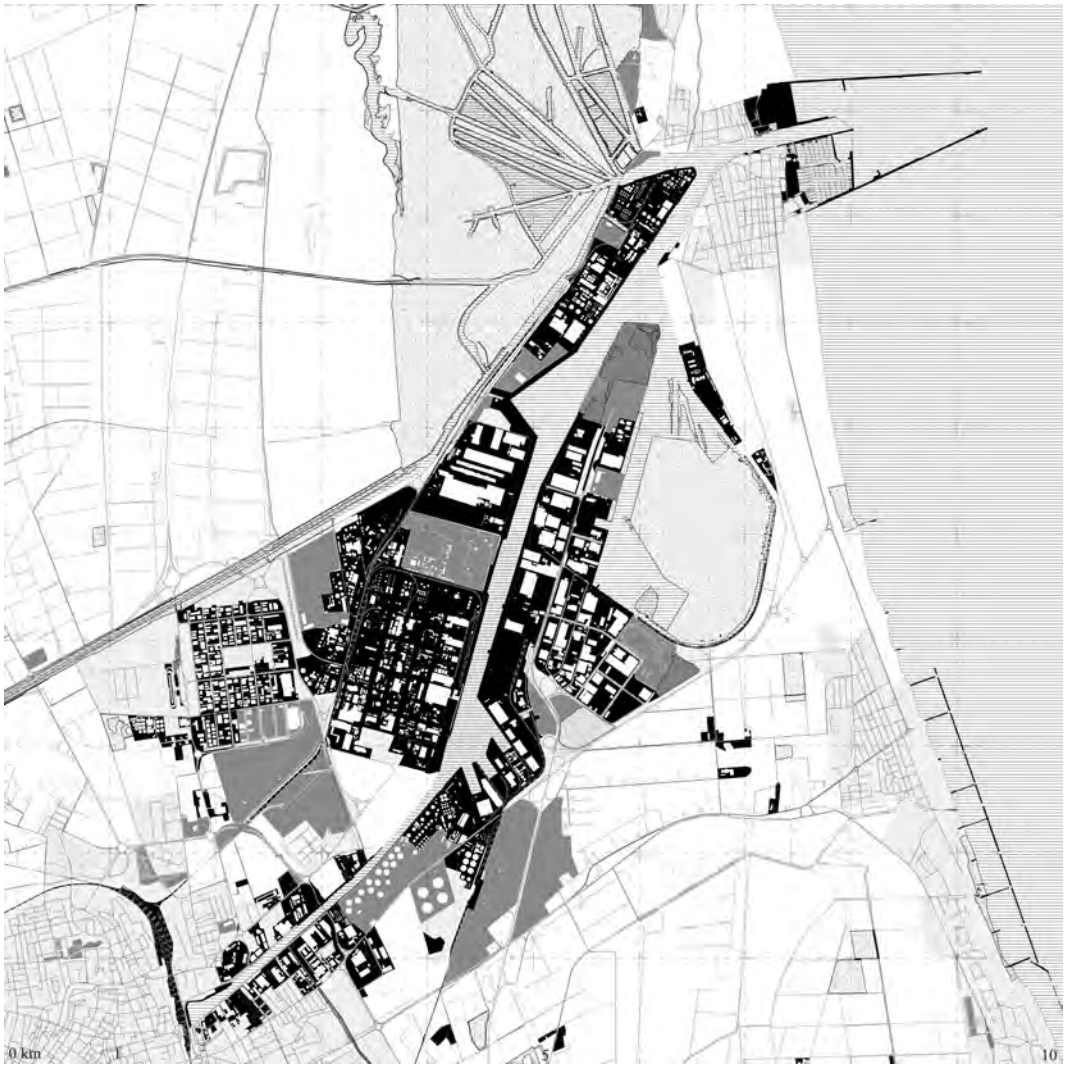
Fig. 1 - The Port of Ravenna. Map by the author.

The Adriatic powerhouse going through the energy transition

Standing at the window of her office, Elena, a representative of the Ravenna Port Authority, points out the terminus of the canal. “Down there is where the port begins”, she says. However, it looks nothing like a port. In front of us, there is a deserted 50-meter-wide waterway with no ships, no cranes, not even a single stevedore. Just a monotonous flatland bisected by a line of still water. I must look surprised since she invites me on a boat trip. Setting out from the city of Ravenna, after passing under a drawbridge, the scenery along the banks changes suddenly. An expanse of brownfields appears. “This used to be Sarom,” she says, “one of the largest refineries in Italy in the 1950s, and closed down in the mid-1980s.” The set of Antonioni’s *Red Desert* is gone, and so too are the anxieties of the modern industrial society he portrayed. All that remains is two



massive cooling towers surrounded by debris and rusted storage tanks. "This doesn't look great, but it will soon be covered with solar panels: the green transition is on the way, and Ravenna will be a protagonist." The canal then widens into a basin, and countless chimneys, barely visible from the city, now tower over us. For the next 7 kilometres, the scene is a succession of massive factories, warehouses, mounds of aggregates, and silos for cereals. But mostly huge power stations and ancillary activities, with their intricate networks of pipes, tubes, and turbines. "This was one of the largest oil refining and chemical clusters in Italy, and it will rise again as one of the most important green energy hubs in Europe," she declares with pride.

Elena's sentiment is justified. The Port of Ravenna is a massive facility covering 2,080 hectares, with tanks storing one million cubic metres of liquid bulks (Figure 1). Its 10.5 kilometres of docks host 26 private terminals, some of which belong to major industries such as Saipem, Marcegaglia, and Buzzi Unicem. These quays are connected by a 35-kilometre rail network that serves both sides of the main canal. At present, 14% of the outbound freight is moved by rail, that is, about four million tons per year on approximately 8,500 trains. Large-scale industries and good connections make Ravenna the biggest Italian port for general cargo traffic: 27.3 million tons in 2022. Incoming goods account for 85% of this traffic, in particular, metallurgical products for Marcegaglia factories (6.4 million tons), cereals and fertilizers for the agribusinesses in the lower Padania plain (5.7 million tons), and raw materials for the ceramics cluster in Sassuolo (5.6 million tons) (Assoporti-Autorità di Sistema Portuale, 2022). Thanks to this inflow, about 15,000 people currently work in the Port, including satellite activities and on-site manufactures.

Belying its industrial semblance, the Port of Ravenna is not solely for producing and sorting goods. It was founded by Enrico Mattei to support the rapidly growing national industrial powerhouses during the Italian economic miracle, and it has been the centre of offshore gas extraction in the Adriatic Sea. Major energy companies such as Eni, Sarom, and Siom built facilities along this waterway to benefit from the offshore gas fields (Menzani, Tagliaverga, 2017). Over the years, this hub underwent many transformations as a result of the changing fortunes of the industrial sector and management turnover. Above all, it suffered badly during the energy crisis in the late 1970s, and underwent partial deindustrialisation in the 1980s. In 2020, a massive development plan was funded under the European Green Deal, the Next Generation EU, and complementary national programmes. Investment increased to 1.5 billion euros, and then doubled in 2023 to address the energy crisis owing to the Russia-Ukraine War. To date, 4.1 billion euros has been invested by public authorities and local stakeholders: 2.3 billion euros is for 11 green energy transition projects, while 1.8 billion euros is for 38 intermodal and integrated logistics developments (AdSP MACS, 2023). The sum of these initiatives aims to turn Elena's prophecy into reality, that is, to transform Ravenna

into the largest energy production and storage hub in Northern Italy, in turn, encouraging the establishment of new businesses in the logistics and manufacturing sectors.
This paper examines the spaces and landscapes being generated by these projects to increase green energy production and improve resource management and exploitation. While the aim is to create a sustainable infrastructure integrated with the pre-existing configuration, the result is a novel anthropic ecosystem which affects the environment, economy, and society. This emerging energy landscape is here investigated and discussed by means of first-hand observations, pictures, and critical cartographies, in the tradition of landscape research and recent studies on infrastructural spaces (Belanger, 2016; Duncan, Duncan, 2009; Lyster, 2013; Waldheim, Berger, 2008). The data presented in the paper have been gathered through empirical work conducted in 2023, when the Author visited port terminals, logistics sites, manufacturers, energy industries, and urban areas of Ravenna, to understand their functioning and monitor their development. In parallel, interviews have been conducted with representatives of public organisations, private stakeholders, and practitioners involved in infrastructure design and management. This information has been collated with secondary sources such as planning and policy documents, consultancy reports, and official statistics – for further details on the methodological aspects of the research see Ramondetti (2024a, 2024b). Without the presumption of providing an exhaustive view on the ongoing transformations and their implications, this paper aims to provide an insight into the emerging energy landscape in Ravenna, its composition and interactions with the environment. This understanding solicits a reflection on the role of planning and design in developing novel approaches for infrastructural spaces, especially to address the challenges arising from the changing energy scenarios.
This paper is structured as follows: the next two sections present the on-land and offshore transformations in Ravenna, their environmental effects, and the ecosystem generated; thereafter, drawing upon this case study, the conclusions set out some preliminary considerations with respect to the current approaches to the design of infrastructure and energy landscapes.

Reclaiming the land
From the outset, the Port of Ravenna was destined to be one of the largest energy clusters in Northern Italy. This energy park is now the base for the Petrolifera Italo-Rumena (PIR), Enel, and Eni facilities, where gas arrives from the many Adriatic offshore platforms and LPG conversion plants. Together, these power stations form the largest energy cluster in Italy, with a total capacity of 1,722 MWe. Under the current energy transition, the public and private stakeholders are upgrading the hub in three ways: the expansion of the energy storage facilities, the ramp-up of renewable energy production, and the reclamation of contaminated areas for energy-related usages. The expansion of the energy storage

facilities and the optimisation of the energy supply chain has become a national priority to replace the gas previously supplied by Russia. In October 2022, PIR, Edison, and Enagas opened a 180-million-euro facility for the storage and distribution of 20,000 cubic metres of LPG, enough for about 12,000 trucks and 50 ferries each year, reducing CO2 emissions by 6 million tons a year (Gruppo PIR, 2018). In parallel with the upgrade in power infrastructures, abandoned industrial sites and brownfields are being reclaimed for energy production. Eni has recovered 45 hectares of contaminated land for a solar farm, a soil reclamation processing site, and a multi-functional platform for waste-treatment (Eni Rewind, 2017). Another 50 hectares, the former Sarom refinery, will be the site of a hydrogen solar farm. In conjunction with these projects, work is progressing on increasing the energy efficiency of the new port logistics structures by installing a 16-MWe solar system. All these initiatives are inextricably linked with landscape transformations. Not only are the existing docks undergoing major improvement for cold ironing (i.e., the use of shore side electricity), but also new logistics platforms are to be built to develop operations in a sustainable fashion (Figure 2). For instance, given the abundance of energy resources, there are plans to build an 85-hectare agrifood hub centred on an energy-intensive cold-storage terminal for the conservation of fresh produce.

Fig. 2 - Logistics area under construction. Photograph by the author.

These on-land works have, however, some controversial effects, exacerbated by the time constraints imposed by infrastructural programmes such as the Next Generation EU. For instance, redevelopment of contaminated sites, such as the conversion of the former Sarom refinery into a solar farm, involves only a partial reclamation. This solution has been adopted because the soil has tested safe in the first two meters, and the foundations of solar panels are less than one meter deep. Thus, green energy production will increase sustainability, but at the expense of a thorough soil decontamination. In parallel, issues arise concerning the new built-up areas. The logistics sites are being constructed on the former Port silt storage facility; however, the new plant for soil treatment has not yet been built, and its plan underwent radical modifications in early 2023. Even so, work is underway to dredge the canal to -13.50 meters, extracting 4.7 million cubic meters of material: raising questions about how and where this material will be reclaimed. Nevertheless, dredging cannot stop. Investments for electric cranes, cold ironing, and new rail facilities have already been made. To remain economically viable in the long term, cargo operators need to increase shipping traffic, especially containers. Thus, a new 40-hectare platform is under construction, while the former area is to be converted into a car terminal.

Reclaiming the sea

The ongoing on-land projects go together with offshore developments. Over the years, the growth of the Port has been driven by gas exploitation. At present, there are 346 wells extracting gas over 1,204 square kilometres of sea, and the Ravenna Offshore Contractors Association is one of the most important groups worldwide in the offshore platforms and facilities sector (Ravenna Offshore Contractors Association, 2023). The Association has recently embraced the green transition paradigms, and started developing sustainable solutions for offshore energy production. However, this transition has been slowed by the gas crisis, with a surge in the number of drilling licences for extracting gas over a new 570-square-kilometre area (MASE, 2023). In addition, in early 2023, the national government allocated one billion euros for a new offshore LPG conversion plant.

This is a floating platform where a regasification ship can receive LPG at a temperature of -160°C from LPG carriers, and then convert it to gas to be fed into the national grid. The plant, by Snam, is scheduled to start up in 2024, and will fill 8% of the national demand, or five billion cubic metres of gas (AdSP MACS, 2023). Together with the expansion of the energy storage facility, projects are underway to increase renewable energy production. Plans have been made to institute the Port Renewable Energy Community: an association of public and private actors involved in the production and management of energy from renewable sources (Figure 3). Within this framework, the Agnes company plans an offshore energy facility composed of two wind farms and a solar farm with a total

Fig. 3 - Eni Teodora Powerhouse. Photograph by the author.

capacity of 166 MWe, as well as a storage facility for 50MWe (Agnes srl, 2019). The project is a one-billion-euro investment and will be the largest green energy platform in the Mediterranean. In parallel, other experimental projects are also underway, such as the Inertial Sea Wave Energy Converter, a floating platform producing electricity from wave power. Furthermore, Eni plans a one-billion-euro investment to install a Carbon Capture and Storage (CCS) facility for the transportation of CO2 to exhausted gas fields off the coast of Ravenna (The CCUS Hub, 2021). This infrastructure will be realised in two construction phases: the first aims to offset the emissions from the Casal Borsetti power station and the Versalis chemical cluster; the second will involve other local energy-intensive industries, which will be able to take advantage of this facility to reduce their carbon footprint. As for the on-land projects, also the offshore green developments present some controversial aspects. A perfect example is Eni's CCS project, which environmental associations such as Legambiente and Greenpeace have strongly opposed. Indeed, the injection of CO2 into gas reservoirs that are near exhaustion is a way to maintain high pressure. As a result, the companies can continue pumping fuel, causing damage to the environment. But side-effects are also arising from the Agnes project. The development will occupy 8,500 hectares of sea with 75

wind turbines, creating an underwater forest of foundations and cables. This will generate a new marine ecosystem, with a strong impact on the local fishing sector: restrictions on trawling will be compensated by the growth in mussel farming. This is expected to increase thanks to the oxygen released into the sea as a by-product of the green hydrogen processing, as the lack of oxygen is seriously damaging the marine environment of the Adriatic Sea. However, the construction of green hydrogen plants is only the final step of the project, and it has not yet been scheduled. Indeed, these facilities are to be installed on the decommissioned offshore platforms for gas extraction, which however will continue to operate thanks to the CCS. These controversial effects call for better coordination among the stakeholders in order to mitigate the long-term impacts of the ongoing developments.

Planning for the reconfiguration of energy landscapes

The many on-land and offshore projects in the Port of Ravenna require a reflection on how energy transition is impacting major infrastructural hubs and their surroundings (Figure 4). The transformations in Ravenna are strictly interrelated with the economy, society, and space: the reconfiguration of the Port is thus a unique opportunity to plan an energy landscape integrated with the territory. However, the rushed green transition, owing to the relatively short time to complete complex projects, is producing an uncoordinated development, with negative effects and environmental consequences. This is partially the result of weak governance. For instance, the Port Authority, which should mediate between the many interests at stake, is relegated to a secondary role. Similarly, the local administrations concern themselves solely with the economic role of the Port, giving scant attention to the impact of this energy landscape on the urban and maritime environments. Furthermore, a common framework for coordinating the many stakeholders is currently missing. Not only is this a policy issue, but it also concerns the instruments and tools currently available to arrange the spatial layout and organisation of the new developments. For instance, the Port Authority is entrusted to plan land-uses and interventions within the Port area. These could eventually occur in coordination with the local administrations responsible for the urban and maritime planning, but not necessarily. Consequently, the many actors pursue their own interests with little coordination. This condition, common to most of Italian ports (Ramondetti, 2023), is further exacerbated in Ravenna, where the Port Authority owns only the 10-metre-wide quays along the canals, and leasing the docks to companies other than those located in the back area is almost impossible. This makes it difficult to negotiate with port operators a shared vision for a comprehensive and coordinated development of the landscape infrastructure. As a result, the plans for the port are merely the sum of the many technical operations necessary to keep the harbour working, with little attention to landscape issues and infrastructure externalities. In sum, weak govern-

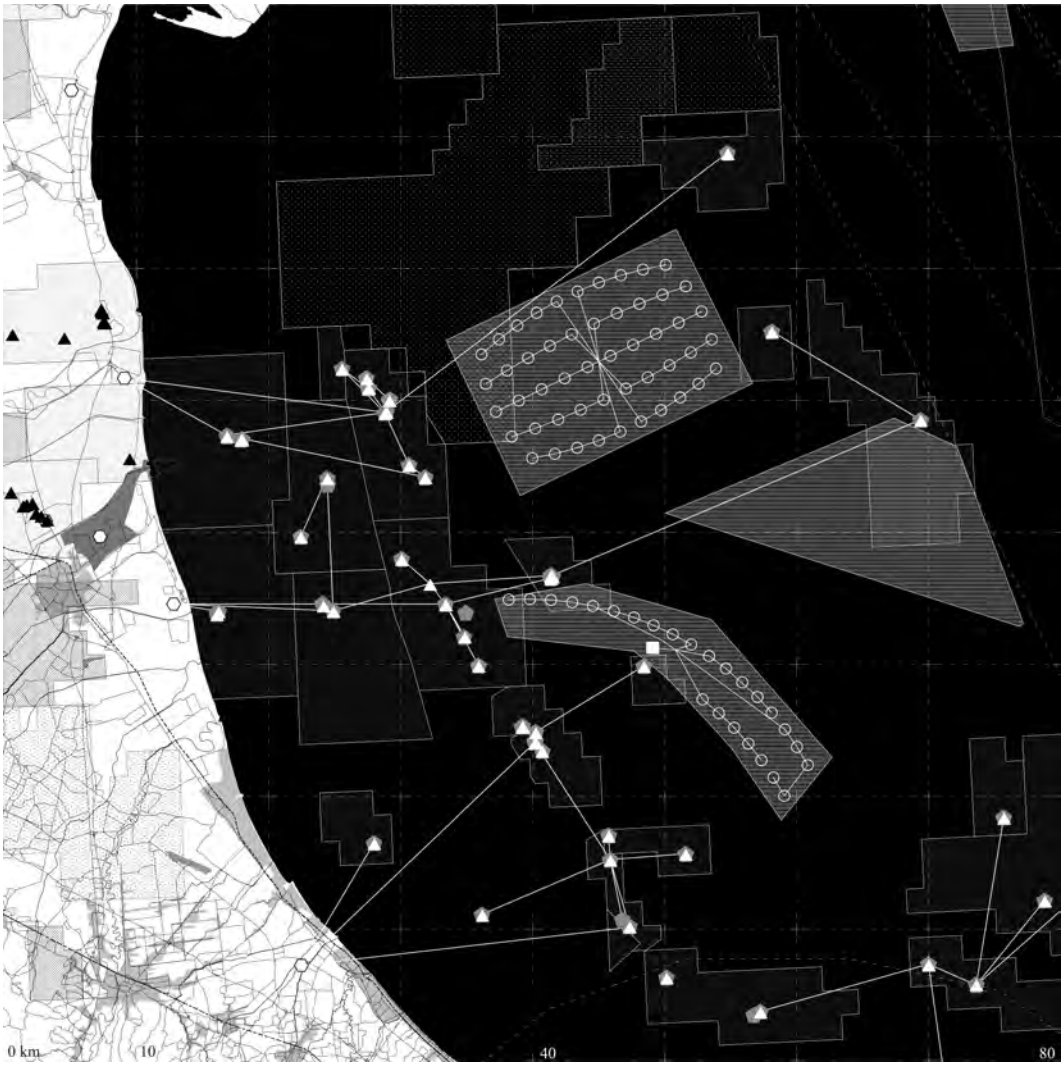


Fig. 4 - The extended energy landscape of the Port of Ravenna. Map by the author.

ance and inadequate tools preclude the involvement of urban and planning expertise to produce large-scale, territorial visions; thus, a systemic approach to integrate harmoniously energy facilities with the urban and natural spaces is completely absent.

However, Ravenna is not unusual in this respect, as documented in literature on port-cities and energy developments (Couling, Hein, 2020; Hein, 2021). Despite being at the core of contemporary urban studies (Castán Broto, Robin, 2023), energy landscapes are still rarely debated within applied science. Not only is this due to the complexity of contemporary infrastructural realms, which require the engagement of multiple disciplines and fields of expertise, but also to some conventional approaches to dealing with infrastructure landscapes, and the transformations brought about by energy transition (Audet, 2016).

In one case, energy landscapes are regarded as a technical support for the economy; hence, their efficient function is essential (Nesbit, Waldheim, 2023). Expanses of solar panels, offshore wind farms, dams, water reservoirs, and port facilities are part of operational landscapes, that is, "specialised regions of production, extraction and circulation where land, energy and labour are invested in the exploration, harvesting and operationalisation of all physical and material substances that sustain contemporary urbanisation" (Katsikis, 2018: 43). Such an economic reading tends to downplay the agency of landscape (Belanger, 2016), since spaces appear to be completely bowed to the capitalist regime (Arboleda, 2020). Within this framework, urbanists and architects have little room for manoeuvre since infrastructural landscapes are purely an engineering domain: each network is assessed per se by technical experts, whose objectives are to optimise resources and improve efficiency. BIG's plan for the *Aqaba Container Terminal* (2022) illustrates this. The project is to develop a decarbonised port; however, the plan assigns the logistics and energy optimisation exclusively to engineering solutions and technical elements, such as the electrification of the machinery and the construction of a huge canopy of solar panels. Little consideration has been given to the features of the landscape; for instance, the project envisions a thriving forest in the desert, which seems more a token gesture than part of an overall strategy for reducing the environmental impact. Similarly, the *eThekwini Regional Hydrogen Strategy* by Arup (2019) envisions a process of decarbonisation at a regional scale – including the largest port in the Southern hemisphere – mainly based on technical solutions for the conversion of the energy facilities and infrastructural networks. Even though projects such as these are important attempts to accelerate the energy transition and to test engineering advancements, they illustrate the challenges in addressing the construction of energy landscapes as comprehensive systems which have regard for the relationships between technical objects and their surroundings.

While this approach gives precedence to technical aspects, another addresses the ongoing transformations from an ecological, grassroot perspective. Energy landscapes are regarded as precarious socio-technical achievements since "service delivery is a process always in the making, one that extends well beyond the time when a connection is provided and the good delivered" (Baptista, 2019: 515). This approach, while helpful in framing infrastructural spaces as a constantly changing realm (Addie, Glass, Neilles, 2024), risks overreliance on problem-solving solutions, and romanticising remedial operations (Jaglin, 2015). Great importance is given to the agency of local institutions, people, and participatory tactics to drive small-scale interventions, raise awareness of environmental issues, and inspire virtuous cultural behaviours (Lemansk, Massey, 2023; Simone, 2004). Such incremental tactics have been applied in urban projects for reducing energy consumption, for instance *Soft City* by KVA MATx (2009), which has developed an adaptable textile system for heat-regulation in buildings while producing energy. Amongst the most emblematic of these grassroot projects is the DIY urbanism fostered by MVRDV for Almere Oosterwold. Based on collective

participation, *Freeland* envisions a self-regulating community that is also a "productive landscape for energy, water reception and purification, and food" (MVRDV, 2011). Although projects like this have seldom been adopted in major logistics and energy-intensive sites, an attempt to stimulate a self-organisation can be found in initiatives such as the Port Energy Community, that is, an ensemble of companies which self-improves the facilities for sharing and producing energy. These kinds of projects, while pursuing flexibility and adaptation, risk being partial: in promoting a step-by-step modification of the environment, they lack a holistic vision. Furthermore, while helping to smooth energy transition, some of the initiatives are embedded in a deeply conservative narrative: no risk must be taken with respect to the current moral ethic, and modifications in networks must occur in harmony with human and non-human beings (Castán Broto, 2019).

The emerging energy landscape in Ravenna helps clarify the limits of such approaches. The ongoing projects implement the on-land and off-shore transformations by adopting technical solutions which seldom take into consideration their side-effects, and mostly regard each network independently (e.g., the construction of wind farms, CCS hubs, and LNG terminals). The role of energy infrastructure in shaping complex ecologies and urbanities is mostly overlooked, so problematic externalities and controversies emerge when examining the current transformations from an environmental perspective. In any case, there are no viable alternatives other than abandoning current development and conserving the existing ecosystem as it is – as proposed by environmental activists. However, this means halting green energy projects, with consequences far beyond their local impacts. To overcome this impasse, a radical change in the approach to large-scale energy landscapes, such as the Port of Ravenna, is necessary. In this respect, it would be desirable to conceive energy as part of an irreducible whole which also includes the terrestrial and maritime ecosystems, as well as the social and economic realms, not to mention the inhabitants' needs (Lopez, 2019). Similar to that proposed by Couling and Hein, the new landscape can be viewed as a "sea-land continuum" (2020: 6), that is, a highly urbanised space where infrastructures fuse sea and land, creating a new environment and ecology. Based on this premise, it is possible to develop novel spatial planning, integrate technical networks and environmental features, and rethink the emergence of new ecosystems. A similar concept can be found in "Urban Metabolism: Sustainable Development in Rotterdam" by James Corner Field Operations and FABRIC (2014). Based on an understanding of the flows that characterise the port and the city of Rotterdam (energy, food, goods, and people), the project proposed a strategy to optimise resources by improving the relations between flows, as well as increasing the efficiency of the production-consumption chains. These examples show how, by avoiding considering energy landscapes as technical spaces, or as grounds for remedial interventions, it is possible to build alternative scenarios. This could be the first step in challenging consolidated norms, questioning contemporary energy production and consumption models, and ultimately envisioning new ecosystems and strategies for energy transition.

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diachronic reading • solar landscape • energy transition

Co-productive Energy Landscape Project: Borgo Monteruga

Elena Vigliocco (1), Paolo Mellano (2), Elena Guidetti (3), Riccardo Ronzani (4)

Abstract

Assuming that an agricultural landscape is an energetic solar landscape, the article describes the premises and the strategy for the regeneration of Borgo Monteruga in Salento, a region known in ancient times for producing lamp oil. After becoming an agricultural site dedicated exclusively to oil production for food purposes, it is now wholly unproductive due to the spread of Xylella Fastidiosa. The absence of unequivocal legislation on agrivoltaics and the need to identify a productive layout that could reactivate and renew the site led the owner to appoint a third-party research institution to determine the most appropriate strategy for the economic regeneration of this non-productive landscape. The method proposed for pursuing the design of a new multifunctional landscape is grounded in the historical reading of the landscape. The visual essay consists of a timeline divided into four sections corresponding to four landscapes. Each section describes how the changing demand for energy, local and supralocal, has modified the actions imprinted on this solar landscape. The last section presents the project scenario reconciling two energy landscapes perceived as inconsistent into a co-productive energy landscape, assuming the historical analysis as design support.

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Introduction

In 2004, fossil fuels supplied 86.5% of the global energy consumption, which amounted to 15,000 TWh (Jefferson, 2005). In 2019, global energy consumption increased by 16% in fifteen years (Degl'Innocenti, 2020). The latest report from the International Energy Agency (2021) estimates that energy consumption will rise again by around 20% in 2020-2050[1]. The increase in consumption would not be a problem if it were not the leading cause of global warming. To achieve net zero emissions by 2050,1 the widespread use of available technologies that use renewable sources is necessary to implement the energy transition.

Among renewable sources, solar radiation is the primary energy source for life through photosynthesis (Smil, 2022). If in acquiring societies, the food, the energy that man needs in terms of caloric needs, was collected, and obtained from wild nature, the introduction of agriculture opens up new demographic opportunities. Agriculture is the first form of extensive domestication of nature, which aims to increase the production of food – energy – for human beings. An agricultural landscape is, therefore, by definition, an energy landscape.

Assuming the landscape as "an area, as perceived by people, whose character is the result of the action and interaction of natural and human factors" (Council of Europe, 2000), disclosing the story of a landscape means unveiling the story of economies that produced that landscape and how those economies have modified it over time.

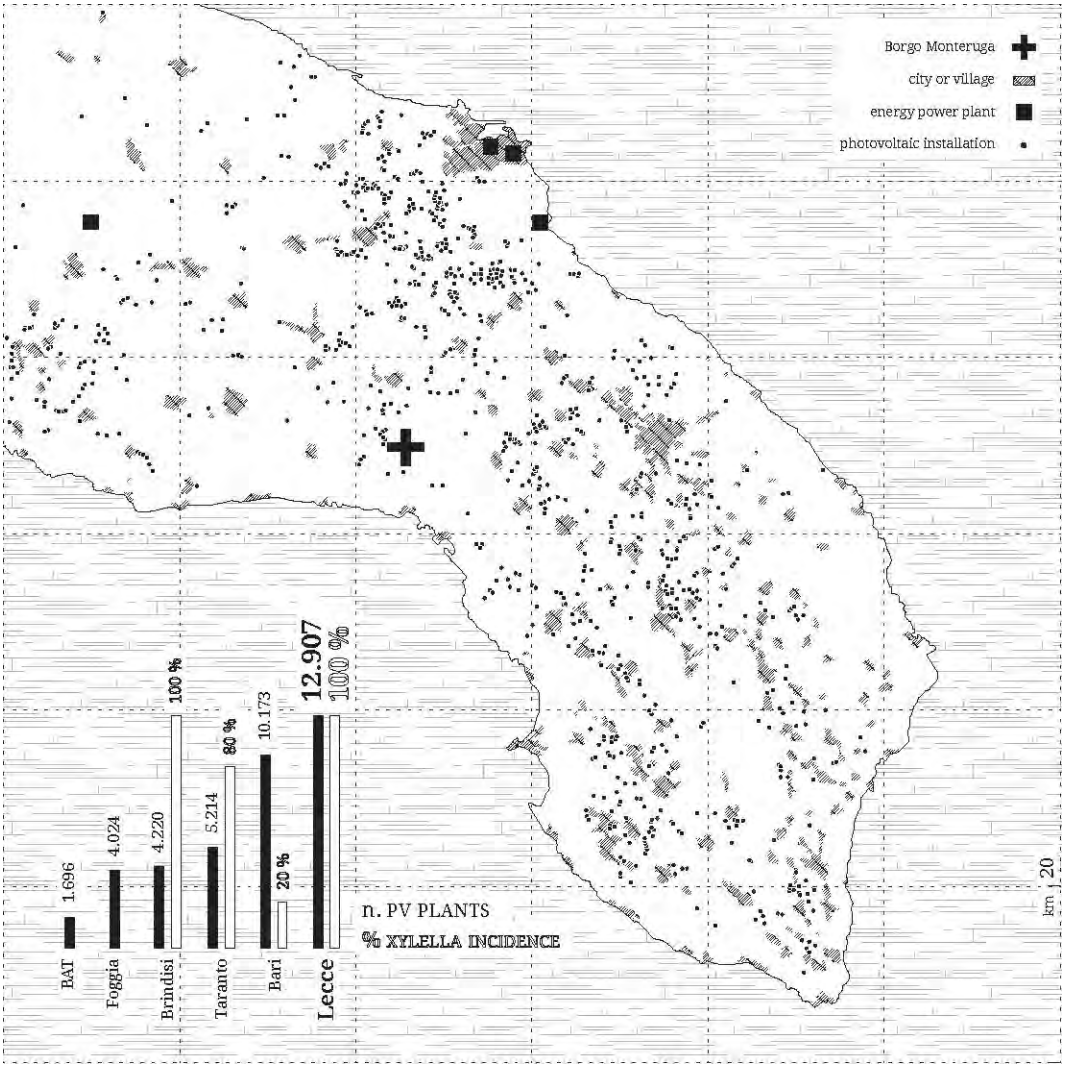
Conflicting solar landscapes

"Not In My Backyard" (NIMBY) indicates the slogan that is often used in protests against works considered to have a negative and relevant impact to be carried out in an area that is perceived as close to the daily interests of those protesting (Carley et al., 2020). In Italy, these complaints involve the debate on large ground-mounted solar parks (Roccato, Mannarini, 2012). The main criticism against these plants is that, by replacing agricultural production with devices for electricity production, the historicides image of the Italian agricultural landscape (Sereni, 1961) would be corrupted. The effect of this ideological resistance determined that in 2022, only 1% of large ground-mounted photovoltaic systems were authorized (Legambiente, 2023).

Who plans the planning?

In 2021, a private agricultural company specializing in the production of olive oil purchased the Monteruga property in Salento, a region where lamp oil was produced in ancient times. The intention is to reactivate the economy of this area whose agricultural production has stalled due to Xylella Fastidiosa. The need to plant more than 100,000 olive trees, which will only come into production after five to eight years, makes it necessary to introduce a second production capable of making the operation economically sustainable. Thus, the agricultural company imagines combining olive growing with the production of electricity from solar sources. Identifying a productive layout that could revive the site, without distorting it, led the company to turn to the Politecnico di Torino. The

1 – Starting from the European Green Deal, the European Climate Law presented by the European Commission in 2020 assumes the NZE as the primary goal (European Commission, 2019).



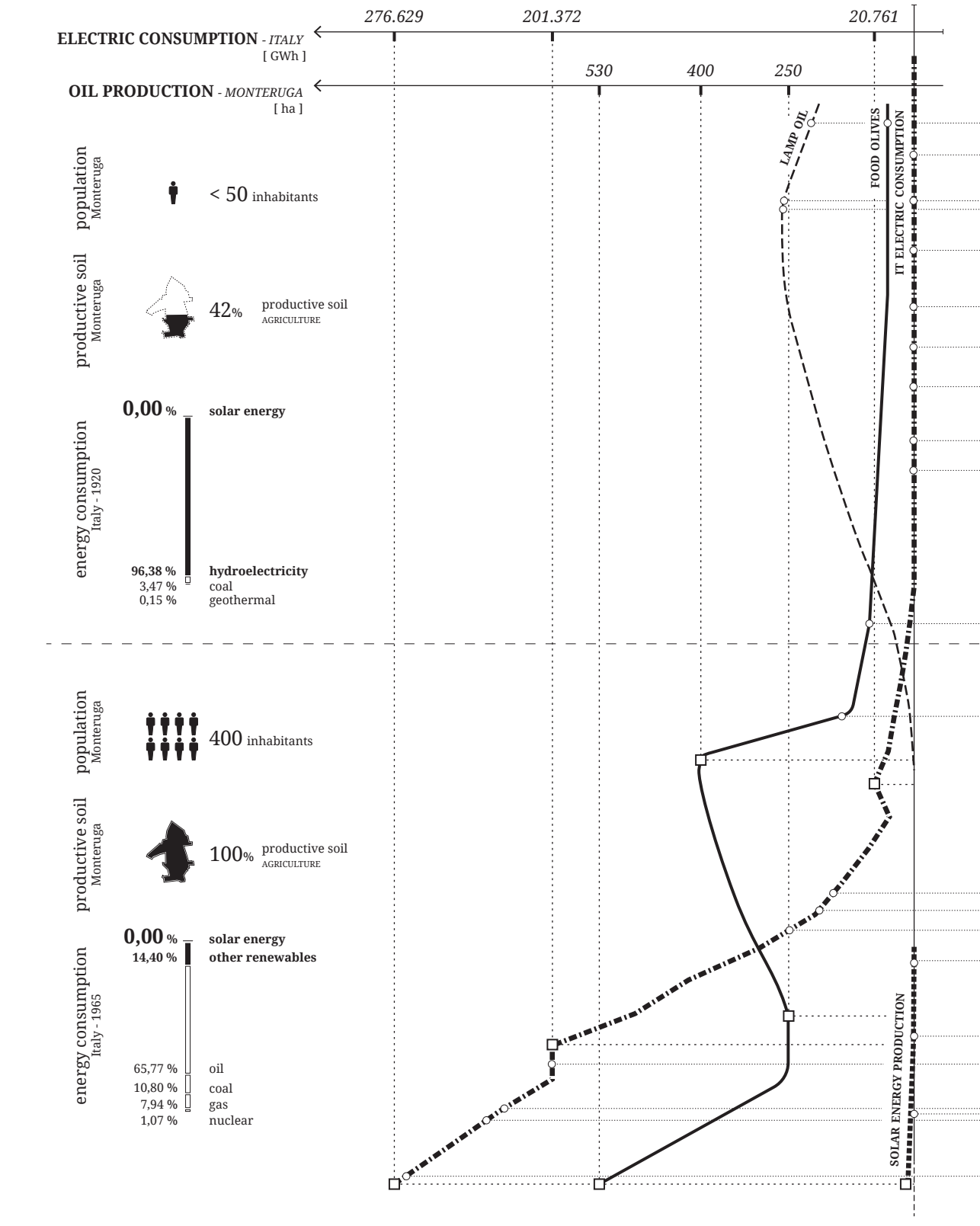
historical reading of the landscape, which highlighted the material and immaterial components and put in evidence the site's characters, made it possible to design a co-productive energy landscape that alternates food and electricity production at variable densities.

Fig. 1 - Location of Monteruga within the Salento context (Apulia Region, Italy).

Fig. 2 - Timeline describing the interaction between events, changes in energy demand, and energy production from solar renewable sources at the local and supra-local scales (1800-2000) [Following pages].

Reading notes

The paper presents the logical construction of the installation strategy of the new agrivoltaic system in Monteruga. The project aims to build a unique alliance between two kinds of energy derived from the sun. The outcome is a new energy solar landscape. The process is based on examining the transformations carried out on this solar landscape by the generations that have succeeded one another and have modified it opportunistically. Four historical sections organize the reading thanks to the maps repository listed at the chapter's end.


276.629
201.372
20.761
ELECTRIC CONSUMPTION - ITALY
[GWh]
530
400
250
OIL PRODUCTION - MONTERUGA
[ha]
LAMP OIL
FOOD OLIVES
IT ELECTRIC CONSUMPTION
population Monteruga
< 50 inhabitants
productive soil Monteruga
42% productive soil AGRICULTURE
energy consumption Italy - 1920
0,00 % solar energy
96,38 % hydroelectricity
3,47 % coal
0,15 % geothermal
population Monteruga
400 inhabitants
productive soil Monteruga
100% productive soil AGRICULTURE
energy consumption Italy - 1965
0,00 % solar energy
14,40 % other renewables
65,77 % oil
10,80 % coal
7,94 % gas
1,07 % nuclear
SOLAR ENERGY PRODUCTION

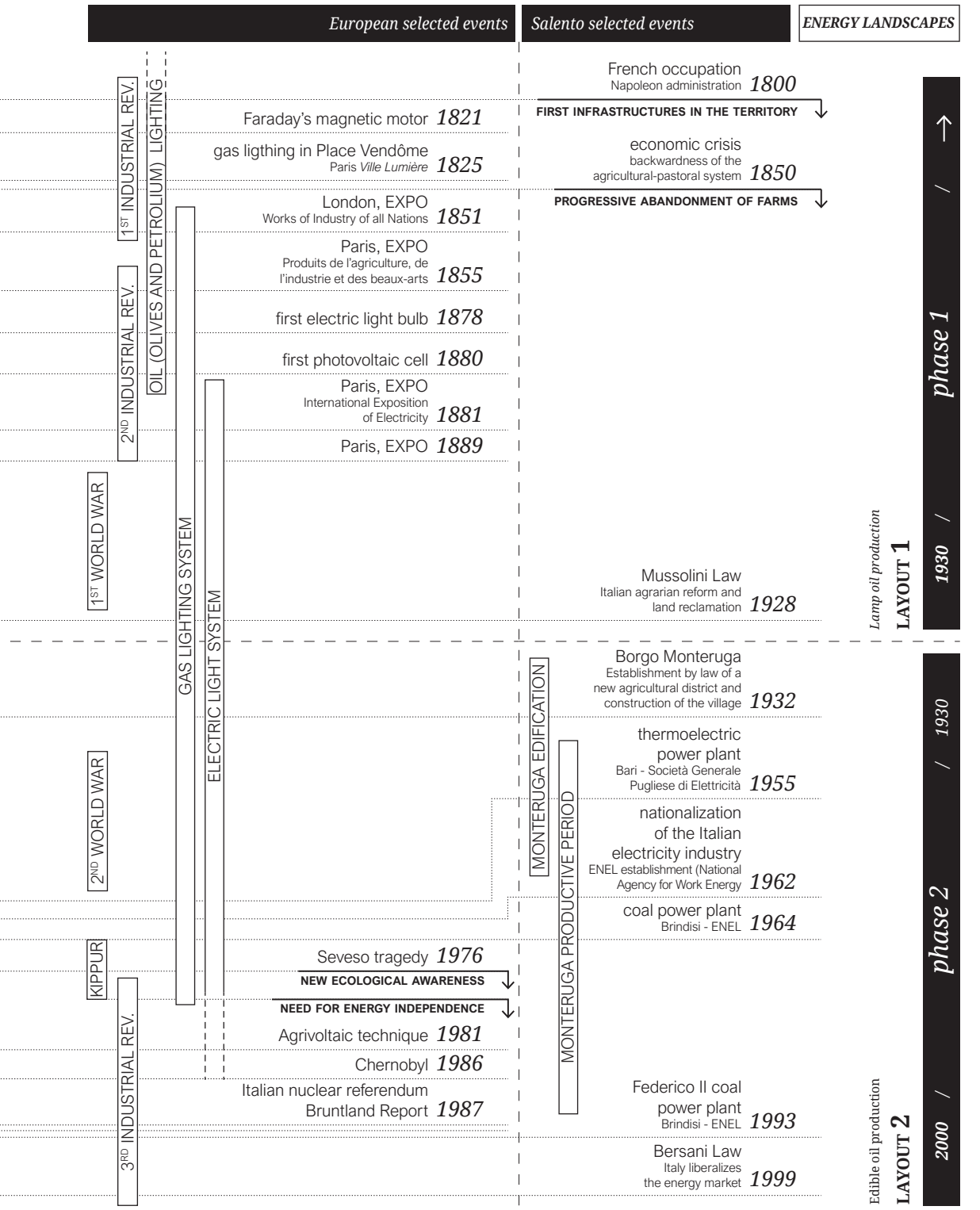
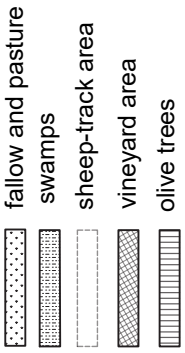

European selected events
Salento selected events
ENERGY LANDSCAPES
1ST INDUSTRIAL REV.
2ND INDUSTRIAL REV.
OIL (OLIVES AND PETROLIUM) LIGHTING
GAS LIGHTING SYSTEM
ELECTRIC LIGHT SYSTEM
1ST WORLD WAR
2ND WORLD WAR
KIPPUR
3RD INDUSTRIAL REV.
MONTERUGA EDIFICATION
MONTERUGA PRODUCTIVE PERIOD
Faraday's magnetic motor 1821
gas ligthing in Place Vendôme
Paris Ville Lumière 1825
London, EXPO
Works of Industry of all Nations 1851
Paris, EXPO
Produits de l'agriculture, de
l'industrie et des beaux-arts 1855
first electric light bulb 1878
first photovoltaic cell 1880
Paris, EXPO
International Exposition
of Electricity 1881
Paris, EXPO 1889
French occupation
Napoleon administration 1800
FIRST INFRASTRUCTURES IN THE TERRITORY
economic crisis
backwardness of the
agricultural-pastoral system 1850
PROGRESSIVE ABANDONMENT OF FARMS
Mussolini Law
Italian agrarian reform and
land reclamation 1928
Lamp oil production
LAYOUT 1
1930 / → phase 1
Borgo Monteruga
Establishment by law of a
new agricultural district and
construction of the village 1932
thermoelectric
power plant
Bari - Società Generale
Pugliese di Elettricità 1955
nationalization
of the Italian
electricity industry
ENEL establishment (National
Agency for Work Energy 1962
coal power plant
Brindisi - ENEL 1964
Seveso tragedy 1976
NEW ECOLOGICAL AWARENESS
NEED FOR ENERGY INDEPENDENCE
Agrivoltaic technique 1981
Chernobyl 1986
Italian nuclear referendum
Bruntland Report 1987
Federico II coal
power plant
Brindisi - ENEL 1993
Bersani Law
Italy liberalizes
the energy market 1999
Edible oil production
LAYOUT 2
2000 / phase 2 / 1930

Fig. 3 - Monteruga region before the 1928's agrarian reform.



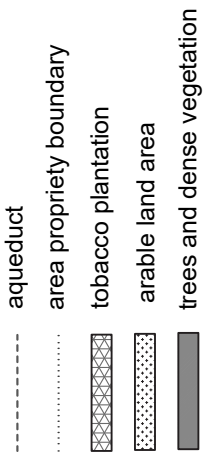
LAYOUT 1: Solar landscape 1 - Lamp oil production
The territory is predominantly calcareous characterized by bushy pastures, scrubland, and swamps. There are extensive marshy areas, which make the place unattractive to human settlement. There are four agricultural farms. Economic activities are linked to agriculture and pastoralism. The olive groves produce olives whose refining produces poor quality oil used as fuel for lighting oil lamps. According to Giovanni Presta (D'Astore, 2001), already in the 18th century, 90% of the oil exported from Puglia was lamp oil purchased especially from foreign states for lighting, wool processing, and making soap. The other 10% was exported to other Italian states for food.

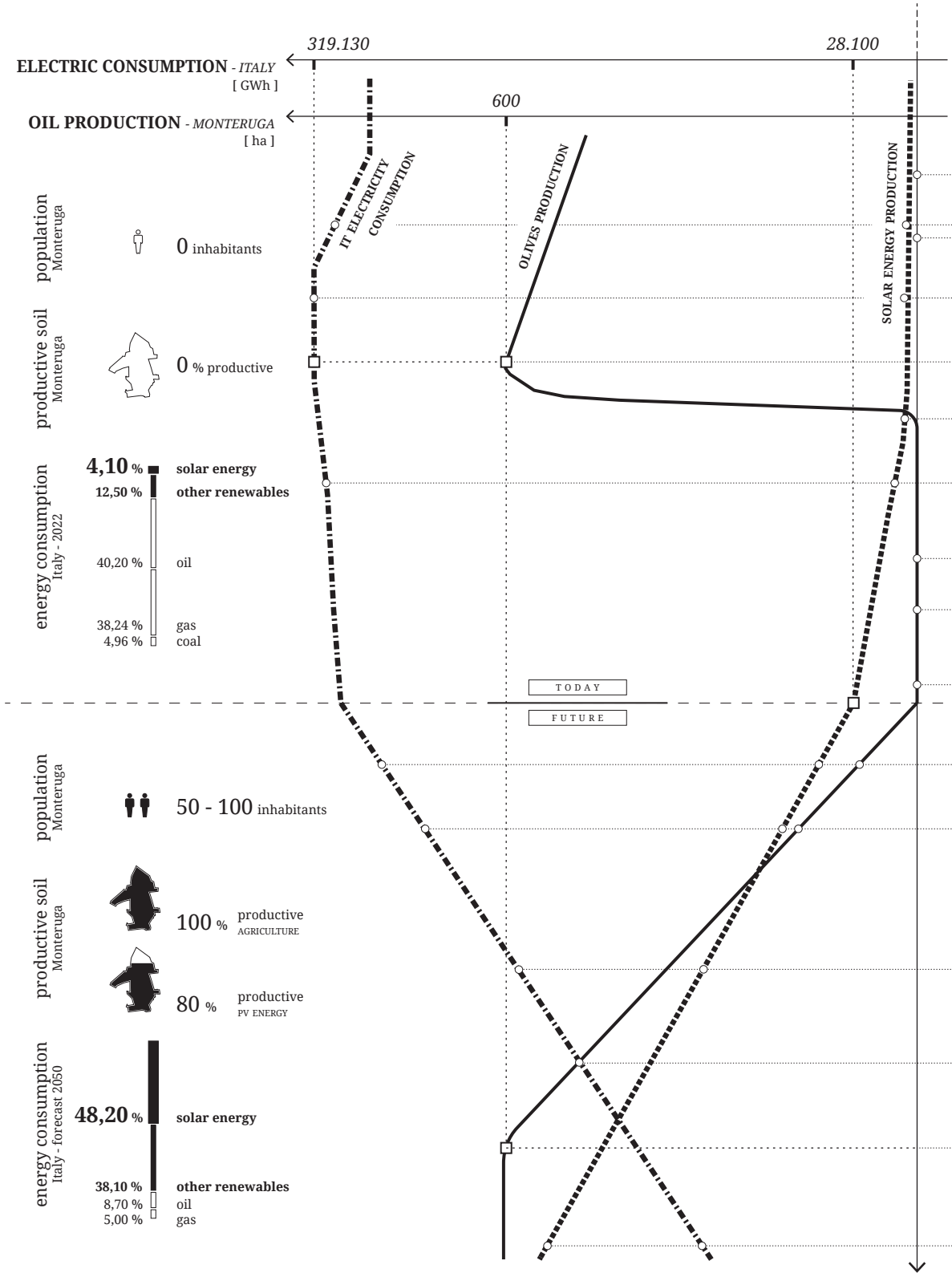
Fig. 4 - Monteruga region after the agrarian reform.

Fig. 5 - Timeline describing the interaction between events, changes in energy demand, and energy production from solar renewable sources at the local and supra-local scales (2000-2050) [Following pages].

LAYOUT 2: Solar landscape 2 - Edible oil production

Starting from the end of the 19th century, the new Italian government gave a new impetus to public works by commissioning investigations on marshy and unhealthy territories. Subsequently, the fascist era recognized land reclamation as crucial in encouraging agricultural production as a strategic asset for Italy. The fascist regime encouraged land reclamation and reorganization and, with the agrarian reform, expropriated the large estates. Fourteen rural villages have been created in Puglia. Borgo Monteruga is one of them and is made of approximately 900 hectares of farmland. The farm located in the lower half is expanded by building new infrastructures and farmhouses. At the same time, land reclamation increases the quality of olive oil production, and the reconversion begins: progressive electrification requires adapting to new market demands.




319.130
28.100
ELECTRIC CONSUMPTION - ITALY
[GWh]
600
OIL PRODUCTION - MONTERUGA
[ha]
IT ELECTRICITY CONSUMPTION
OLIVES PRODUCTION
SOLAR ENERGY PRODUCTION
population Monteruga
0 inhabitants
productive soil Monteruga
0 % productive
energy consumption Italy - 2022
4,10 % solar energy
12,50 % other renewables
40,20 % oil
38,24 % gas
4,96 % coal
TODAY
FUTURE
population Monteruga
50 - 100 inhabitants
productive soil Monteruga
100 % productive AGRICULTURE
80 % productive PV ENERGY
energy consumption Italy - forecast 2050
48,20 % solar energy
38,10 % other renewables
8,70 % oil
5,00 % gas

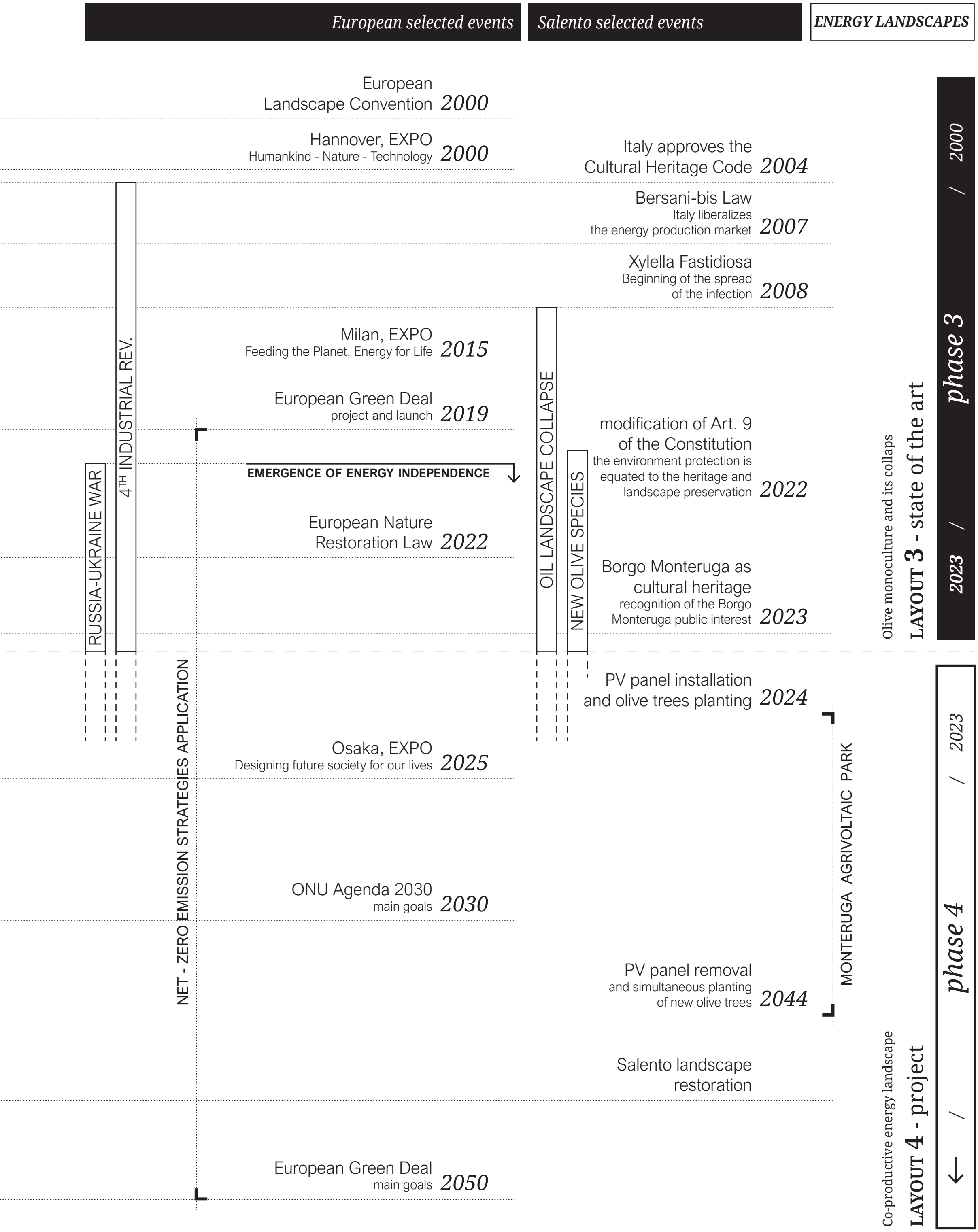

European selected events
Salento selected events
ENERGY LANDSCAPES
European Landscape Convention 2000
Hannover, EXPO Humankind - Nature - Technology 2000
Milan, EXPO Feeding the Planet, Energy for Life 2015
European Green Deal project and launch 2019
EMERGENCE OF ENERGY INDEPENDENCE
European Nature Restoration Law 2022
Osaka, EXPO Designing future society for our lives 2025
ONU Agenda 2030 main goals 2030
European Green Deal main goals 2050
RUSSIA-UKRAINE WAR
4TH INDUSTRIAL REV.
NET - ZERO EMISSION STRATEGIES APPLICATION
Italy approves the Cultural Heritage Code 2004
Bersani-bis Law Italy liberalizes the energy production market 2007
Xylella Fastidiosa Beginning of the spread of the infection 2008
modification of Art. 9 of the Constitution the environment protection is equated to the heritage and landscape preservation 2022
Borgo Monteruga as cultural heritage recognition of the Borgo Monteruga public interest 2023
PV panel installation and olive trees planting 2024
PV panel removal and simultaneous planting of new olive trees 2044
Salento landscape restoration
OIL LANDSCAPE COLLAPSE
NEW OLIVE SPECIES
MONTERUGA AGRIVOLTAIC PARK
Olive monoculture and its collaps
LAYOUT 3 - state of the art
2023 / phase 3 / 2000
Co-productive energy landscape
LAYOUT 4 - project
← / phase 4 / 2023

Fig. 6 - Monteruga region after the spread of Xylella fastidiosa.

Xylella infection spread

photovoltaic panel area

quarry area

LAYOUT 3: Solar landscape 3 - Olive monoculture and its collapse
The increase in the planting of olive trees is directly proportional to the rise in demand for olive oil for food purposes. The isolation of the village and the changes in the lifestyle of Italians in the 60s and 70s led to the progressive abandonment of the agricultural center as a residence. In the 80s, the area was privatized and acquired by SEBI. The last inhabitants have moved away. At the beginning of the 2000s, many agricultural productions were eliminated by the monoculture of the olive tree. However, the spread of Xylella fastidiosa causes it to stop. The trees that inhabit the area die and must be eradicated. Added to the abandonment of the village is the abandonment of the agricultural production area. In 2023, the unused agricultural surface is 100% of the property.

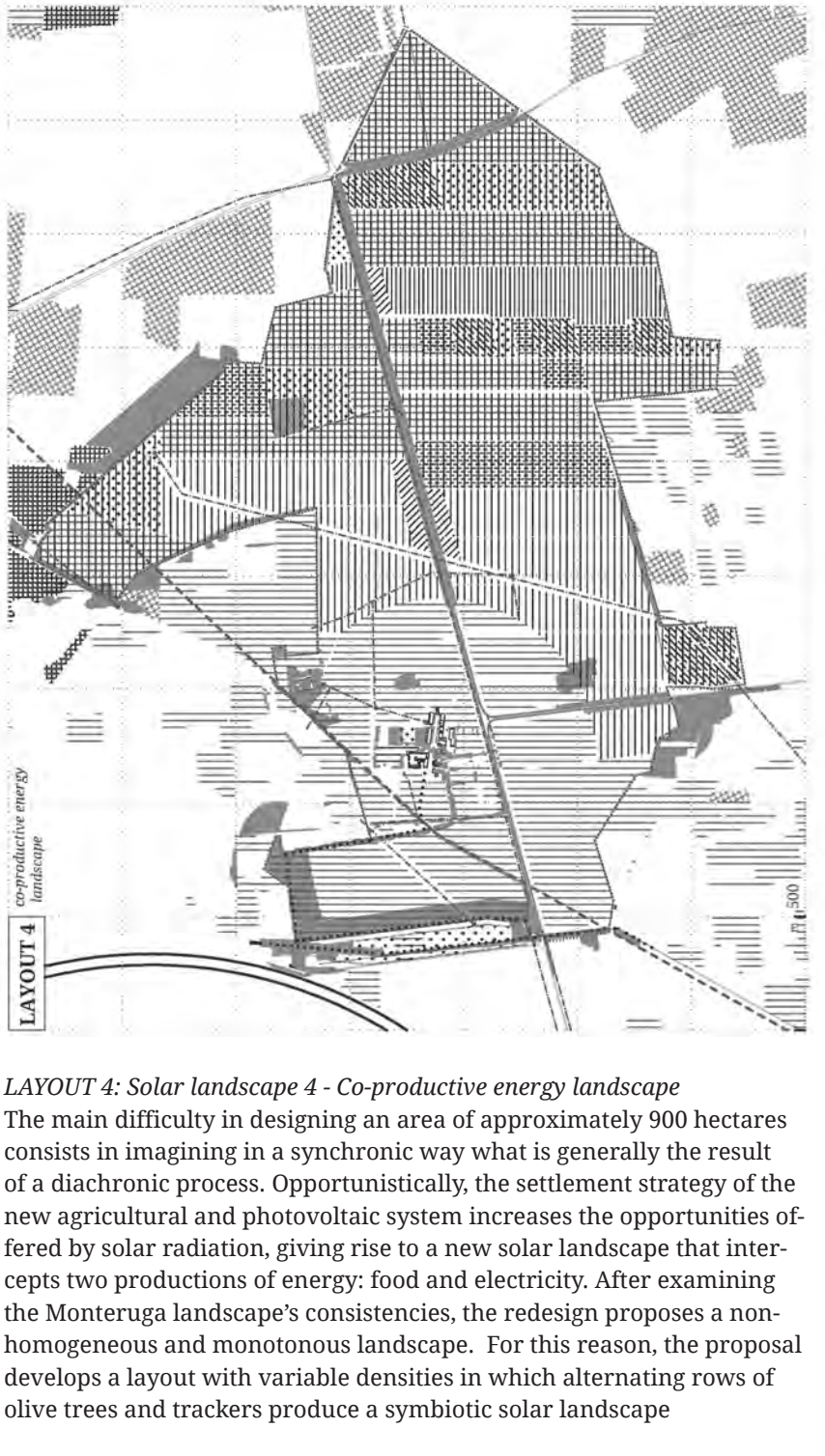


Fig. 7 - The project for a new enhanced and co-productive energy landscape.

LAYOUT 4: Solar landscape 4 - Co-productive energy landscape
The main difficulty in designing an area of approximately 900 hectares consists in imagining in a synchronic way what is generally the result of a diachronic process. Opportunistically, the settlement strategy of the new agricultural and photovoltaic system increases the opportunities offered by solar radiation, giving rise to a new solar landscape that intercepts two productions of energy: food and electricity. After examining the Monteruga landscape's consistencies, the redesign proposes a non-homogeneous and monotonous landscape. For this reason, the proposal develops a layout with variable densities in which alternating rows of olive trees and trackers produce a symbiotic solar landscape

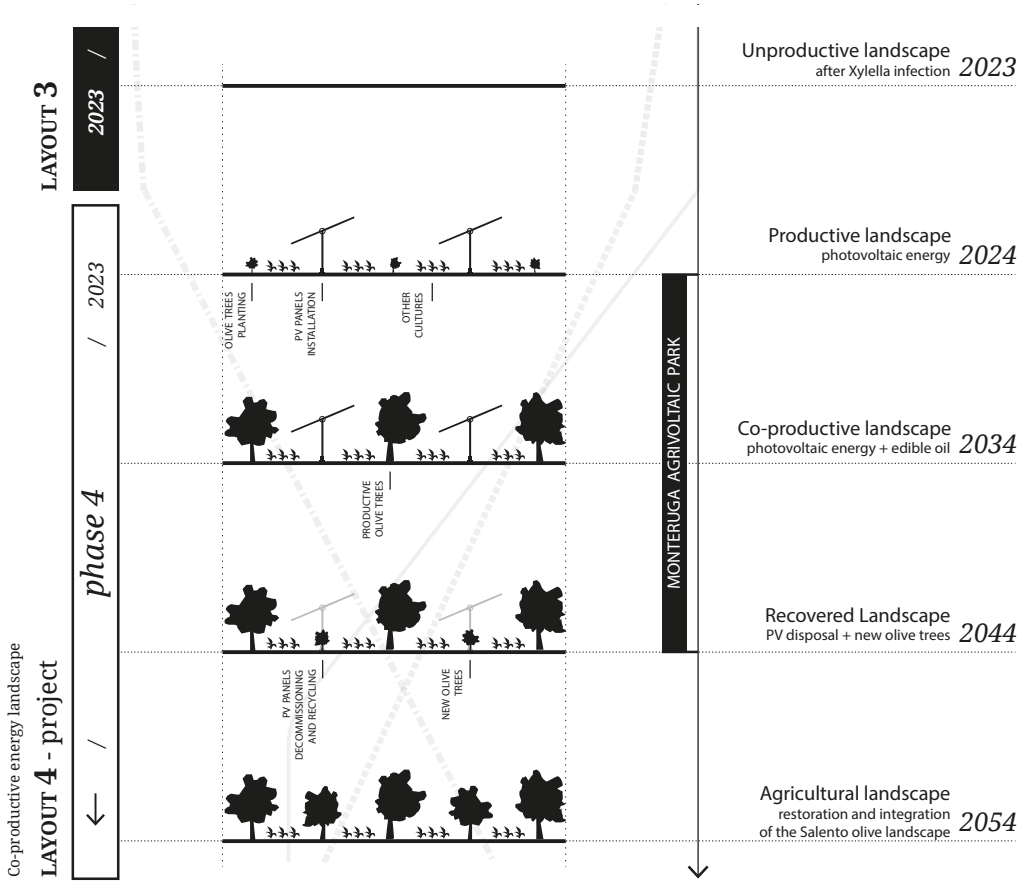
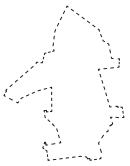


Fig. 8 - Restoring process of the Salento agricultural landscape through a phase of co-productive energy landscape. The dismantling of photovoltaic panels at the end of their life corresponds with the planting of new olive trees.

Conclusion

Despite the definition (Europe Council, 2000), the landscape has always been the victim of hard-to-die simplifications. In practice, the landscape project is reduced to *landscaping* (Folléa, 2019), corresponding to beautifying technological infrastructures you do not want to see by planting trees. Today, faced with an indispensable energy transition, we must imagine new project strategies for energy landscapes that have a specific impact, but which allow us, in a medium-long time (equal to almost the two decades it took from Xylella to annihilate the economy), to restore life, economy, image and meaning to this critical portion of Salento. Starting from a landscape diachronic analysis, the study unveils unexpected characteristics and not exploited potentialities of the site on which grounding the design of a new solar landscape. Because the landscape is not a static concept, this experience assumes that the historical evolution of the landscape must be at the center of every energy transition project. Only by achieving a correct awareness of the landscape under examination can the design strategies find the point of balance between preservation and innovation requests.



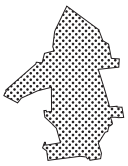
LAYOUT 1

1 - *Provincia di terra d'Otranto già delineata da Magini e nuovamente ampliata in ogni sua parte secondo lo stato presente. Data in luce da Domenico De Rossi*, 1714. Archivio I.G.M. Firenze, 21. B-6, n. 517.

2 - *Oria, Lecce, Otranto del cartografo Giovanni Antonio Bartolomeo Rizzi Zannoni*, 1808. Map published in https://www.davidrumsey.com/.

3 - "*La Descrizione del Regno delle Due Sicilie" – di Benedetto MARZOLLA (Napoli 1851)*, 1851. Map published in https://belsalento.altervista.org/

4 - *Benedetto Marzolla, Carta dei prodotti alimentarii delle Provincie Continentali del Regno delle Due Sicilie"*, 1856. Map published in https://belsalento.altervista.org/.



LAYOUT 2

1 - *Planimetria Bonifica di Arne 1:100.000* (1930). ASL Lecce, Genio Civile, folder 145, dossier 817.

2 - *Masseria Monteruga. Mappa catastale 1:4000*, 1927. Map published in Mainardi, M. (1997), *La modernizzazione rurale a Veglie e in Arnèo negli anni Venti e Trenta*, Manduria, p.40.

3 - *Progetto costruzione strada Monteruga-Cerfeta per Veglie del 7 maggio 1932 redatto da ing. C. Castrignanò. Scala 1:2000.* Archivio di Stato di Lecce, Genio Civile, Titolo XIII, folder 145, dossier 817.

4 - *Planimetria del 1934 con descrizione delle zone con ristagni di acque.* Archivio di Stato di Bari. Ministero dell'Agricoltura e delle Foreste, Ispettorato Compartimentale Agrario, folder 215, dossier 11.

5 - *Plan attached* to the 1940 report with description of the land purchased by SEBI. Archivio di Stato di Bari. Ministero dell'Agricoltura e delle Foreste, Ispettorato Compartimentale Agrario, folder 215, dossier 14.

6 - *Terreni dell'Azienda Monteruga negli anni Settanta.* Map published in Diso, A. (2013), *Monteruga. Frammenti di memoria*, Monteroni.

7 - *Lottizzazione degli anni Cinquanta.* Map published in Mainardi, M. (1994), *Trasformazioni del paesaggio e habitat rurale in un'area salentina negli anni Venti e Cinquanta del Novecento: il caso Arneo.* In Annali del Dipartimento di Scienze Storiche Geografich e Sociali dell'Università degli Studi di Lecce, VIII 1991-1992, Manduria, p. 375.

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LAYOUT 3

1 - *2023, current layout.* The visual survey of the site took place in two stages: May and September 2023.

LAYOUT 4

1 - *Co-productive solar energy landscape.* The project map includes the constraints imposed by current legislation regarding preserving cultural heritage and landscape.

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2023, Current Layout, the visual survey of the site took place in two stages: May and September 2023.

Co-productive Solar Energy Landscape, the project map includes the constraints imposed by current legislation regarding preserving cultural heritage and landscape.

energy sufficiency • urban landscape • energy consumption • Urban Heat Island

Sufficient Energy Landscape. Tuning Technologies with Social Practices and Other Ecologies in the Urban Context

Fabrizio D'Angelo (1), Marco Ranzato (2)

Abstract

European urban contexts and urbanisation processes are facing an energy transition that progressively requires the integration of technical solutions within consolidated spaces and energy behaviours. Concurrently, EU policies have long privileged the economic and technical dimensions of energy, often neglecting its impact on space and people.
However, these urban contexts layered with levels of complexity such as dense and historic fabrics, climate hotspots, governance inertia, require a thoughtful design that combines technological innovation, social needs and ecological balances in a general lack of space and resources. PEDFORALL, an ongoing research project, interprets Ostiense in Rome as a potential positive energy neighbourhood, embracing energy sufficiency as a key concept to tune the technological apparatuses to the socio-spatial features of the site.

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The Techno-Impasse of the Urban Energy Transition

Energy is, and it has always been, a major driver of urban development and transformation (De Pascali, 2008), as urban areas and urbanisation processes have historically been highly energy consuming (Smil, 2021; Rahm, 2023a). Enormous amounts of the world's primary energy are drained by these environments in the production of goods, in the transformation of the Earth's surface, and in the functioning of infrastructures; but also to enable the daily-life practices with artificial lighting, means of transportation, comfort management, etc. The energy issue permeates spatial transformation, revealing the interdependence of energy systems with territorial ones (Puttilli, 2014); an aspect that is finally evident in the current transition, where, following the *rupture* of the hierarchical and monodirectional energy system and the advent of distributed production, the territorial rationalities and the geography and agency of energy spaces are changing.

Energy transition is not limited to infrastructural transformations but also implies a reflection on the ways in which we produce and consume energy and their collateral effects. The most worrying impact of today's urban energy system, are, in fact, the alterations of the global climate due to their strong share on emissions (IPCC, 2022). The dramatic snowball effects are there for all to see: a steady rise in temperatures with the urban heat island (henceforth UHI) effect, direct impacts, once again, on energy consumption through increased use of air conditioning (Roesler, 2022).

The most worrying impact of today's urban energy system, are, the alterations of the global climate due to their strong share on emissions.

The strong energy-climate conditioning exerted by cities is one of the focal points of the broader paradigm of energy transition interpreted by national and international agendas in the European context (Rifkin, 2019). In this paradigm, the transformation of the urban area is one of the levers for ecological transition; labels such as smart city, sustainable district, and green city are building frameworks to bring forward actions that point a specific goal: the energy transition to a less demand for primary and final consumption (Erba and Pagliano, 2021).

However, energy transitions are processes that cannot be described in a defined and univocal way (Smil, 2017). The current EU transition has been interpreted through an *ecomodernist* vision (Puttilli, 2014), an expression that can be roughly translated as the

restructuring of the energy system for a sustainable metabolism starting from the economic and productive sectors. This means modernising energy production and consumption through appropriate *green* or *clean* technologies. This vision has been translated into a series of time-bound strategies with many policy packages to promote renewable energy production and the development of efficient technologies to decarbonise the production and consumption systems. Actually, the design of these energy policies considers the CO2 emissions produced by energy systems as the problem to be addressed by *decarbonisation*, that is, the reduction of the carbon-hydrogen ratio in the use of energy sources (Termini, 2020). This process has been promoted by various policies, in particular those aimed at increasing the use of *renewable sources* (Ghiglione, 2019). Another paradigm that permeates the transition policies is that of *efficiency*, all of which aims aim to reduce energy demand. Energy efficiency has been interpreted by the ecomodernist vision as the technological modernisation of consumption systems for mobility (e.g. electrification of mobility) and housing (e.g. heat pumps, envelope insulation, district heating systems, etc.). Both the increase in renewable sources and energy efficiency are expected to contribute to decarbonisation.

To make renewable production desirable, policymakers have constructed a generous system of incentives to boost the implementation of new REN plants, which actually happened between 2009 and 2013 in the so-called *renewable rush*, a rapid and huge construction of many renewable energy plants (Frolova et. al, 2019). On the other hand, to accelerate efficiency practices, credit tax instruments have triggered an unprecedented urban retrofitting initiative, spreading construction sites everywhere.[1]

However, if we look at the above transition process from a socio-spatial perspective, some evident shortcomings emerge. At first, ecomodernist decarbonisation by increasing renewable energy sources through incentives for new plants is a somewhat different route from the goal of reducing or eliminating fossil sources (Arrobio, 2023). Yet the result of energy transition policies is often an accidental transformation of the landscape (Bridge, 2018; Frolova et al., 2019), where space is considered by policies as a mere support or a generic site to be developed for a maximum

1 – A paradigmatic case is the Italian *Superbonus 110%* launched in 2020, a tax credit tool with economic facilitation that led many buildings "free" intervention by deducting the expenses with the Tax Return, transferring credit to suppliers' banks or financial and insurance institutions, or with the discount on the invoice.

The result of energy transition policies is often an accidental transformation of the landscape.

The spatial blindness of the ecomodernist policies, is directly reflected in the urban design culture.

economic profit or a technological functionalism (Carrosio, Magnani, 2022). This space-blindness has generated inevitable conflicts, new pressures on resources (rivers, soils, forests, etc.) and many layers of injustice (D'Angelo, 2023). The social-spatial indifference extends to energy efficiency, where the tax credit does not consider the feasibility of energy measures in contemporary European urban areas made up of a stratified building stock (old architecture, fragmented ownership), in specific environmental conditions (local climate, thermal service demand), in different social circumstances (income, legal capacity, energy poverty). As a result, the relationship between the socio-technical apparatuses and the quality of everyday spaces with energy practices, which, as Elisabeth Shove (2007) points out, consistently determines energy consumption, is little explored.

The spatial blindness of the ecomodernist policies, where the same technical solutions are devised for similar problems (Barca et al., 2012), is directly reflected in the urban design culture. Most of the European energy urban plans (e.g. SECAPs) show a standardised way of energy planning (De Pascali and Bagaini, 2018), excessive expression of quantity, vague and general objectives, and lack of spatial representation (Rutherford and Coutard, 2014). On the other hand, despite some isolated relevant territorial investigations and design explorations, the dominant design culture approaches the energy transition with a naive vision, reproducing the idealisation of techno-scientific models, thus focusing on a deep eco-efficient architecture – often brand new – isolated in the neighbourhood dimension, thus ignoring the huge urban heritage that already exists.

There is room to move beyond a purely technocratic vision and to experiment with the socio-spatial specificity of urban energy transition. Taking this possibility as a starting point, this contribution reports on a collection of inspiring design experiences and some findings related to an ongoing European JPI-funded research project entitled PEDFORALL. Starting from the premise that technocratic transition alone is insufficient and responsible for chaotic and conflictual territorial transformations, the key question here, which assumes the terms of a challenge, is how to balance the process of energy transition with actions of spatial depth, thus reintroducing thickness to social-

spatial and local issues. More specifically, the project investigates the agency of existing socio-spatial arrangements to achieve conditions of *energy sufficiency* (a concept that will be developed in the following paragraphs) and explores what the urban project can do. Although not a new concept, energy sufficiency still appears blurred through the lens of space. Unable to follow predefined patterns or refer to established research and design experience, the contribution follows hints and insights worked out through an abductive reasoning, that is a pragmatic way of proceeding by testing the most plausible hypothesis.
By building on the concept of energy sufficiency and attempting to transcend it when it is restrictive – for example, when it implies a moral judgement and contours of dismal degrowth – this study aims to contribute to the repair motion as an alternative to the techno-authoritarian urban project of sustainability. In this sense, the insistence is not on replacing the socio-technical apparatus, nor even on fixing it – both of which are susceptible to insisting on the *status quo* of practices, policies and socio-spatial organisation.

Fig. 1 - Historiacal, dense, worm, energy hungry, EU cities are facing several challanges for energy transition (Source: Fabrizio D'Angelo, 2023)

Fig. 2 - Evolving Energy Spaces: the former Italgas area in Ostiense, Rome. Neighborhoods like Ostiense are historically dedicated to the production, distribution, and storage of energy. Today, many of these decommissioned and abandoned infrastructures are being repurposed or regenerated with new energy functions, creating a stratified urban energy landscape (Source: Roma Capitale).

Rather, it focuses on the idea of a transformative process of repair (Moore, Patel, 2022) that engages with and takes on the maybes and conditions that emphasise extraction processes geared towards accumulation.

The interpretation of space by the current energy transition policies as a mere functional support has proposed an isomorphic and atopic view of the spatial configuration.

Space, an energy source

To focus on the role of space is to partially reframe, if not overturn, the dominant frame of the energy transition. For Viganò (2023), the potential of space could shape the transition as a collective capital and heritage, and as an open support capable of acting and adapting, reworking the relationship between the individual and the collective. However, as we have seen above, the interpretation of space by the current energy transition policies as a mere functional support has proposed an isomorphic and atopic view of the spatial configuration. Soils and surfaces are usually treated as development sites for standardised technologies, whose morphology and distribution follow functionalist protocols. And the exclusive consideration of the urban territory for energy purposes neglects its essence as a *social construct*, as a place where social facts take place (Crosta, 2010), with the consequence that all forms of integration, synergy and contamination with social practices, uses and

actors are too often overlooked. Yet space is the key to realising the conditions of the energy transition. For instance, renewable energy sources, which have a lower energy density per square metre compared to fossil sources, require the involvement of more space in a diffuse mode and in existing configurations (Pasqualetti, Stremke, 2018; Trainor et al., 2016). Or again, energy efficiency, which refers to the property of a process and/or a material not to waste energy, refers to improving the conditions, including therefore space, of something that already exists (i.e. the existing building stock) in order to make better use of the energy through recovery, recycling, and optimisation processes (Arrobio, 2023). But paying little attention to the social situation of the context means also running the risk of not recognising the essence of transition itself, understood as a change that affects the structural part as well as the set of practices of a given context (Geels et al., 2015). Otherwise, both renewable energy and energy efficiency fail to consider the potential of space and the social practices embedded in it to reduce energy demand. What happens instead is the installation of a technological system that often almost sterilises the local conditions, does not allow for alternative ways of producing and better using energy, and does not necessarily entail change in behaviour of the subjects living in the contexts in which it operates. But there is another concept that could be considered to test the possibility that its interpretations offer to overcome the socio-spatial impasse of the current energy transition, and that is *energy sufficiency*. At a theoretical level, sufficiency reduces the problem of consumption to its roots, by directly eliminating or reducing certain energy needs. Indeed, sufficiency refers to reducing waste by restricting oneself to consuming just enough (Burke, 2020). In other words, some behaviours could reduce the need for some energy demands (Arrobio, 2023). Although not new in the energy debate (Ivan Illich's contribution *Energy and Equity* dates back to 1973), sufficiency practices have been for long associated with a certain cultural rejection, overridden by a technocentric bias that neglects actions achieved by non-technological means and, above all, does not envisage practices that limit demand but only act on supply (Arrobio, 2023). Other authors have pointed to the limits of energy sufficien-

Some behaviours could reduce the need for some energy demands.

cy, the dark side of a concept that focuses on the deliberate, voluntary actions of individuals and groups of individuals (Sorrel et al., 2020). Rebounds and spillover effects are identified as possible drifts related to the mechanism of reducing on the one hand in order to feel financially, morally and temporally legitimised to spend more energy on other goods, services and activities involving other energy uses and emissions (ibid.). Nevertheless, energy sufficiency remains the least technosolutionist and most promising concept for reformulating energy balances. Our hypothesis is that this concept has not been sufficiently considered and that it could still be a way out of the impasse.

Yet traces of energy sufficiency can be found in various architectural and urban projects. From Victor and Aladar Olgyay to Glenn Murcutt and Lacaton&Vassal, the concept of sufficiency is behind studies and projects of bioclimatic architecture. It is well known that the design of climatological architecture is about establishing a close relationship with the external atmospheric and climatic conditions of the site, to achieve a high level of climatic comfort with a low input of artificial air conditioning, ventilation or heating device and, consequently, a minimum use of fossil source. However, as the work of Barber (2020) shows, the imposition of a universal standard of comfort has reduced and trivialised the relationship between the architectural artefact and the context in which it is located, entrusting mediation to mechanical means or relying on fossil fuels. Today, this line of research is once again attracting attention, and a set of solutions that make an economy of means is seen as one that can help to rearticulate the architectural project (Grohar et al., 2023; Rahm, 2023a; Rahm, 2023b). Without taking sides against thermomechanical systems, these works endorse the hypothesis of variable indoor climatic conditions, as well as the possibility of discomfort due to less stable thermal conditions as well as the obligation to constantly take care of one's surroundings (Kędziorek, 2023).

Energy sufficiency remains the least technosolutionist and most promising concept for reformulating energy balances.

And urban space? As early as the 1980s, Hough called for "more ecologically sound ways of manipulating the climate of cities than the current total reliance on technological systems" (1984: 28). His work, as well as that of Spirn (1984) or Tjallingii (1995), among others, integrates sufficiency even without direct reference

to it. They offer attentive readings of urban space that highlight design possibilities that contribute to creating urban conditions of comfort while reducing energy demand. More recently, design scenarios such as the "Climatic Urbanism" by Philippe Rahm (2023b) consider the reduction and elimination of some energy consumption by reintroducing the nexus of "natural geographical location." In projects such as the Taichung Central Park (Taiwan), or the Scalo Farini (Milan), the public spaces generate a high quality of comfort that contributes to the well-being of those who directly inhabit them and, more broadly, work to mitigate the local microclimate through strategies such as increasing the albedo in horizontal surfaces; extending the phenomenon of convective winds; and cooling the air by evaporation, planting trees or activating fountains. Particularly interesting is the pre-modern knowledge that Rahm (2023a) recalls to design with the context, a valid and central point in the spatial strategies for energy sufficiency. The way to reduce energy consumption through a bioclimatic approach also informs contemporary research and projects, especially those dealing with the UHI effect. The "Climactions" project in Rome (Pone, 2023), for example, provides design solutions for urban open spaces to counteract the UHI, and also assesses their impact on temperature reduction and perceived comfort.

Sufficiency could also serve as a paradigm for reading urban space as a whole in terms of energy.

Sufficiency could also serve as a paradigm for reading urban space as a whole in terms of energy. The work of Paola Viganò (2012; 2014) focuses on the possibilities of reducing consumption, integrating renewable energy production, recycling energy and valorising embodied energy as key factors to address the transition in consolidated urban areas. This is a key set of urban research based on the figure of isotropy, the scenario tool and territorial mapping, which has explored the possibilities of reducing energy consumption in large territories such as the metropolitan areas of Paris (Viganò et al., 2014), Brussels (Région de Bruxelles-Capital; Bozar Architecture, 2012), Lille (ADULM, 2014) and the central area of the Veneto region (Viganò et al., 2014). It shows how the mapping of the large amounts of embodied energy and labour accumulated in the existing urban morphologies legitimises the existing territorial stock and acts as a ba-

sis for thinking about design strategies that elaborate possible promising relationships that re-energise the existing heterogeneous mass of materials. The main outcome of this work is the valuation of the existing territorial stock as a capital, the important role of the existing isotropic network of grids and infrastructures, and the research based on the radical reduction of car use. Less attention has been paid to the elaboration of project strategies for energy sufficiency, including architecture and everyday practices.

The concept of sufficiency is explicitly interpreted in an inspiring study on buildings' energy sufficiency by the European Council for an Energy Efficient Economy (2019) or in the guidelines of NégaWatt (2022) to promote energy sufficiency (referred to as *sobriété*) in France. In particular, the latter examines energy savings that could be achieved by changing energy behaviour both in buildings (e.g. setting the thermostat to higher temperatures in summer and lower temperatures in winter) and in open spaces (e.g. reducing lighting consumption in car parks). Although presented as a principle among others, sufficiency is also an asset of energy plans such as those of Zurich (Energy Master Plan Steering Group, 2016) or Geneva (République et Canton de Genève, 2020). However, the sufficiency measures that could actually be taken are still general or vague.

The concept of sufficiency is explicitly interpreted in an inspiring study on buildings' energy sufficiency by the European Council for an Energy Efficient Economy or in the guidelines of NégaWatt.

Energy sufficiency is therefore not a new or ignored concept, but it is often treated implicitly and/or as non-primary. While there is certainly a greater awareness of practices that lead to reduced energy consumption, it is less clear how to create the spatial, physical, and infrastructural conditions to facilitate and replicate them in a specific context. Architectural, landscape and urban design expertise could converge to treat space as a continuum, shaped to accommodate configurations that enable social practices that reduce energy demand.

At an operational level, it is already possible to identify an initial portfolio of energy-sufficient design options, based on the above work and that of other researchers and designers, that make use of existing urban space and encourage practices that reduce energy consumption. For example, in order to mitigate the UHI effect and the use of mitigating appliances for comfort, streets, car parks and squares

could be landscaped by introducing lawns, planting trees and shrubs in rows or groups (Dessì, 2015; Latasa, 2022; Pone, 2023), adding shading structures such as PV canopies or *pergolas* (Ratti, 2017), replacing permeable paving with light-coloured asphalt or similar (Adjuntament de Barcelona 2018; APUR, 2020). Alternatively, to reduce indoor temperatures, existing buildings could be retrofitted with *brise-soleil* or double-skin facades that, when closed in winter, form an insulating space and, when open in summer, filter the sun's rays and create ventilation spaces; rows of trees could be planted along the southern façade to reduce the albedo index (Erba and Pagliano, 2021). Existing flat roofs can be used to accommodate PV and solar energy systems for energy self-consumption, but also to form vegetated (and cultivable) roofs that passively insulate buildings and reduce surface overheating (Guida, 2022; Toboso et al., 2023). In medium-density urban patterns, courtyards, loggias and porticoes could also host PV and solar systems for self-consumption or community consumption (Marrone and Montella, 2022). The shared use of these spaces, but also of facilities such as shared laundries and bike/car sharing, can allow to reduce individual consumption (Erba and Pagliano, 2021). The urban street section could be reorganised as a space of light mobility, concentrating, where possible, social, recreational, commercial and vegetated spaces, thus reducing the movement of local citizens for basic uses in other neighbourhoods and recovering the quality of public spaces (e.g. planning programmes such as *Superillas* in Barcelona; or the *Ville du quart d'heur* in Paris). Or again, the use of the Cool Material technique in the form of white paintings is used both to mitigate UHI and to give social agency to street spaces (e.g. the intervention in streets and car parks by the Bureau of Street Services in Los Angeles; and the *outdoor cooling station* in Tiffany Street Plaza, New York designed by Interboro and the Department of Health and Mental Hygiene).

The urban street section could be reorganised as a space of light mobility, concentrating, social, recreational, commercial and vegetated spaces.

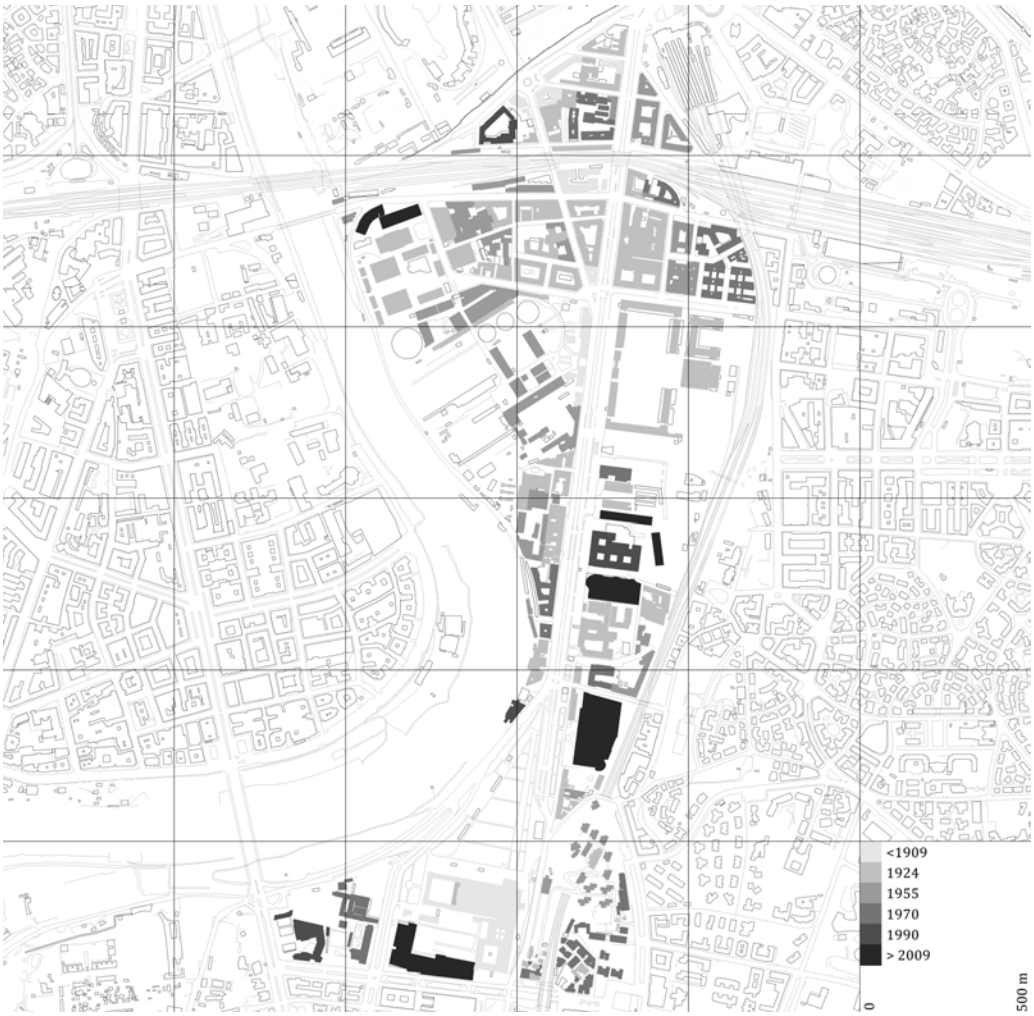
Ostiense energy-sufficient neighbourhood

The reference case of PEDFORALL is the context of Ostiense in Rome. Faced with social and governance inertia, this historic neighbourhood is representative of the relationship between comfort and energy demand in a city where the consumption system in the

building and mobility sectors still plays a major role in the production of climate-altering gases and where the implementation of renewable energy installations and energy efficiency retrofitting is particularly slow (Roma Capitale, 2023). The implementation of renewable energy installations is very slow,[2] while energy efficiency measures are particularly complex and therefore slow.[3] Inertias is also related to the fact that large parts of Rome were built before any energy efficiency regulations, often as a result of speculative and unauthorised processes (Insolera, 2011). This led to problems in the organisation and construction of urban technical services (e.g. electricity distribution networks, district heating, etc.) and resulted in the proliferation of buildings with low energy perfor-

2 – Within the city limits (1.285 km2), only 195 MW are available from 17.000 installations. Few of these are integrated into buildings, for example, only 1% of condominiums have photovoltaic systems.

3 – Today 65,5% of the total building stock is certified according to the EU Energy Performance Certificate in classes F and G, the lowest.



mance. The high energy consumption generated by housing discomfort affects urban energy poverty, with more than a hundred thousand users that are in serious situations of distress (Asdrubali et. al., 2023; ENEA, 2018). In Ostiense, the imbalance between the consumption system and the production system is quite evident: an average of 150 MWh is consumed per month while the installed capacity, including the existing renewable energy installations, is only 400 kWp. The significant weight of consumption is linked to a specific spatial-environmental phenomenon: the urban heat island. Ostiense is one of the hottest parts of the city in summer, especially at night, when the temperature rise can reach up to +3°C (Pone, 2023). This condition leads to an impressive use of artificial

Fig. 3 - Ostiense is largely made up of buildings constructed before the 1970s, i.e. without any energy saving solutions. This results in a legacy characterised by widespread low energy efficiency labelli (Source: Fabrizio D'Angelo 2024).

Fig. 4 - Energy consumption and Climate Change. The city of Rome is increasingly affecte by heat waves and urban heat islands, the effects of whic lead to intensive use of cooling devices and consequently to electrical peaks and blackouts. The map represents urban areas based on the percentage increase in electricity consumption during summer, ranging from the most intense (black) to the least intense (white) (Source: Fabrizio D'Angelo 2024).

PEDFORALL aims to combine the potential for new renewable energy installations with the implementation of energy efficiency strategies, and the promotion of energy-sufficient practices.

air conditioning with a 10% increase in electricity demand (Asdrubali et al., 2023). As studies have shown (e.g. Cattaneo, 2023), the UHI is strongly influenced by the large presence of mineral surfaces, mostly asphalt, in addition to the scarce availability of permeable soils and vegetation, the massive use of cars and the given topographic conditions.

Aspects such as those just mentioned are only marginally present in urban energy transition programmes, such as the *Piano Quadro per la Transizione di Roma* (Rifkin et al., 2010) or the Sustainable Energy Climate Action Plan (SECAP, 2021, updated in 2023) which, like similar planning tools designed for other contexts, propose techno and isomorphic solutions, without specific consideration of the spatial dimension related to energy systems (De Pascali, Reginaldi, 2016) and the contextualisation and rooting of planning strategies in specific local actors and social practices (Nessi, 2018).

PEDFORALL therefore aims to combine the potential for new renewable energy installations with the implementation of energy efficiency strategies, and the promotion of energy-sufficient practices. For example, in order to reduce the massive energy consumption of air-conditioning, it is necessary to mitigate or, if possible, eliminate the socio-spatial conditions that make air-conditioning necessary. Referring to energy mapping studies that work on the existing energy spatial capital (Viganò et al., 2014), a series of detailed maps of urban spaces and social practices have been compiled, such as the existing energy system, roof characteristics, albedo, solar radiation, and extends to the observation of typo-morphological aspects, land cover, land subdivision, presence of vegetation, wind direction, but also the distribution of common spaces in residential and tertiary buildings, income distribution, mobility behaviour, energy poor users, and other statistical data capable of revealing the socio-spatial complexity.

On this basis and taking into account the insightful studies on bioclimatic architecture and urbanism mentioned above, PEDFORALL elaborates, supported by master's thesis works, design speculations at the architectural, urban design and territorial scale. The neighbourhood's areas are designed to combine low energy mobility facilities, shading and cooling options to mitigate UHI, interventions in building facades and courtyards to regulate irradiation and air exchange, installation of PV systems on roofs and shading struc-

tures, vegetated roofs, ventilated attics for thermal insulation, limitation of artificial lighting.
At the same time, some of the more economically viable and less technologically demanding options are being prototyped and implemented as test cases. For example, a workshop with the municipality and a local association is transforming large areas of asphalt in front of schools and other public spaces using Cool Materials (Figure 6). Test cases such as these provide an opportunity to get the views of the people who live in Ostiense, to investigate the impact using simple monitoring tools and to study possible improvements. Other research initiatives include a series of co-design workshops where experimental representative tools are tested to qualitatively design how space and social practices interface with the energy system in the domestic environment. Through iterative interactions with a selected group of actors-residents, a series of semi-directive interviews, households' maquettes, and participatory spatial design workshops are conducted. This work is very similar to what is happening in Brussels with La Pile (City Mane(d), 2023), a project that seeks to socialise the energy issue by creating opportunities for neighbours to discuss energy and how to reinvent electricity in the city.
The aim of designing the energy arrangement by improving the energy synergy between buildings and the whole urban environment (Roesler, 2022) (including human and other-than-human), through maps, design speculations and actions with people, brings together social practices and space, approaching different scales (the urban and the architectural), different disciplinary fields (urbanism, landscape, architecture, engineering, sociology and law) and different urban materials (vegetation, soils, streets, public spaces, housing, etc.). In turn, the combination of these different aspects aims to reshape the technology of energy production and consumption, offering a more integrated urban energy landscape to design and live in. Not just new vegetated areas, but comfortable urban spaces; not just high performance buildings, but renovated with spaces and equipment for *sufficient* lifestyles; not just more cycle paths, but places designed for social interaction and the sharing of activities and practices.

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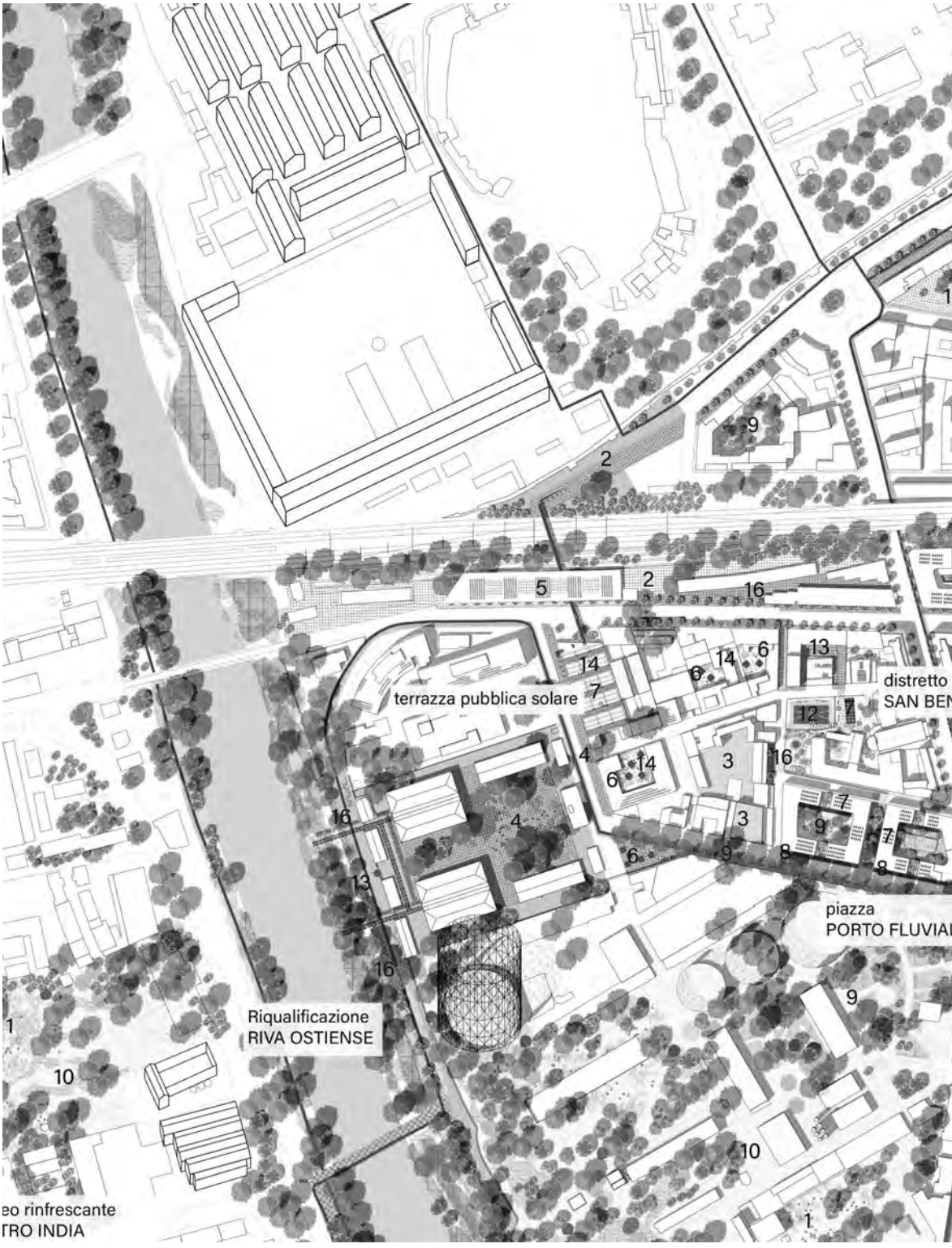
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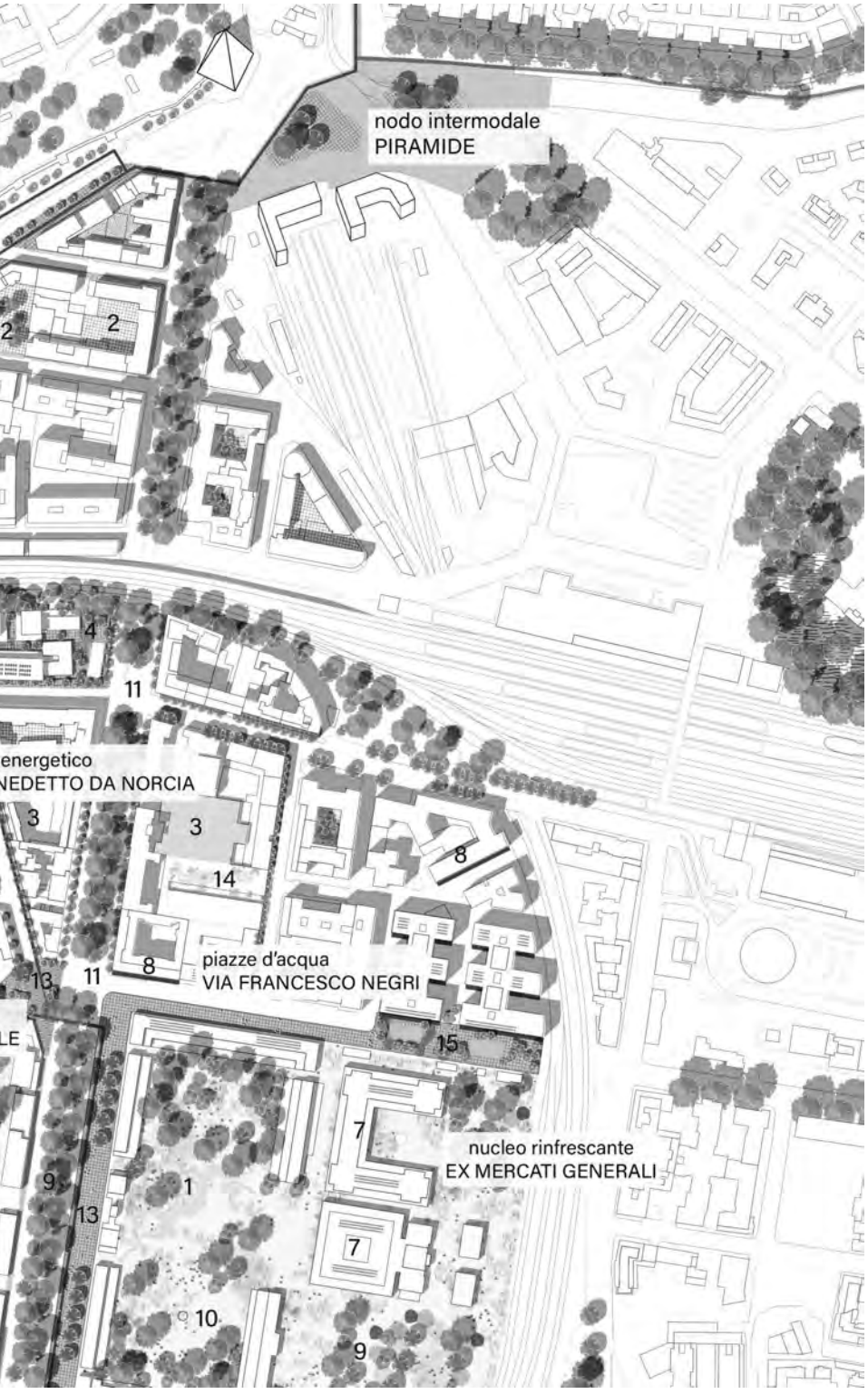

Fig. 5 - 'Bioclimatic Ostiense', a design speculation to ground different bioclimatic devices and new energy solutions (Source: Giordana Panella and Giancarlo Scarascia Mugnozza, 2023).

Fig. 6 - Marciapiede Fresco/Cool Siedwalk. On-site workshops for testing Cool Materials tecnique in public asphalted spaces. (PEDFORALL in collaboration with Laboratorio di Progettazione dello Spazio Urbano - LAPSUS, Università Roma Tre, Municipio VIII and Sportlab. (Source: Alessandro Vitali, 2023)and Sportlab).

Ostiense as a laboratory to explore the relationality of energy

In its current stage, the work of PEDFORALL for Ostiense functions as an open framework aimed at studying, promoting and implementing the possibilities for improving and strengthening the relationship between the socio-spatial characteristics of the neighbourhood and energy, a world of flows increasingly present in economic concerns and political attention, but still abstract, intangible and seemingly difficult to operate. The effects of the *rupture* of the technocratic energy paradigm inevitably complexify the energy question, which is no longer governed by infrastructures alone, but is pervasive in territory and society. How can we grasp the possibilities that open up between the folds of this rupture, in order to activate connections with that from which we have been separated (Stengers, 2021), namely the material and operable dimension of energy production and consumption that the socio-technical apparatus and the associated urban energy service system have gradually made inaccessible and untouchable? How

do we socialise the energy world we inhabit and that inhabits us?

The *spatial design nebulose* presented in this contribution holds together many fragmented projects carried out at many different scales and by different disciplines. In these experiences we see more or less explicit signs of energy sufficiency, a concept that allows us to recover and explore many experiences and sensitivities that are closely imbricated with the socio-spatial aspects of the energy question. Unfortunately, sufficiency is usually associated with narratives of crisis and scarcity, and this tends to make it associated with temporary efforts rather than outlining proactive horizons (Arrobio, 2023); at the same time, as recalled above, sufficiency can lead to unintended effects, known as rebounds, where the elimination of some consumption practices may elicit others (Sorrel et al., 2020). Finally, sufficiency as understood by policies and programmes is based on individual responsibility, a condition that could also increase socio-spatial inequalities and disempower political and planning action.

For these reasons, PEDFORALL does not position itself exclusively within this concept. The policies' more technical recommendations for efficiency and decarbonization are taken into consideration, but only to the extent that they qualify the space and provide opportunities to deepen the relational dimension with energy. In this search for ways to enhance the *relationality of energy*, Ostiense is a laboratory where the context is reinterpreted through the paradigm of sufficiency, and at the same time it is opened to integration with other visions of efficiency and decarbonisation (including renewable energy production), always highlighting the relations they open with social practices and space. The laboratory becomes a time and a place for experiments strongly focused on spatial relationships with bodies and practices through the materialisation of design actions in domestic and urban space (workshops, living labs, etc.). Some of these experiences can be replicated, some will find space in local regulations to promise their recursiveness, in any case all are intended to be widespread possibilities that give agency to space and people in the world of energy.

The *spatial design nebulose* holds together many fragmented projects carried out at many different scales and by different disciplines.

Acknowledgements
The reflections on this paper are part of PEDFORALL-JPI's research project. PEDFORALL is testing one of the actions foreseen in the European Strategic Energy Technology Plan, which calls for the establishment of one hundred sustainable energy districts by 2030. The same action promotes the urban model of Positive Energy Districts (PEDs) which can be defined as energy-efficient and energy-flexible urban areas that produce net-zero greenhouse gas emissions and actively manage an annual local or regional surplus production of renewable energy (Gollner et al., 2020). In this framework, PEDFORALL is developing strategies and tools to extend the district to the more complex urban dimension of the neighbourhood (i.e., the Positive Energy Neighbourhood-PENs) in three different low/medium-income European areas (Cureghem in Brussels, Kartal in Istanbul, and Ostiense in Rome). The Italian case in Ostiense is led by the Architecture Department of Roma Tre University in collaboration with the Department of Law of the same university, the LUISS University, the Municipality of Municipio VIII, Fondazione Feltrinelli, and ACEA.
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energy data• simulation games • city building games

Playing Energy Landscapes. Reconnecting Architecture, Data, and Scales

Andri Gerber

Abstract

The climate crisis has heightened the relevance of architecture due to its substantial impact on energy consumption and carbon emission. However, such relevance is conveyed by means of simply numerical values that are derived from data and communicated through digital tools that cannot be examined or questioned. They become labels that frequently serve to certify that a particular abstract objective has been successfully accomplished. Such *landscapes of energies* flatten out any distinctions between architecture and urban environments. The article describes the development of a simulation game that defies this prevailing pattern. The game alludes to the historical legacy of simulation games centered around ecology and economy, while adopting a lighthearted and exploratory attitude towards data and energy. By engaging in gameplay, the simulation experience allows users to easily understand its mechanics while also reconnecting the different dimensions of architecture and the urban environment.

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The impact of architecture on the climate is mainly measured in quantities and abstract entities.

The scale of data

Amid the ongoing climate crisis, architecture has discovered a new relevance, which is best reflected by two repeated figures from conference to publications: *30%* and *80%*. Both recur over and over and refer to the share of the CO2 emissions (construction and services) and waste produced by the building industry, reflecting architecture's enormous impact on the environment and the climate. However, the discipline's newly regained relevance has an obvious downside which is also reflected by these two numbers: the impact of architecture on the climate is mainly measured in quantities and abstract entities. It is essentially a matter of energy consumption, consequential emissions and their impact on the climate – mere numbers and statistics that pave the way to performances' optimization and protocols to conform to. "Good" architecture is then a matter of achieving certain goals and a positive eco-balance (*Ökobilanzierung*). It is measured and assessed through environmental impact points (UBP: kg/m2 effective energy related surface), greenhouse gas emissions (THGE: kg CO2-eq/m2 effective energy related surface) or grey energy (kWh oil-eq./m2). The calculations of these data are highly complex and often performed by digital tools and by specialized firms. In Switzerland, the main instrument to calculate emissions and grey energy is the KBOB-list, a governmental standard which is periodically revised. It is based on the different degree of impact on health and environment and through the revision, these different influences are weighted differently. In the first edition of 1990, the major weight was on ozone layer depletion (50%), while in the last edition this accounts only for 2%. Here climate change accounts for 38%, while back in 1990, it only accounted for around 4%. The calculation of these factors in their various interdependencies, is highly complex and can only be done through digital instruments, such as Greg, Lesosai, Co2mpass or Ecotool, just to mention some of the most popular ones. These tools allow for a calculation of several parameters – first of all of energy consumption, production and greenhouse gas emissions – and are the foundation of Swiss building-standards such as GEAK, Minergie and SNBS, which attest and label buildings. Here again, every standard has a different

set of parameters that they include in their evaluation (SNBS being the most holistic) and which change over time.
For architects the struggle is twofold: on the one hand, they have no control on the tools and on the operations that these perform, as they are given, on the other hand, energy-consumption and its consequences – such as greenhouse gas emissions – remain ungraspable entities that have no relation to the *real* world of architecture. As for the first point, these tools appear to be *black boxes* that are fed with data – square meters of floor, square meters of window surface, tons of concrete etc. – and based on this, they generate results, that will tell if a building conforms to a certain goal or not. Obviously, this tells nothing about the architecture of the building and its qualities. As for the second, these numbers and these percentages are totally abstract and difficult to relate to a particular scale of architecture. They are a linear or non-linear sequence of numbers and as such potentially endlessly scalable, without a real point of reference. Consequently, sustainability is – also – a matter of numbers and this must be reflected by the discipline. The results are "landscapes of energies" that make no distinction between the scale of a house, a quarter, a city or an urban landscape and as such, between architecture and urban environments. Multiscalarity, which is the possibility to change and work on different scales, is then suspended and scales *flattened*.

The scale of the planet
In the context of sustainability, the issue of scale has gained momentum, as it became more and more clear that the relationship of human beings to their environment, and their impact on it, must be retaught in the terms of its magnitude. Indian scientist and historian Dipesh Chakrabarty has made an argument for the need of a new *regime of historicity* through the concept of anthropocene but mainly through the concept of planet and planetary (Chakrabarty, 2021:68). The planet is then a new category to think sustainability, opposed to the notion of globe (and of globalization), with the latter being a humanocentric construction, while the planet *decenters the human* (Chakrabarty, 2021:4). Among the many references Chakrabarty builds upon, there is also the distinction

Dipesh Chakrabarty has made an argument for the need of a new *regime of historicity* through the concept of anthropocene but mainly through the concept of planet and planetary.

made by Martin Heidegger, between *Erde* and *Welt* in his attempt to define the nature of artworks. *Erde* then is something that can be "manipulated", while *Welt* is given (Heidegger, 1977). This reference is telling about the fact that these different scales have a long tradition and have been used to explain other contents. In his book Chakrabarty includes a dialogue with Bruno Latour and his plea for a return to earth, which appears to be antithetical to the position of Chakrabarty, at the same time it covers the same issues of a "New Climatic Regime" including the question of human-nature relationship or global inequalities (Latour, 2018:16). For Latour the question of the scale at the center of his movement from close to far:

Whereas urban spaces had traditionally been designed by arranging *voids* and *solids*, only abstract diagrams could grasp this new and vast scale.

> We must face up to what is literally a problem of dimension, scale, and lodging: the planet is *much too narrow and limited* for the globe of globalization; at the same time, it is too big, infinitely too large, too active too complex, to remain within the narrow and limited borders of any locality whatsoever. We are all overwhelmed twice over: by what is too big, and by what is too small. (Latour, 2018: 1)

This struggle and search for the *right* scale of sustainability, resonates with the history of architecture and the discipline's struggle towards the horizon of its operations and that which is still manipulable through its means, such as plans, diagrams or models. By no way the struggle with scale is new to the discipline, as it rises now again in the context of the landscapes of energy. In fact, it is something very peculiar to the history of the discipline. In the wake of industrialisation in particular, cities exploded and sprawled into a suburban dimension, losing their previous contours and size. For architects, this marked a dramatic change in their profession and the tools they were accustomed to. This transformation is particularly evident in two competitions: the 1910 Groß-Berlin competition and the 1919 Greater Paris competition, where, alongside a more traditional scale (1:5,000, 1:10,000), new and larger scales emerged (1:60,000 and 1:40,000 respectively) that challenged the conventional way of designing urban spaces. Whereas urban spaces had traditionally been designed by arranging *voids* and *solids*, only abstract diagrams could grasp this new and vast scale. The introduction of ever-larger scales

overthrew all theoretical attempts to wrest control of this scale: in the German Ruhr region, for example, a new regional scale emerged that obliterated any attempt to maintain the notion of a contained *city*. The engineer Robert Schmid presented a study, in a 1:100,000 scale, for the development of the newly created *Siedlungsverband Ruhrkohlebezirk* coal-mining settlement district (Schmid, 1912). The study marked the birth of a new discipline: *Landesplanung* (state planning) which was later to become *Raumplanung* (spatial planning). In this context, architect Gustav Langen introduced the concept of *Landschaft* (landscape) to describe this new form and scale of urban design. He posited that a geographical point of view should integrate into architecture (Langen, 1912). The consequence of this development was the incorporation of a multiscalar perspective on architecture.
The recent call for *planetary urbanisation* (Brenner, 2014) in the context of architecture and urbanism, has further extended the space of observation and action to ever-larger scales, leaving architects puzzled and insecure about their possible interventions and means. In this sense, the periodical resurgence of the notion of *territory* may well represent an attempt to reclaim lost agency, as it was the case in the 1970s when the term became fashionable in Italian architecture or again nowadays (Aymonino, 1964; Gregotti, 1966; Topalović, 2018).

The contemporary data-based *landscapes of energy* constitute a new challenge for architecture.

Landscapes of energy
Building on a century-old tradition of responding to ever-increasing scales, the contemporary data-based *landscapes of energy* constitute a new challenge for architecture in that, in addition to their expanding scale, they are – if possible – even more abstract than large-scale *space*. Energy is expressed through charts and graphs rather than plans and perspectives. Energy and emissions are measured and expressed in data, constituting the basis for models and simulations. The discussion about the climate crisis and its impact on human life is based on simulations and projections. Among the most famous – and probably most controversial – simulations in this arena are those developed by Jay Forrester, professor at MIT's Sloan School of Management, which the Club of Rome used to develop the scenarios published in the seminal "The Limits of

Energy and emissions are measured and expressed in data, constituting the basis for models and simulations.

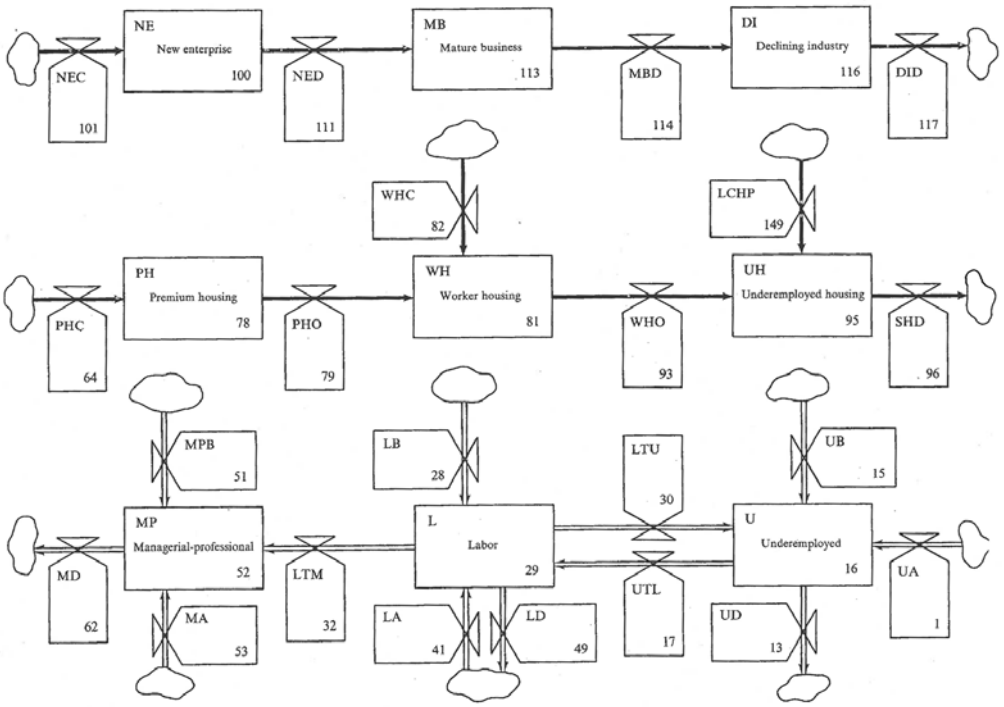


Fig. 1 - Jay Forrester, "Diagram. Model for an urban area", 1969. Source: J. W. Forrester (1969), *Urban Dynamics*, p. 16.

Growth" in 1972 (The Club of Rome, 1972). Forrester went on to apply his theory of system dynamics on urban environments and published his research in 1969 in his book "Urban Dynamics" (Forrester, 1969) in which he described the development of a city as an economic model with a corresponding life cycle and identified business and housing as the main levers of its development. To explain his model, Forrester mainly relied on diagrams visualising the interdependencies between the different factors and levers. He also included a rather hapless perspective of his *ideal city*, revealing just how abstract his understanding of the urban scale was and how much he struggled to complement the structure's scale with a corresponding physical model. The representation resembles rather to an abstract data sheet, than to an urban environment.
Two things appear relevant in this context. Firstly, at the time, the climate crisis was not discussed in terms of energy (consumption and production) to the extent that it is today, but more in terms of resources and pollution. In "The Limits of Growth," energy is only discussed in passing and in relation to pollution (The Club of Rome, 1972: 71).

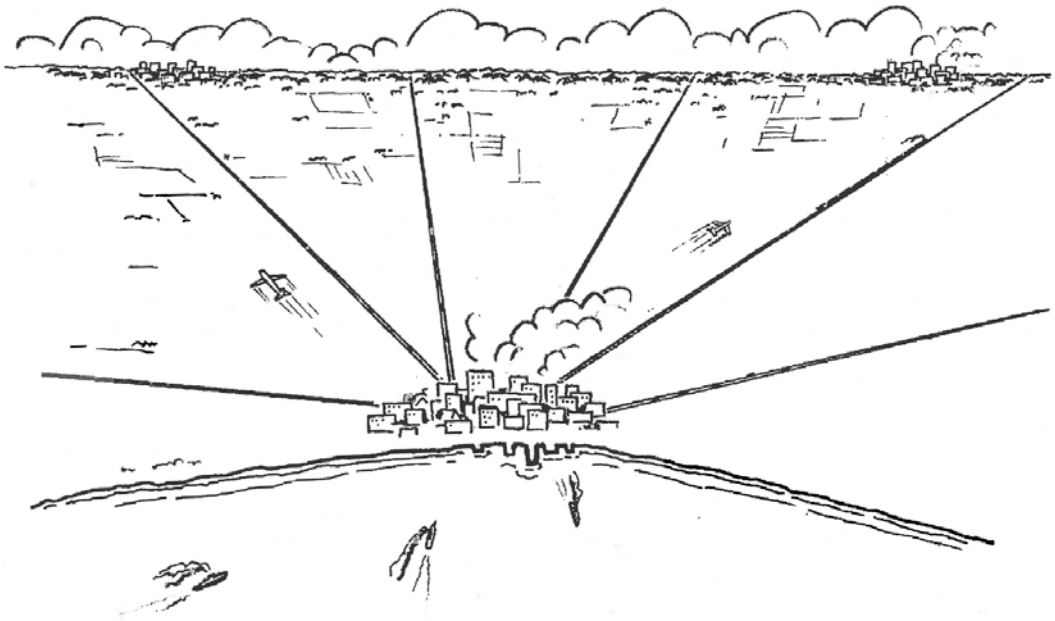


Fig. 2 - J.W. Forrester, "Urban environment", 1969.
Source: J.W. Forrester (1969), *Urban Dynamics*, p. 15.

Secondly, there was a general discontentment at the time towards these models and simulations and the related emerging technologies, which from the start were heavily criticised on the grounds of lacking or insufficient data (Edwards, 2010: XVIII).
Proponents of the environmentalist counterculture of the 1960s and 1970s were critical of the *top-down* technology that had emerged from military founded research during and after World War II:

> Between 1945 and 1965, digital computers revolutionized weather forecasting, transforming an intuitive art unto the first computational science. Unlike many scientific revolutions, this one was planned. Numerical weather prediction became the civilian showcase for a machine invented in wartime to support specifically military needs. Scientists conceived and carried out the first experiments with numerical forecasting in the earliest days of electronic computing, years before commercial computers became widely available, as a joint project of American military research agencies and the US Weather Bureau. A principal architect of that project was John von Neumann, who saw parallels between the science of nuclear weapons and the nonlinear physics of weather. (Edwards 2010: 6)

The focus of the discussion, among the scientific community as well, at the time was on the accuracy of these projections, the model used and the available data.

Eco-simulation games

Against this background, the significance of games and game-playing as alternative approaches to dealing with data while maintaining a critical stance towards the associated technology was growing considerably. At the same time, the pedagogical value of games started to be recognised and games at the intersection of simulation and ecology emerged in this period. However, they typically focused on the scarcity of resources and not on energy, mainly adopting a management perspective. Not least, the motivation behind these games was how to deal with data. Buckminster Fuller developed one of the most influential games of the genre. In 1969, he realised his "World Game," which he had already started working on in the 1940s. The game was based on *dymaxion maps*. It was

The pedagogical value of games started to be recognised and games at the intersection of simulation and ecology emerged in this period.

> […] an attempt to turn a technocratic apparatus of data analysis, systems modelling, scenario building, computer technology, and information design – the stuff of Cold War military strategy – to more egalitarian ends to meet human needs. (Stott, 2022: IX)

The players had to deal with the scarce resources of the world and find ways to distribute them more equally by modelling scenarios. The aim was not to win but to find solutions and gain literacy around complex systems, data and world problems. The "World Game"

> was driven by a fantasy of a cybernetic architecture of total information, the cybernetics of the Seminar were characterized by an *ontology of unknowability*. (Stott, 2022: IX)

Fuller's approach was influenced by the biologist Ludwig Von Bertalanffy's General Systems Theory (GST) John von Neumann's game theory and based on the notion of the world as *Spaceship Earth*, a metaphor that would gain much momentum at the time (Ward, 1966). The implicit assumption of the metaphor was that the earth could be controlled and its mechanisms

understood – which is the purpose of the game – but we are yet to learn how:

> Now there is one outstanding important fact regarding Spaceship Earth, and that is that no instruction book came with it. It is worth noting that there is no instruction book for successfully operating our ship. (Buckminster Fuller, 2008: 60)

The "World Game" was a typical product of its time, with both a fascination with and critical stance towards computer and cybernetics, and the attempt to use them to solve environmental problems. Data was negotiated and played out in the game and as such made tangible in its influence on the game world. A World Game Institute was created in 1972 to disseminate the game and the insights it provides.

The "World Game" was a typical product of its time, with both a fascination with and critical stance towards computer and cybernetics, and the attempt to use them to solve environmental problems.

The "World Game" was a mix of tabletop and digital games. Several other game experiments emerged in its heyday, notably the "Sumerian Game," whose history has been the subject of many investigations and myths. Developed between 1962 and 1967 by IBM under the direction of Bruse Moncreiff and supported by the New York State Education Department, it was aimed at Sixth grade children and based on an IBM mainframe. It was connected to an IBM 1050 terminal and a slide projector (Wing, 1967). After receiving some background information about the Sumerian culture, the children would assume the role of Lagash, the ruler of a Sumerian city-state and be put in charge of its resources. They would be tasked with deciding how to distribute the harvest to feed the population and plant new crops. The projected slides would serve as a visual aid to support the players' decision-making and show the consequences of their decisions. It is noteworthy that Mabel Addis, one of the first female video game designers, played an essential role in this project and is credited in the game.

A third game worth mentioning is "Ecogame," aimed at teaching economics – and, indirectly, ecology – and developed by Georges Mallen in England around the same time. Mallen had worked for Gordon Pask, one of the most prominent cyberneticians of the time. He and his System Research Ltd developed, among other things, SIMPOL (SIMulation of as POLice system), a project about decision-making in crime investigations.

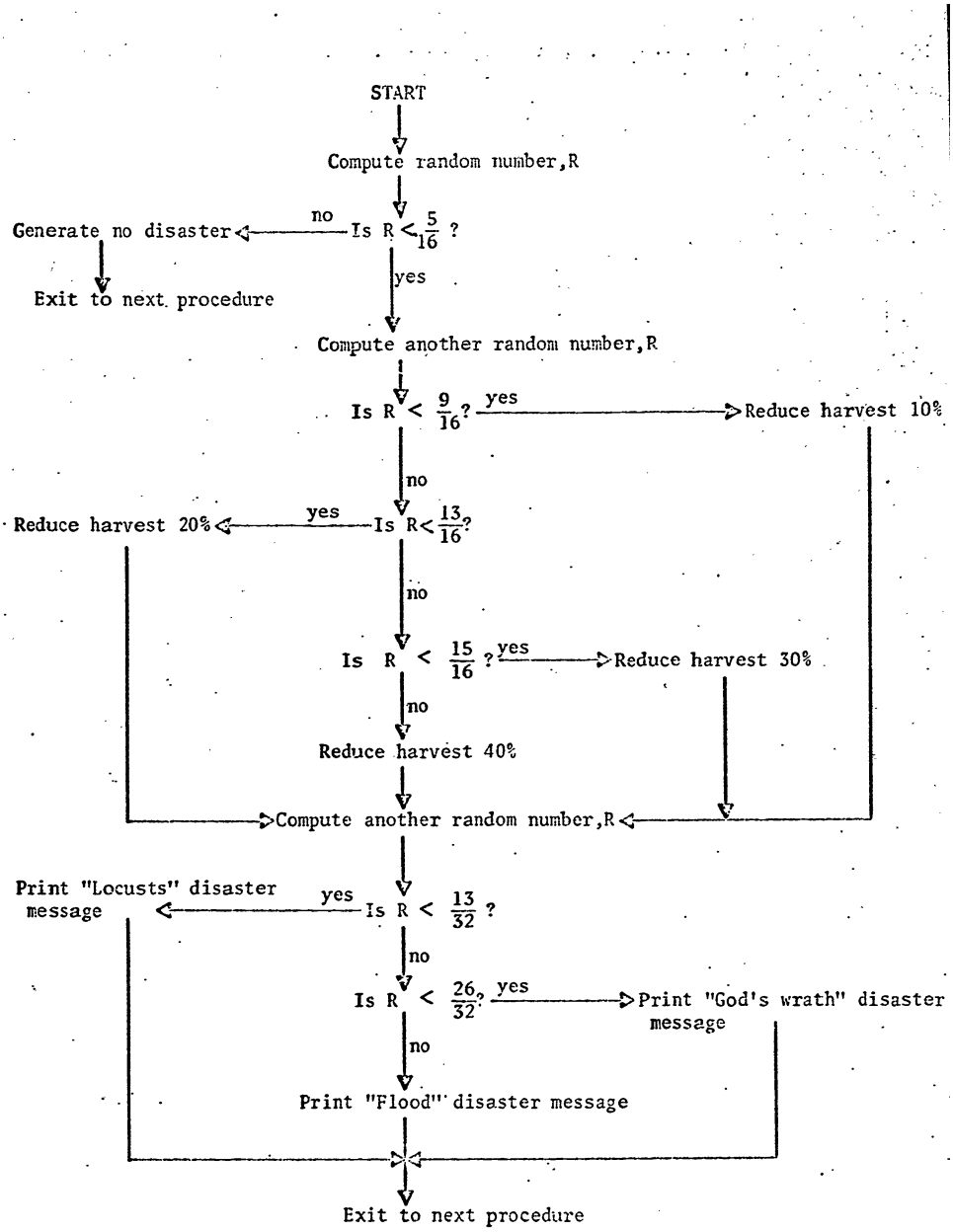


FIGURE 4. NATURAL DISASTER GENERATION PROCEDURE

Mallen had previously cooperated with Cedric Price on the "Fun Palace," and after leaving Pask, he founded his own company, System Simulation Ltd with Mike Elstob. One of their first commissions in 1969 was de-

signing a game to be displayed inside a "Buckminster Fuller type geodesic dome" at the Computer 70 trade fair (Mallen, 2017: 197). He developed the "Ecogame," which could be played by groups of three players who had to make decisions for a model economy. According to these decisions, a slide projector connected to the computers (as in the "Sumerian Game") would display corresponding images:

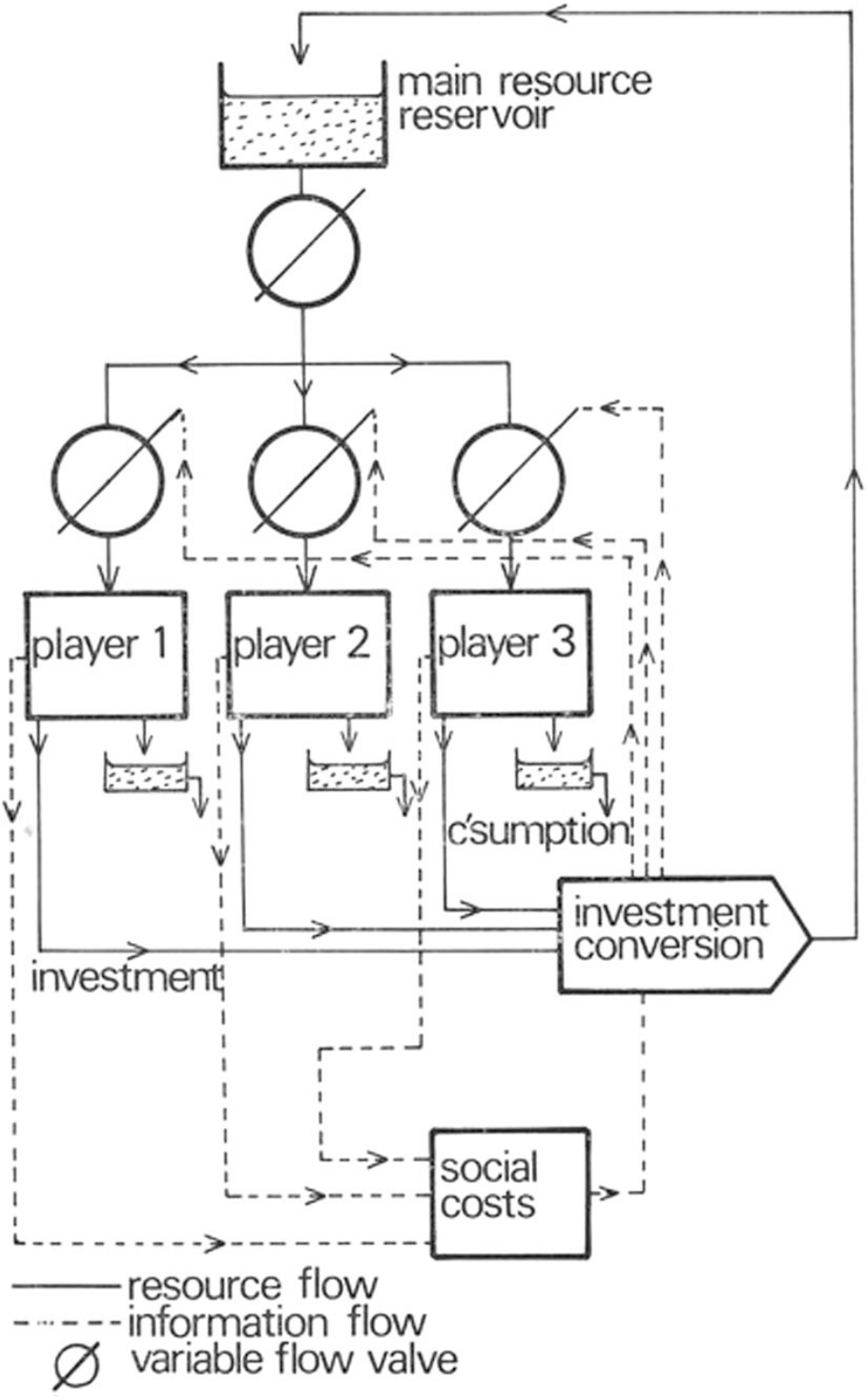
Fig. 3 - The Sumerian Game, "Example of generation procedure", 1967. Source: R. Wing (1967), *The production and evaluation of three computer-based economics games for the sixth grade*, p. 30.

> The heart of the game was a system dynamics model that I developed of an hypothetical national economy which was controlled by three players seated at three Tectronix terminals each with slide projectors projecting images of how the model economy was faring on to screens suspended above the terminals. These images were photographs collected or taken by Anthony McCall. So, for example, if the model economy was performing well and creating wealth, colourful images of happy citizens, elderly folk or families at play were selected. If, however, the economy was being run down, black and white images of dole queues or civic unrest would be selected. So spectators could see how things were going by the mood of the projected images. We called the system "Ecogame". (Mallen, 2017: 193)

The game was used again by the Centre d'Etudes Industrielle (CEI) in the context of the European Management Forum held in January 1971 in Davos (a precursor to the current World Economic Forum). Both "World Game" and "Ecogame" would put the economy at the forefront and rely on abstract diagrams and, conversely, projections of real-life pictures, thus bridging abstraction and concrete representation.

Both "World Game" and "Ecogame" would put the economy at the forefront and rely on abstract diagrams and, conversely, projections of real-life pictures, thus bridging abstraction and concrete representation.

Along with these games, another type of simulation game emerged at the time. It focused on urbanism and urban environments, such as "Metropolis" (1964) by Richard D. Duke and the subsequent "METRO game/simulation" (1967), "CLUG – Community Land Use Game" (1966) by Allan G. Feldt, who had worked on "Metropolis," and "INHABS" (Instructional Housing and Building Simulation) by Cedric Green (1967). The purpose of these games was for players to learn how to deal with the complexity of cities. They were primarily used in a classroom setting. However, they were also used to bring relevant stakeholders to the board to play different roles. These were mainly


main resource reservoir
player 1
player 2
player 3
c'sumption
investment conversion
investment
social costs
resource flow
information flow
variable flow valve

analogue games, but soon extended to computer programs that could register and process the players' input. Duke, who like Stuart Marquis is considered to be one of the pioneers of urban simulation games, would later question this path from analogue to digital:

Fig. 4 - Economic flow diagram for "Ecogame", 2017. Source: G.L. Mallen (2017), *A journey - crossing boundaries, Interdisciplinary Science Reviews*, p. 199.

> It was a time when a significant number of planners believed that it was possible to model a major metropolitan community as a predictive, scientific tool to evaluate various proposals affecting the community [...]. This later proved to be a rather simplistic view, limited in theoretical content and technology. (Duke, 2000: 80)

"Metropolis" and other urban simulation games did not focus on ecology, but they still centred on limited resources, and compared to the "World Game" and "Ecogame," they had a clearly defined urban scale. "Metropolis" famously took the city of Lansing (the capital of Michigan) as its reference. With around 100,000 inhabitants in 1960, the city was fairly large-scale. By comparison, the other games tended to focus on idealised, smaller towns.
Generally, architects started to take an interest in games in the 1960s, as alternative approaches to dealing with physical reality and the limitations of their profession. In the words of architect Juan Pablo Bonta, editor of a 1979 issue of the "Journal of Architectural Education" dedicated to games:

"Metropolis" and other urban simulation games did not focus on ecology, but they still centred on limited resources, and compared to the "World Game" and "Ecogame," they had a clearly defined urban scale.

> Architects and architectural educators are becoming interested in gaming. There is a philosophical reason: since the collapse of the modern movement, we are no longer sure that the architects' values, stylistic preferences or prejudices are better than anyone else's. In abandoning the messianic role, we fabricated for ourselves, we can see architecture as a transaction between groups with different goals and values-the users, the owners, government, labor, industry, public opinion, architects themselves. Like war, business and politics, architecture can be seen as a game in the widest sense of the term. The principles of gaming theory are applicable to it and they can cast light upon aspects of the profession overlooked before (Bonta, 1979: 1).

This tells us that there is a tradition of architects applying methods of gaming in their practice.

The idea is to create a game that moves energy consumption and production to the forefront and is oriented towards teaching school children.

Net Zero: A sustainable construction simulation game, 1990-2050

The pioneering experiments mentioned above were later translated into commercially successful games such as “SimCity” (1989), “Big City” (1999) or “Cities: Skylines” (2013), which all focus on having fun rather than learning and which build on a model of constant growth. However, the first version of SimCity already featured pollution, the option of a car-free city, and the principle of limited resources, which extended to money, land, energy and connections. Subsequent games put ecology in the foreground, such as “City Rain” (2010), “Anno 2070: Das Spiel mit der Ökobilanz” (2011), “Block’hood” (2017) or “Save the Earth” (2023), but the fun factor remained at the heart of things. These games all oscillate between a large scale – the world – and a small scale: the blocks. There is no in-between scale. Once more, ecology is mainly understood in terms of balancing resources rather than energy.

In line with this tradition, we are developing a new simulation game called “Net Zero: A sustainable construction simulation game, 1990-2050.” The idea is to create a game that moves energy consumption and production to the forefront and is oriented towards teaching school children. In the game, the player is responsible for an average Swiss city of 20,000 inhabitants and tasked with spending funds in a way by which net-zero emissions can be attained by 2050. It is based on different projections and goals developed in Switzerland and around the world, all of which have a 2050 net zero target.

The focus is on buildings, infrastructure, and green spaces. Emissions, energy consumption levels, and waste management are constantly displayed and made visible to the player. Houses are grouped according to their date of construction, alignment, orientation, and the corresponding type of insulation and heating system. According to Swiss statistical data, 31% of buildings in Switzerland are pre-war buildings, 21% were built between WWII and 1970, 33% between 1970 and 2000, and 15% were built more recently. Each of these types are associated with a specific consumption of energy and production of CO2. Aspects such as densification, re-use of building materials and biodiversity are also integrated. Embodied energy is also part of the

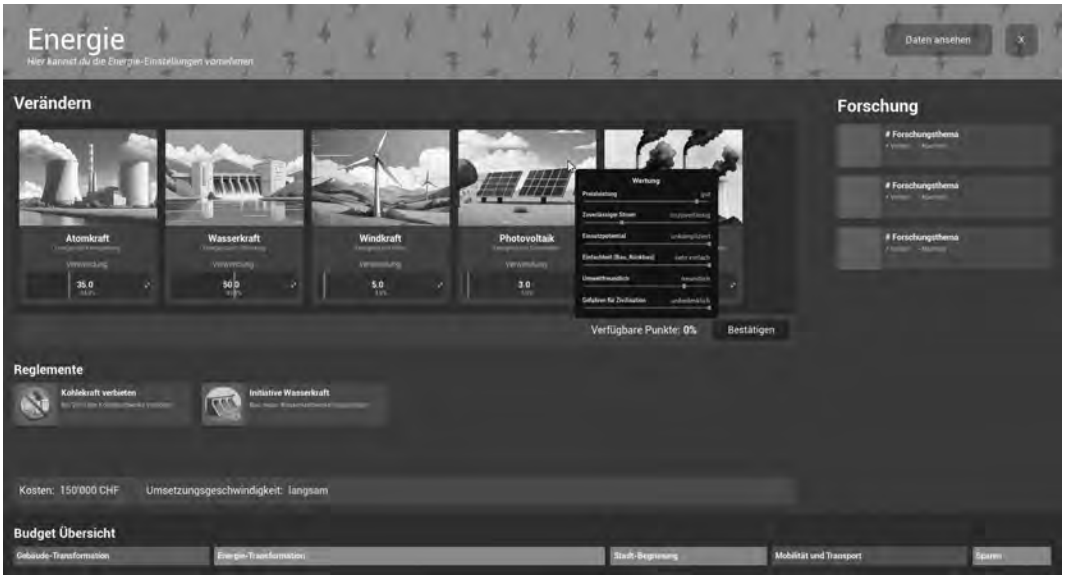


Fig. 5 - Tool box, "Net Zero: A sustainable construction simulation game", 1990-2050.
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equation, meaning the player should avoid destroying structures whenever possible. The game's goal is to find ways to make the complex interdependencies within urban planning understandable for children aged 14 to19, who will be playing the game in the classroom. The game follows the "Education for Sustainable Development-ESD 2" approach, which suggests that children should learn to reflect on sustainability and come to their own conclusions. This way, sustainability is no longer a topic only accessible to experts, but a learning process open to all of society. This approach aligns with the "emancipatory approach" coined by Arjen Wals (Wals, 2011). Sustainability is a matter of knowledge-building through action and interaction rather than passive information-gathering.

Sustainability is no longer a topic only accessible to experts, but a learning process open to all of society.

One of the game's main ambitions is to reconnect the different scales that constitute the *energy landscape* and to make their differences graspable for the player. Three scales are represented in the game: the single house, the urban district, and the city. Energy consumption and production, CO2 emissions, and waste production are constantly displayed on each scale and seen in relation to each other. The game will show different ways to display energy levels. Using infrared thermography, the player will be able to see which houses and districts are losing energy due to poor insulation, and the contribution trees make to cooling a single house or district.

Fig. 6 - Mockup, "Net Zero: A sustainable construction simulation game", 1990-2050.
© Andri Gerber, Pascal Aregger.

The player will be able to visualise how their city is doing and what kinds of improvement they are achieving with their actions at any point. This aspect of visualization is key to the game and will allow to better understand the consequences of decisions. Players can simultaneously intervene in a single house, a group of buildings (e.g., the category of pre-war houses) or a district. The data is always available and displayed in relation to a comprehensible unit. Data and energy are not abstract entities in this game but part of a whole. The player understands by which means and choices to manipulate these factors and what results will likely yield. Their actions will have an impact that can be visualized and contextualised. In school, the children will play on their computers or tablets while the teacher sees all their screens displayed on a dashboard, allowing them to discuss the children's different strategies.

We decided to develop this game not only to create a pedagogical tool to create awareness, but also to regain control over the *black box*, that is the digital model by designing our own model with our own rules. The rules and mechanics of the game are on display rather than hidden, meaning the player can intervene at any time during the game and witness the effects of their decisions. It is what makes this type of game so powerful: unlike the *black box* programs

with simple input and output, this game allows the player to intervene and change the course of the game whenever they wish.
In her book and exhibition dedicated to games in architecture, Mélanie van der Hoorn underscores how players are simultaneously in power and powerless:

> A game is a form of empowerment: players can grasp and control situations that remain inaccessible in normal life. At the same time, the developer also exerts a considerable influence on the course of the game through the material and rules, in which he embeds – consciously or not – messages and ideologies. (van der Hoorn, 2022: 86)

To achieve this condition is the goal of our simulation game.
Designing a game like this is a means of regaining control over the mechanism within. Of course, a game is always just a reductive copy of reality, but deciding what is worth copying always rests with the designer. Models and simulations do not have to be passively accepted; they can be designed so the player can manipulate them at will. Sustainability, then, is not only a matter of resources but also of energy, and energy can be understood as an element that ties the different scales of our lived-in-spaces together.

Sustainability is not only a matter of resources but also of energy, and energy can be understood as an element that ties the different scales of our lived-in-spaces together.

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postwar recon-struction • embod-ied coal • rubble re-cycling

Mining for Embodied Coal. Building Material Reuse in the Postwar Reconstruction of Warsaw

Adam Przywara

Abstract

The conditions prevailing in Warsaw in the aftermath of World War II were ones of urban and industrial ruination, material scarcity and resource depletion. The way in which such conditions led to the development of a distinct urban strategy of energy conservation during the reconstruction period is the core subject matter of this paper. The presented investigation commences with the analysis of various types of calculation through which architects and engineers tried to grapple with rubble – a defining material feature of Warsaw's ruined landscape. This then leads into a highlighting of the development of embodied-coal calculations, with consideration given to their role in securing the support of the socialist government for the recycling of rubble in architecture. The resulting argument offers a new historical entry point into a discussion of the circular economy in architecture, by embedding rubble recycling in the energy landscape of postwar reconstruction in Europe.

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Introduction

In summer 1947, a group of engineers from Warsaw arrived in Hamburg in what was then the British-administered zone of occupied postwar Germany. Antoni Kobyliński and his colleague Kazimierz Kamiński were being hosted there by the *Studiengesellschaft für Trümmerverwertung* (Scientific Association for Rubble Recycling). That Association had been established a few years previously, to coordinate research into the use of rubble in the postwar reconstruction of cities across Germany. To this end, the period 5th-20th July 1947 saw the Association organise an industrial fair at Hamburg's Planten un Blomen Park.

Visiting that *Interzonale Ausstellung für Trümmerbeseitigung und Trümmerverwertung* (Inter-Zonal Fair for Rubble Clearance and Recycling), the Polish engineers came upon a robust private industry in rubble recycling. The latter had emerged in response to the material conditions produced in urban areas of Germany by the Allied "strategic bombing" (Friedrich, 2008). For their part, the Polish engineers were paying their visit so as to learn of and introduce recycling methods into the mountains of rubble left in the wake of Germany's 6 years of occupation of Poland.

Kamiński reported on the visit in a 1948 article published in *Numer Gruzowy* ("The Rubble Issue") of the magazine *Inżynieria i Budownictwo* ("Engineering and Building"). That article opened with a listing of the "universal values" that were to govern construction activity in the postwar period: "Don't waste iron, save cement, build from basement to roof without the use of wood, remember about energy – coal, converted into building materials, as well as the lack of skilled labour" (Kamiński, 1948, 2). According to the engineers, the most promising way in which these resource-and energy-conservation imperatives might be pursued, was through an intensified use of rubble in the postwar reconstruction of cities.

Thus did the proliferation of ruins and rubble in postwar Europe trigger both a conceptualisation and an implementation of a new architectural paradigm entailing the conservation of resources and energy. The present paper elaborates on this historical development, tracing the conceptualization of embodied-energy calculations as Warsaw's postwar reconstruction went ahead. The paper also defines the role assigned

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to rubble recycling in architecture, in the context of socialist Poland's developing politics and forms of economic management.

Energy- and resource-conservation in architecture

While contemporary discussion of sustainable architecture has tended to focus primarily on the energy performance of individual buildings, this dominant paradigm is now shifting, albeit in two directions. We find a concern with – on the one hand – the consumption, conservation and production of energy in larger urban assemblages (Roesler, 2022), and on the other embodied energy and emissions associated with building-material production, as well as construction (Calder, 2022). The present paper seeks a consolidation of these two approaches by developing an inquiry of novel temporal and spatial scope, given the retrospective look at conservation of resources and energy in Twentieth century architecture.

While embodied energy has been addressed by scholars since the 1970s (Hannon et al., 1978), only recently has its conservation through material reuse and recycling started to become central to the debate taking place among lawmakers, corporate actors and architects (Heisel et al., 2022). This has reflected wider recognition of the destructive effect of the construction industry on the Earth's environment, as well as the growing urgency of climate-neutrality goals being reached in all economic sectors (Arup, 2016).

While embodied energy has been addressed by scholars since the 1970s, only recently has its conservation through material reuse and recycling started to become central to the debate.

In this context, architectural historians have worked to further interrogate and nuance understanding of the relationship between architecture, environment and a capitalist economy. Tracing the history of architectural obsolescence across the Twentieth century, Daniel Abramson has shown how the profit imperative of capitalist development shortened the temporality of buildings, neighbourhoods and cities radically (Abramson, 2016). Today, such accelerated cycles of urban development and creative destruction lead to a proliferation of demolitions, and an unprecedented rise in amounts of waste generated: worldwide, 2025 is likely to see some 2.2 billion tonnes of construction and demolition waste produced (Jarzombek, 2019). Abramson's work also shows the concept of sustainable architecture as rooted historically in opposition to the excessive consumption of energy and resources

that built-in obsolescence entails. The oil crisis of the 1970s led to a rise of sustainable building practices and discourses in which building from waste also featured (Abramson, 2016: 131). Walter Stahel notes that it was also that period that first saw US economists, engineers and architects articulate the paradigm of the circular economy (Stahel, 2020). The further development and implementation of that economic paradigm has become a central focus of sustainable architecture and construction in recent times.
Stahel sees the envisioning of the circular economy as a means by which to "decouple wealth (value) creation from resource consumption" thanks to improved management of existing stocks and the maintenance of their value (Stahel, 2020: 10). Within architecture and construction, the approach can be associated with a variety of use-centred practices, from maintenance, renovations, and adaptive reuse of whole structures through to a careful deconstructing of buildings, with reuse and recycling of building materials. It is particularly the latter set of practices that attract professional and scholarly attention today, often as conceptualised under the umbrella term of "urban mining" (Kobi et al., 2023). Yet, as critical scholarship on the topic has shown, the concept of the circular economy remains a highly ambiguous one, as does its relevance to development that would be truly sustainable (Corvellec et al., 2022). At the same time, contemporary architecture has as yet failed to find a way to implement building-material reuse on a scale larger than that of the individual experimental building (Stricker et al., 2022).

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This paper sets out to expand the scope of current reflection on the circular economy in architecture, by investigating the history of Poland's capital city in the aftermath of World War II. The case of Warsaw highlights the fact that, alongside obsolescence, it was progressively industrialised and urbanised warfare that shortened the lives of buildings in the Twentieth century so radically. While historians have in recent years started to articulate these ways in which WWII shaped the professional and institutional landscape of architecture (Cohen, 2011; Allais, 2018), postwar urban and architectural development is still associated primarily with the "Great Acceleration" in the consumption of resources and energy (Bonneuil and Fressoz, 2016).

Against that background, work detailed here draws on long-term historical investigation seeking to trace ways in which the ruins of Warsaw were transformed in postwar decades, by being wasted, salvaged, re-used or recycled. The research in question was pursued through the whole 2019-2022 period at multiple archives and sites in Warsaw and across Poland. This leaves the narrative presented here as founded in a wide variety of historical sources, if primarily those published in professional magazines during the historical period in question; as well as those present in the archival collections of the leading state institutions involved in the reconstruction. The written sources are supplemented by archival photographs – an essential resource when it comes to apprehending the conditions of ruination prevailing in Warsaw in the wake of war.

Material Excess

The six years of the German occupation of Poland during WWII left society, the environment and cities in ruins. The ruination of Polish urban areas during that time was not just a side effect of the industrialisation of warfare (Bonneuil and Fressoz, 2016, Ch.6), being also the outcome of deliberate acts of planned destruction, or "urbicide" (Coward, 2008). The destruction of Warsaw can be deemed representative of fullest implementation of that strategy by the occupant.

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Resulting damage and destruction did vary across the capital city, being focused in "Left-Bank Warsaw" (vis-à-vis the River Vistula), i.e. the central districts. Here, total destruction encompassed 9.865 buildings, denoting 57.8% of the city's built-up area (Dunin-Wąsowicz, 1984: 370). In the same area, a further 2.873 buildings (17.4%) were devastated to a very considerable degree, while 4.225 could be regarded as damaged only moderately. The areas of what the Nazi authorities had delineated as the Jewish Ghetto were joined by inner-city areas of *Śródmieście* District, as well as the so-called Old Town in being almost completely razed to the ground (Figure 1). While 84% of the buildings of Left-Bank Warsaw can be thought of as obliterated, the same fate was reserved for 65% of the entire city, meaning that districts in Right-Bank Warsaw were also much affected.

Initial estimates accounted for at least 27 million m3

(some 40M tonnes) of rubble lying spread across the capital in the wake of WWII. In October 1945, architect Eugeniusz Olszewski wrote: “to realise the volume of rubble lying in Warsaw, it suffices to calculate that, to transport it, you would have to load 2 million freight wagons, which is 20 times the total annual transport of all goods and raw materials to Warsaw before the war” (Olszewski, 1945: 8). In the following years, such assessments were extended to the wider context of amounts of rubble in all urban areas of Central and Eastern Europe (Tyszka, 1948). It was estimated that some 175M m3 of matter was spread across the urban areas of Poland (perhaps 260M tonnes), even as the same article attributed amounts of rubble to Germany and the Soviet Union respectively equalling 300M m3 (approx. 450 Mt.) and 460M m3 (690 Mt). Other articles in the professional press urged readers to consider amounts in relation to population size, given that this was also labour force. In such an assessment Warsaw came first with 20 m3 of rubble per inhabitant, as compared with 16 in Berlin and 3,5 in London.

During WWII the construction industry in Poland shared the same fate as befell the buildings it had helped to erect in the preceding decades.

These calculations allowed for some translation into the rational language of numbers and estimates of what was a simply unfathomable scale of wartime destruction. However, an underlining of the unprecedented challenge that lay ahead had been a further goal of the analytical work, and here a certain disservice was done as rubble was rendered in terms of its being uniform waste matter in need of clearance from city areas. This was a suggestive simplification that led, ever since, many historians to account for rubble solely as an obstacle to reconstruction plans (Kohlrausch, 2019). However, a closer look at the archival documentation suggests the emergence of a much more complex and insightful understanding of rubble among architects and engineers in 1940s Warsaw.

Costs assessment

During WWII the construction industry in Poland shared the same fate as befell the buildings it had helped to erect in the preceding decades. The occupation brought a halt to any new building works beyond what might serve to further the plans of the Occupant (Popiołek-Roßkamp, 2021). That meant stagnation and depreciation for any facilities in existence that

Fig. 1 - The ruins and rubble of the Old Town, Warsaw, 1947. Socialist Press Agency, National Digital Archive.

produced bricks or made timber ready for use in construction (these being the primary building materials in pre-war Poland). By the war's end, once-abundant sources of timber had been depleted, clay had gone unextracted for years, and brickworks lay in ruins. An abrupt intensification of renovation work in postwar Warsaw had a dynamic effect in raising prices of materials and rates for skilled labour. The postwar circumstance of resource depletion and industrial ruination thus had an inevitable role in shaping the organisation of the effort at planned reconstruction. From 1946 onwards, the architects and engineers of the reconstruction focused on the development of expertise, technology and practice that would maximise the "rationality" and the economical nature of their work, meaning a process of construction frugal in terms of its use of both resources and energy. In that way a core objective of this branch of the reconstruction effort was for architecture to make productive use of rubble. An initial report on this matter came out in late 1946, being the work of *Biuro Odbudowy Stolicy* (the Office for the Reconstruction of the Capital

A core objective of the reconstruction effort was for architecture to make productive use of rubble.

City). The report's authors asserted that the salvaging and reuse of materials found in rubble would be the most cost-effective way of procuring a supply of building material in general, for the reconstruction work that was to take place over the period. To make their point, they argued:

> The profitability of salvaging is confirmed when one takes into account, on the one hand, the entire process of production and supply of new bricks to the construction site (extraction of coal, its transportation to the brickyard, manufacture of new brick and its transportation to the construction site), the lacking industrial capacity to produce the quantities of bricks required, finally the cost of new bricks; and on the other hand, the billions of bricks lying in situ in the ruins of the city, their suitability to be used in the new construction, and finally their low cost. (Nowiński, Mazurkiewicz, 1946: 12).

In the Warsaw of the late 1940s, hundreds of small construction firms were finding employment in carrying out renovations for private clients.

Comparison of production and salvaging costs led those authors to argue for a revaluation of rubble, and reorganisation of the planned reconstruction around this postwar resource. This was in fact to dignify a process already taking place literally and figuratively "on the ground" in Warsaw, in an unplanned, unsupervised way. In the Warsaw of the late 1940s, hundreds of small construction firms were finding employment in carrying out renovations for private clients. Salvaging from rubble was their chief means of sourcing bricks, as well as a variety of other interior components – to the extent that these could actually be thought of as quickly, cheaply and directly obtainable *in situ* (figure 2).
The dependence of these small actors on salvaged material can be associated with their attractive price. The survey of the market for building materials published monthly in *Przegląd Budowlany* (the "Building Review") – as a leading platform of the private construction industry – reveals a May 1946 cost of 3.500 zloty for 1.000 new bricks, as opposed to 1.800 for the same number of salvaged bricks (*Przegląd Budowlany*, 1946). The corresponding figures in the following year were 6.700 and 3.500 zloty respectively (*Przegląd Budowlany*, 1947); while in 1948 a similar differential in price was maintained, with 7.400 zloty needing to be paid for new bricks, as opposed to 4.800 for those

that had been salvaged (*Przegląd Budowlany*, 1948). Importantly, these data take no account of bricks obtainable with no market transaction needed, given the possibilities of theft or appropriation in the absence of inhabitants or owners for many a ruined building. The comparison of prices set by the dynamic local market was a crucial way in which employees of the reconstruction administration assessed the "rationality" of the specific material or construction technology in the immediate postwar period. However, many of them were also involved in the development of a planned economy and socialist politics in Poland. They therefore sought to depart from market price as the sole indicator of a rational and economically justified decision – a perspective associated at the time with decision-making under a capitalist economy. They searched for other indicators which would allow reconstruction materials to be assessed, such as: "[...] the amount of coal or oil needed to produce a given building material," as well as "the use of waste materials" in their production (Nechay, 1947: 35).

Fig. 2 - Brick salvaging in the ruins of the central Warsaw, 1948. Socialist Press Agency, National Digital Archive.

Fig. 3 - Cover of the special "Rubble Issue" of the Engineering and Building published in January 1948. National Library, Warsaw.

The embodied energy calculation

It was in January 1948 that the aforementioned *Numer Gruzowy* ("Rubble Issue") of *Inżynieria i Budownictwo* ("Engineering and Building") magazine was published. The introductory article there was authored by engineer Stefan Pietrusiewicz, a Vice-Minister at the Ministry of Reconstruction. He begins with these words: "A huge mass of rubble amounting to 160 billion m3 is scattered around our cities, it is a burnt-out material, for the production of which millions of tonnes of coal have been used, therefore it is a reserve that should be utilised" (Pietrusiewicz, 1948). That statement hints at a novel understanding of rubble that was taking hold within the state administration during the first period of the planned economy in Poland (1947-1949). The importance of rubble being used in reconstruction was argued for, not in relation

to the price of salvaged materials, but rather on account of the extended energy they embodied, i.e. the coal that had been used in production.

The period in question indeed saw extensive use made of processes of ruin demolition and planned salvaging – by both state institutions and state-commissioned firms – with a view to building materials being procured (Przywara, 2023). Simultaneously, an intensive approach to the reuse of rubble had been developed. Considerable state funding had been extended to the development of so-called "new materials." The latter were to become a viable alternative to the bricks and timber that had been used traditionally. They were also engineered specifically to save coal during production. The initial studies of new materials focused on the "clean rubble," which constituted approximately 1/3 of any mound left after the demolition of a ruined building had taken place (figure 4). This rubble could be crushed and sorted, and substituted for aggregates and sands in the production of concrete mix.

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In the discussed issue of *Engineering and Building* magazine we find the report from the visit to Hamburg quoted in the Introduction to this paper. In his article, Kamiński elaborates on the coal-conserving capacities of rubble recycling: "As far as rubble materials are concerned […], the most coal is needed for the production of cement, which, in the manufacture of such materials, is a commonly used binding agent" (Kamiński, 1948: 2). Nevertheless, as he argues, materials made of rubble require smaller amounts of fossil fuels than their traditional counterparts: "Burnt clay brick (German format), requires 300 kg of coal per 1.000 pieces. Sand-lime brick - 220 kg, while rubble brick with 150 kg of cement in 1 m3 of concrete requires 170 kg of coal" (ibid.).

In Kamiński's article, we thus encounter developed reflection on the fossil-energy consumption inherent in different ways of producing building materials. His calculations do not concern the materials salvaged from rubble, which were the cheapest and, one could add, most coal-efficient material available. Instead, the engineer focuses on discerning the most coal-efficient trajectory for the production of new building materials. As he concludes clearly, most coal can be saved where air-bricks are manufactured from rubble

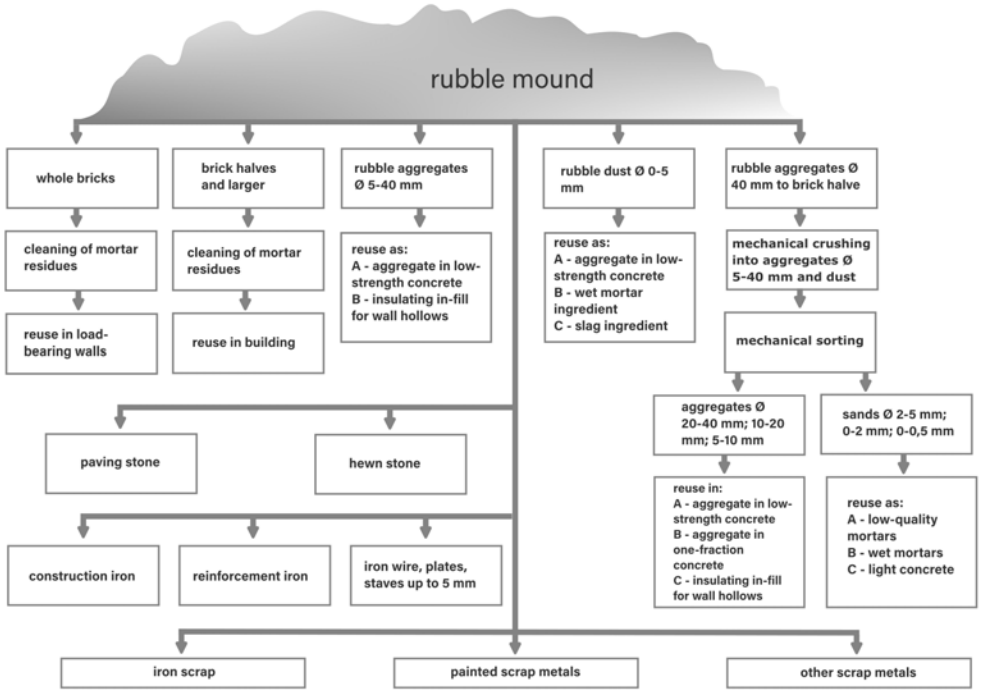

Fig. 4 - Diagram showing typical contents of the rubble mound and their use, excluding waste matter (Redrawn and translated by the author from Kiepal and Rogalewicz, 1950).

aggregates and sand (figure 5). The latter, the engineer claims, would require only around half as much coal as the traditional fired-clay brick.
Concluding, Kamiński returns to the question of the most economical and rational construction, asserting that this is an issue that changes dynamically, and one that: "[...] especially in the current planned economy, can in no way be measured merely by the 'price' of a unit of a given building, as we did before the war" (ibid.). As he further explains, by referring his calculations to the broader economy of the period: "Today - one zloty in an export material or raw material, e.g. iron, cement and coal; and one zloty in a non-export material — e.g. brick or rubble air-brick, or gravel — is not the same zloty" (ibid.). The last section of this paper will focus on explaining that difference, while positioning the embodied energy calculations in a broader economic landscape of socialist reconstruction.

Fig. 5 - Air bricks made from a mix of crushed-rubble aggregates and sands with cement and water, Warsaw, 1948. Socialist Press Agency, National Digital Archive.

Energy conservation in the Planned Economy

The funding for scientific research on the use of rubble in reconstruction came from the government, through the Three-Year Plan of Economic Recovery (1947-1949). Publications summarising the achievements of this first period of planned economy, often compared the outputs of different branches of industry in the circumstances of pre-war and postwar Poland. One such comparison noted that the extraction of coal exceeded pre-war outputs as early as in 1948. It is therefore relevant to ask why, if not for reasons of scarcity, would government investment support coal-conservation strategies in architecture?

Modernisation of production was a crucial item on the political and economic agenda of the socialist government. The pursuit of that goal required both technologies and infrastructure, which the state could only obtain abroad. Coal, as well coal-intensive materials like steel and cement, were crucial goods tradeable on the European market of the time. This left support for the conservation of energy and resources in architecture as directly related to government spending abroad. And that relationship can be further inter-

Modernisation of production was a crucial item on the political and economic agenda of the socialist government.

Fig. 6 - Rubble crusher and sorter in operation in central Warsaw, 1948. It is one part of the larger mechanical assembly producing air bricks, eighteen of which were acquired in Switzerland in 1946. Military Photographic Agency, National Digital Archive (WAF, 1948).

rogated if a look is taken at the transactions allowing coal-conserving rubble recycling to be pursued in the context of Warsaw's reconstruction.

Between May 16 and July 3 1946, Polish engineer Walenty Karnaś visited several companies and industrial associations across Switzerland on behalf of his employer – the Ministry of Reconstruction. Karnaś spent 6 June 1946 in Zurich, where he finalised a deal with a consortium of firms led by Schindler & Co and Brun & Co based in Lucerne (Karnaś, 1946). The Swiss firms were commissioned to provide six sets of machines for rubble crushing and sorting, as well as eighteen machines for the production of rubble concrete airbricks (Figure 6). The cost of the order was estimated at 500.000 Swiss Francs. However, the consortium was paid indirectly through the Polish government's "coal account" with the Swiss National Bank.

This "coal account" was a line of credit the Swiss government offered to Poland in the wake of the war. Switzerland remained neutral during WWII, and thus

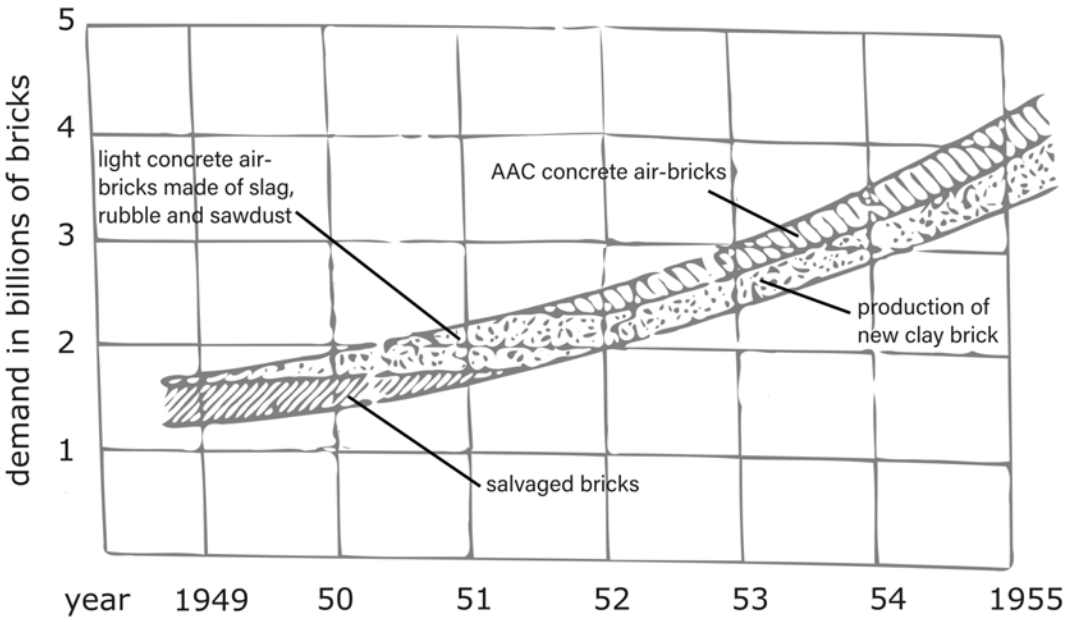

Fig. 7 - Projected growth in the planned reconstruction's demand for building materials over the 1949-1955 period. Marked is the projected supply of building materials capable of covering the rising demand (Redrawn and translated by the author from Nechay, 1949: 30).

saved its private industry from wartime ruination. Yet, ever since the 1920s, the country had been fully dependent on the importation of coal from abroad. The "coal account" was thus a financial tool set up to secure the provision of coal from Poland, while allowing the Polish government to buy from Swiss private industry without needing to resort to money. Instead, the Polish government delivered the coal-equivalent of the incurred costs to its Swiss counterpart, which subsequently set the accounts with private firms. This example shows how the Polish state administration traded coal for technologies from abroad, *inter alia* seeking to achieve coal-efficient architectural reconstruction back at home.

The machines which arrived from Switzerland in 1947 initiated the process of rubble recycling in the planned reconstruction of Warsaw. They provided for the manufacture of rubble air-bricks – as non-bearing materials used for walls, callings and floors, substituting the traditional clay brick. In the circumstances of 1940s Warsaw, such air-bricks were used extensively in all the projects funded by the state, as well as in its subsidiaries. That meant use in various headquarters buildings of governmental institutions, in workers'

housing estates, and sporting facilities. When at the end of the decade the availability of their main competitor material, i.e. salvaged bricks, declined rapidly, the new materials became further reinforced in terms of their significance to the socialist reconstruction of Poland. The chart presented at the 1949 Conference of the Polish Engineers' Association highlights this fact (figure 7). The resource- and energy-conserving materials made of recycled waste (i.e. rubble, slag and sawdust) won for themselves a central role in the supply of construction sites across the country within the framework of the 1950-1955 Six-Year Plan, which was marked by the accelerated industrialisation the Stalinist faction of Poland's postwar government was able to press on with.

The idea of energy conservation through maintenance and reuse of the fossil fuels embodied in building materials has come to shape the knowledge and practice of sustainable architecture.

Conclusion

In recent years, the idea of energy conservation through maintenance and reuse of the fossil fuels embodied in building materials has come to shape the knowledge and practice of sustainable architecture (Stricker et al., 2022). The practice of diverting demolition waste from the landfill back into construction is promoted as vital if production is to be maintained, even as its impact on the global environment is reduced (Arup, 2016). Such practices in architecture and construction fit into the version of capitalism reformulated around an idea of circularity that has gained promotion since the 1970s as an innovative solution to a wasteful and destructive economy (Stahel, 2020). However, as it draws on far-older historical sources from Poland in the period following WWII, the present paper contributes to a critical reformulation of the existing discussion surrounding embodied-energy conservation as it makes reference to the practices of urban mining, as well as the reuse and recycling of building materials in architecture.

In the wake of WWII, ruins and rubble had been a defining material feature of the cities across Central and Eastern Europe. In Warsaw, the administration in charge of reconstruction first conceptualised rubble in terms of waste. However, that was a perception that changed quite rapidly, as rubble re-entered the fray – this time being viewed as a resource in the reconstruction economy. Recognised as a source of salvageable materials and conceptualised as a com-

ponent of new ones, rubble came to occupy a central position in the discussions engaged in by architects, engineers and politicians, when it came to reconstruction being both efficient and rational. The latter, pursued as a transition to a planned economy, sought to break with market price as the sole index underpinning material choice. Instead, a start was made to the use of embodied energy, or references to stocks of coal converted into a given building material in the past, as indices of rationality and efficiency when it came to planned procurement of materials.

This paper argues that the shift in question related to the role urban reconstruction was intended to play within the broader planned economy of the postwar Polish state. By implementing and pursuing resource – and energy-efficient technologies based on the reuse and recycling of rubble, the state administration diverted coal from being used on local building markets, instead drawing benefit from its being traded on international markets. There, coal represents a commodity exchangeable for technologies which could allow for further improvement of resource efficiency in reconstruction, as well as contributing towards the industrialisation and modernisation of postwar Poland's economy. In the absence of an environmental incentive, it was the politics and economics of planned reconstruction that drove the development of embodied-energy calculations, urban mining, and the reuse and recycling of building materials.

The history of Europe's postwar reconstruction provides a vital example upon which to engage in a critical rethink of urban mining as a practice in energy conservation that operates on the scales of the city, state or international market, as opposed to the individual building. It follows that the invoking of historical examples allows for a preliminary reimagining of the challenge of energy-conservation in construction, as linked intrinsically with politics and economics, rather than technological innovation implemented on the scale of the single experimental building.

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Translations

All the quotes from archival sources that the article presents are translated from Polish into English by the Author.

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open city-scape • artisanal microclimates • landscape continuity • weather types

Emptiness as a Project. Warsaw's Artisanal Microclimates as a Response to the City's Post-Catastrophic Past

Małgorzata Kuciewicz (1),
Simone De Iacobis (2)

Abstract

This article aims to shed light on Warsaw's urban design traditions based on expertise in passive landscape solutions as tested in local conditions. It focuses on the work of designers originating from the Greenery Studio of the Warsaw Reconstruction Office (BOS) from the 1940s to the 1990s. The studio's designs relied on open space arrangements and the urban microclimate component was treated as equal in importance to buildings.

Planned in a modern way, drawing on the principles of the Athens Charter of 1933, Warsaw's reconstructed urban structure can be approached today not with a focus on hygiene, but in terms of thermal comfort. Post-war solutions demonstrate that empty urban spaces can be designed to prepare the city for the increasingly felt effects of climate warming and extreme meteorological phenomena.

Warsaw's public space and housing estate common spaces ought to serve as areas that readily accommodate microclimates and thus become of benefit to the society. Last but not least, this approach may reduce the number of AC units installed in the city.

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Warsaw's open cityscape, with an abundance of empty spaces in the urban tissue, is considered a burdensome legacy of the city's post-war reconstruction under the communist authorities. Such voids are widely viewed as something that needs filling. Since the 1990s and the return of private ownership, they have been seen as dormant land awaiting private investment. In some cases, economic pressure has even led to the construction of buildings on memorial sites, where the *meaningful emptiness* or *arrested decay* of war-time ruins had been envisaged as a form of commemoration in a city that narrowly survived annihilation.

In their current form empty areas represent a valuable resource for the whole urban community. Such open spaces had been deliberately arranged in the city in order to regulate the local climate. It is vital to protect them from being devoured by construction and development. Moreover, they set exemplary models of an adaptive transformation of urban spaces that reduces their reliance on energy-dependent technologies.

Warsaw is well-suited for colder weather.

Owing to its geographical location, Warsaw is well-suited for colder weather. The city has retained its coal-fired central heating system and architecture with thick, frost-resistant walls, while its people lead a largely indoor lifestyle. Heatwaves are a relatively new phenomenon. And yet, extreme temperatures are expected to represent a major challenge for the city in the future, exposing its residents to the risk of overheating. Warsaw already uses more energy for mechanical cooling in the summer months than for heating in winter.

Heatwaves are a relatively new phenomenon. Extreme temperatures are expected to represent a major challenge for the city in the future, exposing its residents to the risk of overheating.

According to the findings of the research project "Embodying Climate Change", led by Zofia Boni:

During group interviews in Warsaw, older adults talked a lot about how excessive heat increased their isolation. Some of them followed the policy advice and stayed at home, going out only in the early morning for groceries, or in the late evening to "catch a breath of fresh air." The participants rarely used the term "loneliness," but our results are similar to Klinenberg's findings about how the 1995 Chicago heatwave affected both people's health problems and increased their isolation. Our research participants often cancelled doctors' appointments and meetings with family and friends

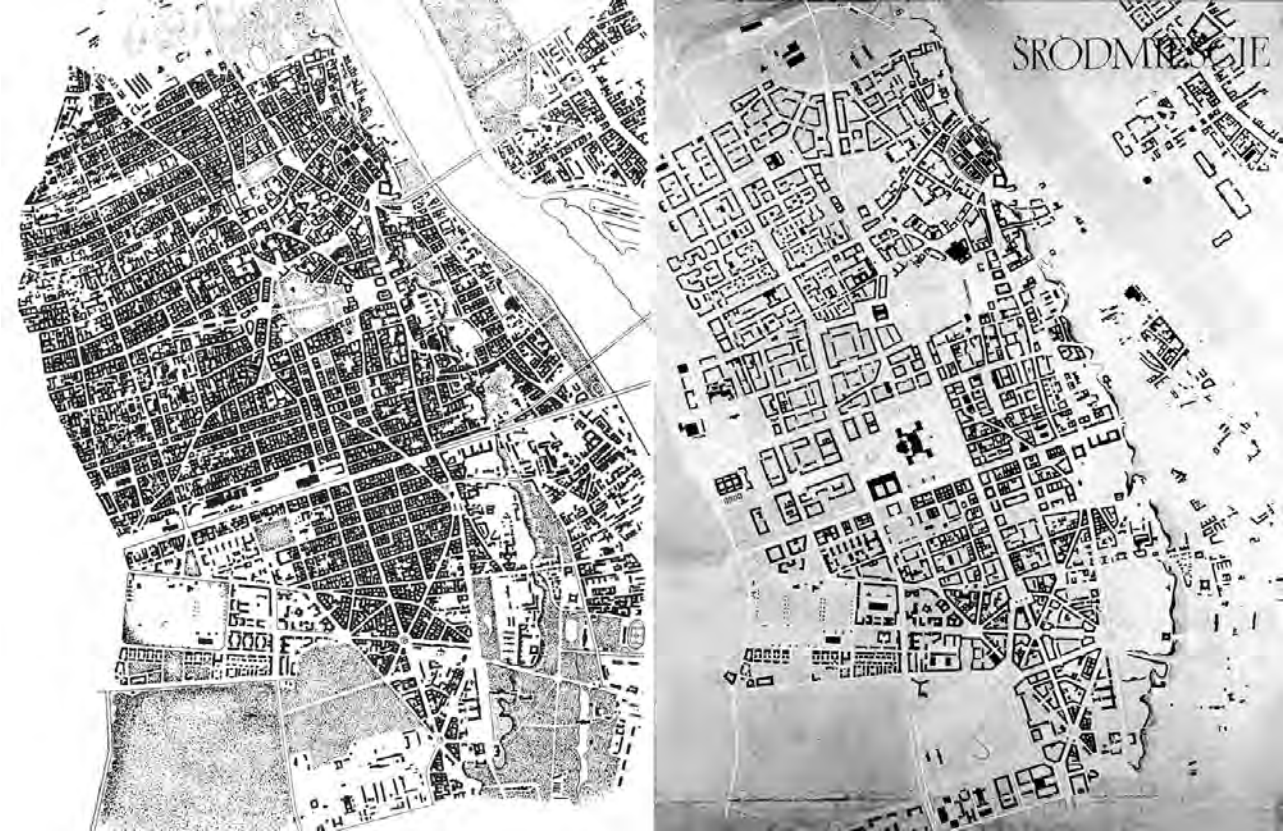

Fig. 1 - Comparison of housing density, 1938 vs. 1956 (projected), drawing by Kazimierz Marczewski, repr. from: "Architektura", 1956, no. 11–12, p. 430, Association of Polish Architects (SARP) Library.

and stayed at home alone waiting for the heat (wave) to pass. (Boni et al., 2023)

Some old homes are difficult to ventilate because they were designed to keep the heat in. Such buildings effectively retain heat within their thick walls, and thus become heat traps in prolonged periods of hot weather. As a result, the air inside may actually be hotter than outside. Meanwhile, urban spaces prepared to face the challenge of extreme weather conditions can offer an attractive outdoor experience.
After the Second World War, Warsaw's urban fabric saw its morphology almost literally reversed:

The traditional closed cityscape was largely exchanged for an open cityscape where, rather than the streets and squares being carved out of the solid mass of buildings, the buildings are autonomous objects surrounded by space. (Ibelings, 2011: 28-29)

This was due to the scale of the city's war-time destruction, but also Warsaw's planning traditions developed since the 1930s. Importantly, the reconstruction plans should be seen in the context of the urban planning concept known as "Functional Warsaw" ("Warszawa funkcjonalna"), formulated in 1934 (Chmielewski, Syrkus, 2013). This manifesto proposed a hub-and-spoke model of the city's development in which urban fabric would be secondary to natural one. It drew on research into the spatial relationships between the city and its surroundings. A pioneering study of the city as a functional region, the proposal introduced the term "urbanized region," with reference to the distribution of urban functions across a given territory. An analysis of fixed factors (geographic location, climate, geomorphology, and major transport links) provided the basis for a functional scheme of the city's development in time and space.
The planners continued their work in secrecy throughout the German occupation in the first half of the 1940s. They carried out a number of diagnostic studies devoted to the city's destruction and created sketches for the "Warsaw Urban Complex – the Discontinuous City" project, a layout based on topography and hydrography, thus embracing landscape design. During the war, natural elements took on a new significance since they were seen as something that does not fall prey to destruction. The sketches in question featured buildings grouped in rows and separated by vast green areas that demarcated different districts. These principles informed the start of Warsaw's reconstruction.

The Greenery Studio of the Warsaw Reconstruction Office was responsible for designing the arrangement of spaces between buildings in pursuit of developing an open cityscape.

Alina Scholtz
The Greenery Studio of the Warsaw Reconstruction Office (1945-1949), headed by landscape architect Alina Scholtz (1908-1996), was responsible for designing the arrangement of spaces between buildings in pursuit of developing an open cityscape. Scholtz was among the founding figures of Polish landscape architecture. One of the first and most talented graduates of the Department of Landscape Architecture and Park Studies at the Warsaw University of Life Sciences (SGGW), she designed modernist gardens, parks and monuments that have been preserved until today. (Czerniewska-Andryszczyk et al., 2021) Moreover, she

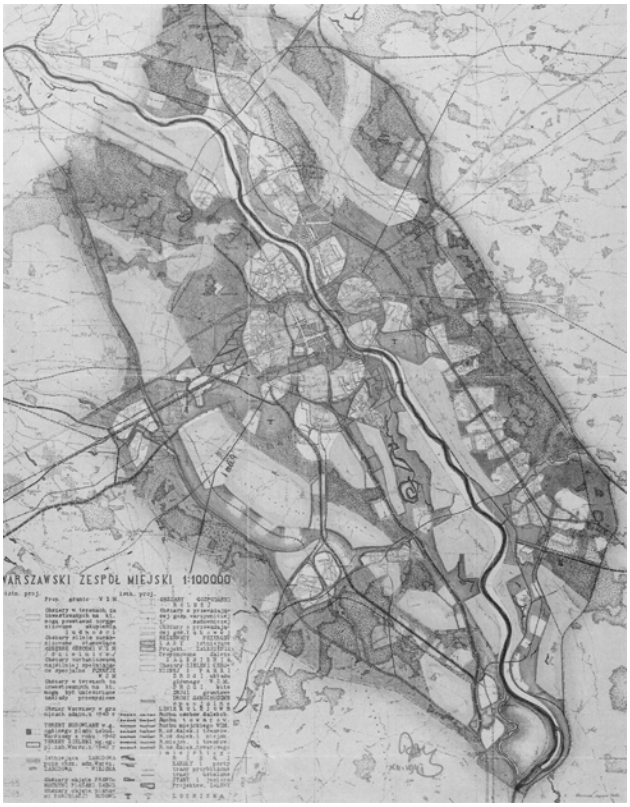

Fig. 2 - Warsaw Urban Complex, an organic development model with a cellular structure, sketch 1:100 000 by Jan Chmielewski, December 1941, repr. from: *Historical Atlas of Warsaw Volume II* (2004), Warsaw, Association of Friends of the State Archive of the City of Warsaw, p. 69.

established and looked after the Park-Monument in Żelazowa Wola, headed the Greenery Studio at the Warsaw Reconstruction Office, and at the Warsaw Urban Planning Office (1949-1958). Scholtz was a creative force behind Warsaw's modern-day landscape, and a co-founder of the International Federation of Landscape Architects (IFLA). She stated:

> In the field of design, the Greenery Studio was primarily involved in and enthusiastic about citywide concepts – large-scale spatial plans that we believed could be implemented. This was a common attitude: to rebuild Warsaw from the ground up, enriching it with new foundations based on historical tradition. This was accompanied by a fresh perspective, which – among other things – allowed us to appreciate the natural qualities of the place – the topography of Warsaw. (Scholtz, 1965: 5)

The studio developed a number of design strategies and initiated gradual processes, understanding that the intended results would take decades to achieve. It

The landscape architects often based their designs on natural thermodynamic processes, vegetation, water circulation and the thermal responses of materials. A vital concept was that of landscape continuity.

was necessary to consider how a project would evolve over time, which was something markedly different from reconstructing buildings and permanent structures. This included both short-term changes within daily and seasonal cycles and long-term linear development of the landscape architecture compositions, involving the growth, maturation, withering, and death of trees. Different types of trees grow at a different pace, while their lifespans also vary. Scholtz embraced these factors in her work by estimating the time needed for the designed planting to mature and predicting how much space it would eventually require.

She designed *transitional* forms with a variable, evolving composition, whose certain elements disappeared or died to yield place to others before the latter fully developed. In her designs, she drew trees in spiral forms to indicate that they grew with time. The tree species planted on a mass scale in Warsaw by Scholtz's team was linden. This specific variety emerged spontaneously in the city's tree nurseries between 1898 and 1900. First described in 1926, it received its name "Tilia Varsaviensis" in 1951. The use of seedlings propagated in the 1930s can be seen as a symbolic gesture of restoring the capital's nature. Fortunately, this lime tree species is relatively best adapted to warming climate and drought.

Because of limited resources, the landscape architects often based their designs on natural thermodynamic processes, vegetation, water circulation and the thermal responses of materials. A vital concept was that of landscape continuity. A network of interconnected green spaces, encompassing clusters of greenery, street trees, and greenery between buildings, was established. These spaces were linked to larger concentrations of green areas and integrated with regional-scale natural environments, forming a comprehensive green infrastructure system. It was understood that an appropriate architectural composition would reduce the negative effects of weather conditions and enhance the positive ones.

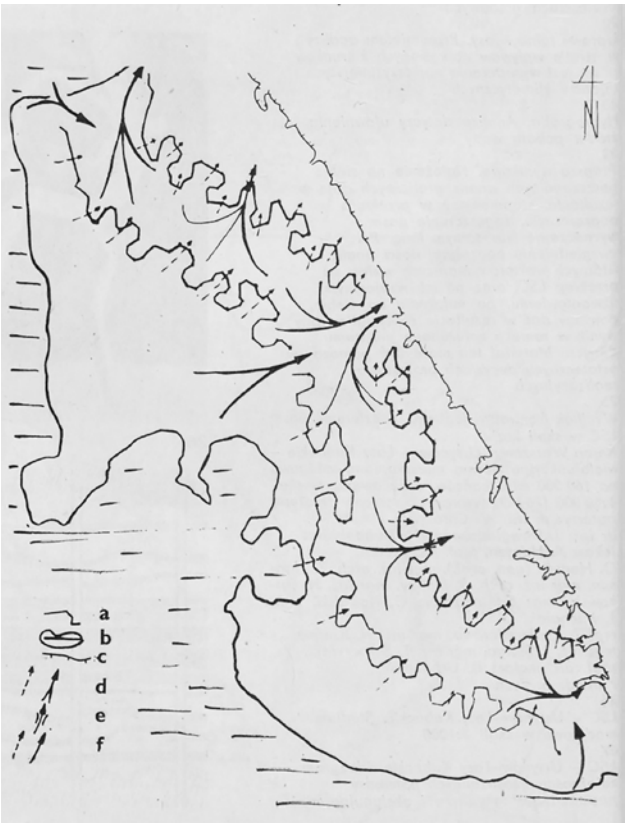

Fig. 3 - Oskar Hansen, *The Mazovia Belt*, Ursynów district along the river and the Warsaw Escarpment. Diagram of air circulation at night during radiative weather, 1968. Hansen, 1970: 137.

Two Key Types of Weather

In their design of microclimates, Warsaw's architects and urban planners took into account two types of weather. Their names can be found, for example, in Oskar Hansen's designs from the 1960s, created in collaboration with climatologist Stanisław Zych (Gola, 2005: 46, 48, 108-109, 21).

The first is *insolative-radiative weather*, cloudless during the day and windless at night. The sun illuminates the city during the day – the mosaic of materials warms up in different ways. Architectural solids, terrain features and plants are responsible for the movement and reach of shadows. By ensuring appropriate thermal contrasts, they set air in motion. At night, the city cools down, materials radiate heat in different ways – air heats up from the ground depending on the radiation emitted. Knowledge of the thermal responses of materials allows for combining them in a way that refreshes air. Owing to its low surface roughness, water draws air that settles above the city. The thermal inertia of standing water heats up the cool-

Knowledge of the thermal responses of materials allows for combining them in a way that refreshes air.

Microclimates in the city can be constructed once we embrace meteorological phenomena as a component of urban design.

ness of the night, generating updrafts. Greenery does not absorb as much heat as buildings and impervious surfaces. Cooler air, which is heavier, flows to heated areas and can be felt as light wind.
The second type is *advective weather*, observed during the horizontal flow of air masses. A weather front is formed in the contact area of masses with different properties. Clouds and rain reduce thermal contrasts, and wind mixes and moves bubbles of variously heated air. Conditions are similar everywhere, regardless of whether it is night or day. Only wind can change. A composition may accelerate it, create places with strong winds, overcooled zones, which increase people's immunity and respond to the needs of other inhabitants. Windiness can also be mitigated by forming quiet enclaves in the terrain, planting greenery as windbreaks, shaping architecture so that it casts aerodynamic shadows.
Understanding these types of weather allows us to perceive air as a mass that can be intentionally shaped. Microclimates in the city can be constructed once we embrace meteorological phenomena as a component of urban design. Historical projects from the era of Warsaw's reconstruction demonstrate that arrangements of open spaces are absolutely not devoid of purpose (Kuciewicz, De Iacobis, 2022).

Post-War Reconstruction as Building New Landscapes
The significant amount of rubble resulting from the war-time destruction and subsequent demolitions was repurposed in Warsaw's reconstruction as a fundamental terraforming element. In some cases, topography was shaped to alter wind patterns, and so-called "dry ditches" were created to divert cold air, while mounds proved capable of preventing gusts of wind, and retention ponds – of collecting melting snow. The greatest amount of rubble was used to regulate the Vistula over a span of 361 kilometers, from Puławy to Toruń. This architectural configuration appears as a palimpsest of hybrid transformations performed by both humankind and nature. Scholtz's team at the BOS's Greenery Studio was often compelled to use rubble in shaping the terrain, for example in Central Park of Culture and Moczydło Park.

Fig. 4 - Moczydło Park, aerial view, Lech Zielaskowski's photo archives, 1975, NAC, file no. 3/53/0/8/564.

Moczydło Park was built between 1957 and 1970 on the site of former clay excavation pits, adjacent to the Koło II housing estate, designed by Helena and Szymon Syrkus. The park comprises two distinct and yet symbiotic sections: a tall mound composed of rubble on the eastern side, which serves as a ski slope during winter, and a sunken area with interconnected pools of water towards the west. The topographic fold beneath the ski slope serves not only as an elevated barrier protecting skiers from sliding into the nearby ponds. Situated on the south-facing slope – where snow is the fastest to melt – it also directs meltwater and rainwater into a paved gutter that feeds the nearest pond. Retention basins have enhanced the functionality of the slope for years. The evaporation of water from the ponds and layers of trees planted around the water have created a favourable microclimate for the local area.

The composition of Moczydło Park needs to be adapted to changing climatic conditions. With the absence of high snow caps to feed the ponds as they melt, the movement of water and air requires to be managed differently, for example through horticultural interventions. In some cases, this means cutting openings in dense shrubbery to allow cool air to pass above

Moczydło Park comprises two distinct and yet symbiotic sections: a tall mound composed of rubble on the eastern side, and a sunken area with interconnected pools of water towards the west.

The principle of landscape continuity, is represented by the Sadyba housing estate, created by Scholtz and Skibniewska between 1965 and 1978.

Values are a fundamental element of the quality of life and a valuable stimulus for the inhabitants to identify with their place of residence" (Skibniewska, 1990: 395-405). The estate's most notable feature is a 1.5.

the water; in others, it means allowing free-growing thickets to form windbreaks.

In the decades following the reconstruction period, socialist city planning often resulted in projects founded purely on centrally determined economic decisions. Warsaw began to sprawl, adopting an amorphous layout of prefabricated housing estates. It was in this context that Alina Scholtz began collaborating in 1958 with Halina Skibniewska at the Warsaw Housing Cooperative (WSM), a studio that was exceptional in cultivating the tradition of open space layouts. The estates built according to its designs garnered outstanding acclaim. The principle of landscape continuity, which aims to ensure the continued presence of ecological systems across time and space, is effectively represented by the Sadyba housing estate, created by Scholtz and Skibniewska between 1965 and 1978. Like most of Warsaw's post-war housing estates, Sadyba was designed primarily on the basis of CIAM's *existenzminimum* principles. The architects compensated for the minimisation of flat surfaces by offering a considerable amount of social space. As a result, the area between buildings became an extension of the flat, a "domesticated exterior". The quality of such space depended on the landscape architect's talent. Skibniewska believed that in the housing estate co-created with Scholtz "natural values are a fundamental element of the quality of life and a valuable stimulus for the inhabitants to identify with their place of residence" (Skibniewska, 1990: 395-405). The estate's most notable feature is a 1.5 km pedestrian walkway that runs parallel to the north-south axis. This verdant "backbone" connects the area's two main green spaces: a waterway and the parks surrounding the old fort. Skibniewska proposed the "green backbone", where the majority of schools, kindergartens, sports facilities, and recreational areas are located. Something of an open-air community centre, it enables environmental education programmes and intergenerational exchanges with senior citizens. Scholtz deliberately planted common whitebeam in one section of this passageway, which produces colourful fruit in autumn for children to enjoy on their way to school. In the southern part of the housing estate, she designed a pathway lined with birch trees that offer intermittent shadow. Furthermore, she scattered

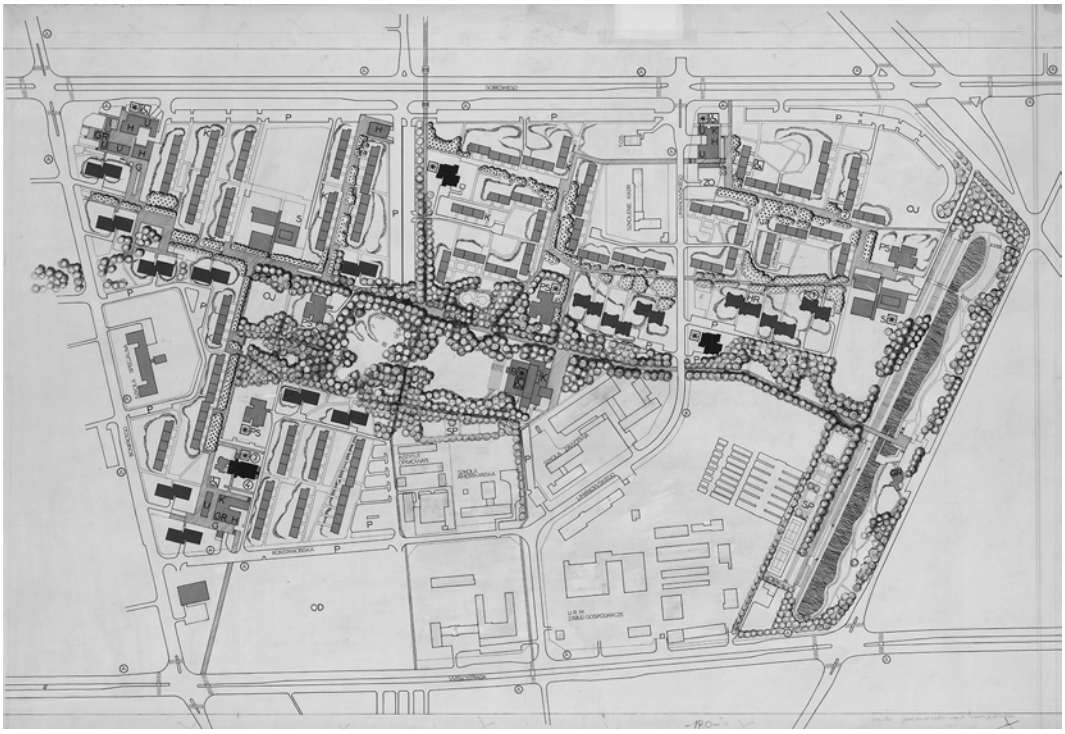

Fig. 5 - Sadyba housing estate, implementation stage, November 1977, implementation design, original scale 1 : 500 (unsigned), reproduction available at the Museum of Architecture in Wrocław.

mounds throughout the estate for winter activities, including sledging slopes, which additionally concealed water infrastructure.

A Tradition that Informs the Future

At the end of the socialist era, before the upheavals of 1989 and the advent of the neoliberal economic doctrine, Scholtz's last project was the Białołęka Dworska housing estate. Designed under the watchful eye of nearly thirty biologists, it was meant to become an environmentally friendly neighbourhood. Research was carried out into the area's "biotic and abiotic environment." Maps of natural conditions between 1976 and 1990 were drawn up, together with predictions of changes according to various housing development scenarios. It was assumed that the designed open space would be connected to the nearby forests, and the surrounding landmarks were also highlighted, following the principle of "fostering interest in local attractions." The design was never implemented, but it exists as a prominent example of an attempt to ensure the continuity of functioning ecological systems in time and space, a basic tenet of so-called *urbi-ecology*.

Maps of natural conditions between 1976 and 1990 were drawn up, together with predictions of changes according to various housing development scenarios.

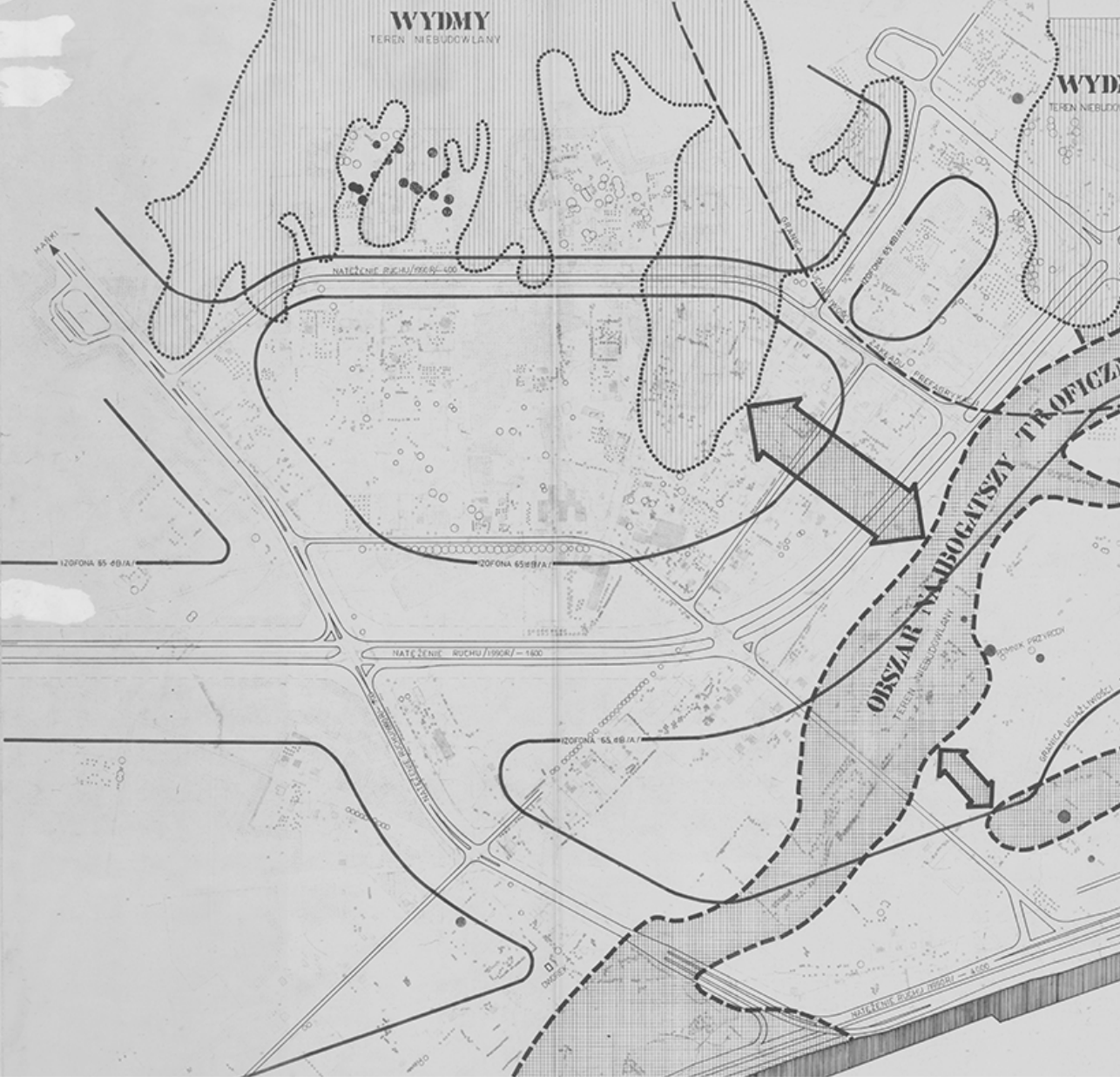

Fig. 6 - The Białołęka Dworska housing estate, programme and spatial concept, original scale 1 : 2000. Applications ed.: Alina Scholtz, Alicja Brejnak, Regina Ekielska; studio head: Krystyna Sokołowicz, undated reproduction, available at the Museum of Architecture in Wrocław.

Climate, biology and hydrography were interlinked in this project, and the natural functioning of the space was more important than the aesthetic criteria of development.

Przemysław Wolski, long-time lecturer at the Warsaw University of Life Sciences, who researches connections within climate-forming landscape structures, admits that the knowledge of passive landscape solutions developed by the interdisciplinary offices of the socialist era has almost been forgotten. No continuity has been preserved. This includes the disappearance of terminology. He considers it a mistake that in the

recent years the term “open space arrangement” has been replaced by “green and blue infrastructure.” The latter describes the system in terms of its visible components (greenery plus water), without considering air, which is shaped by the composition. It does not take into account the thermodynamic relationship, which is more difficult to perceive than the visible elements and yet exists as an equally important component of the urban structure:

The term *infrastructure* carries the connotation of subservience, but here we are not referring to human-made technical

elements that are meant to be subservient. We are talking about nature, which exists for itself. It is man, as an element of nature, who should serve it. (Wolski, 2023)

Warsaw can use the potential of “open space arrangements” to make the city’s organism and its metabolism limit negative weather effects and amplify positive ones.

Wolski is critical of recent housing developments, built following the closed cityscape formula, without conducting aerodynamic studies which he witnessed in the 1980s. He calls for Warsaw’s open cityscape to be appreciated and carefully shaped, at least in part, by a generation of landscape designers who embrace the thermodynamic interdependence of different forms of life in their architectural practices.
Warsaw, like many other European cities, is currently transitioning from a cold to a hot place and needs to proactively adapt to increasingly frequent extreme heatwaves. On an urban scale, the old rule can be applied: the river valley channels the air that settles over the city even when the weather is windless, with air movement caused by the river current. A fundamental aspect to take into account when it comes to the urban landscape are its cooling properties. Building on its design traditions, Warsaw can use the potential of “open space arrangements” to make the city’s organism and its metabolism limit negative weather effects and amplify positive ones. When the structure of a city is designed to harness natural phenomena to create optimal microclimates, as was done in some of Warsaw’s historical designs, there will be a reduced need for energy to mechanically cool or heat architectural spaces. Focussing on Warsaw as a case study, this article calls for a transformation of the disciplinary framework of current urban and landscape design practices in Europe and beyond. For a change that would put urban microclimates at the heart of the discipline’s endeavours.

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hydrogen valley • scenario • rail-based 15 min-utes city

Neutralità del paesaggio costruito del Nord Est, due ipotesi a confronto.

Scenario normativo vs scenario di adattamento attivo

Lorenzo Fabian (1), Susanna Pisciella (2), Chiara Semenzin (3)

Abstract

The research deals with the adaptation of the built landscape of the North East and, more generally, of the construction industry Italian, to the transformations necessary to achieve climate neutrality. The particular geographic and settlement configuration of the Triveneto region and the current structure of the energy sector lead to the construction of scenarios for two of the area's most energy-intensive and emissive sectors, the industrial and residential sectors. The rationale with which the topic of retrofitting is approached follows two distinct strategies: on the one hand, the construction of regulatory scenarios, which visualise what would concretely happen in the area by applying the indications contained in the *European Green Deal* and derivatives, at project dates 2030 and 2050. On the other hand, the construction of scenarios that look at the same vulnerability but through the possibility of an active adaptation, which implies a change of habits before that of the built territory.

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L'aggravarsi delle conseguenze della crisi climatica e delle tensioni geopolitiche rende sempre più urgente ripensare il territorio in un'ottica di "età della resilienza".

Nord Est in ottica di neutralità: de-centralizzazione vs accentramento

L'aggravarsi delle conseguenze della crisi climatica e delle tensioni geopolitiche rende sempre più urgente ripensare il territorio in un'ottica di "età della resilienza" (Rifkin, 2019) per sopravvivere all'intensificarsi dei cataclismi con i quali l'ambiente reagisce all'impatto antropico. Le recenti esperienze di pandemia, crisi logistica del Canale di Suez e guerra in Ucraina hanno impresso un'accelerazione inaspettata al piano di accorciamento delle filiere e autosufficienza che accompagna il più vasto progetto di de-carbonizzazione e neutralità climatica dell'Unione entro il 2050, il *New European Green Deal.* Tuttavia proprio il prolungarsi del conflitto bellico, dell'incertezza, e il generale aumento dei prezzi chiedono di pensare a scenari anche alternativi e magari più radicali rispetto a quelli ambiziosi e, in certo senso costosi, calendarizzati dall'*European Green Deal.*

L'articolo, che si concentra sul territorio costruito del Nord Est italiano nell'ottica della sua conversione a sistema energetico rinnovabile, autonomo e resiliente, accanto agli indirizzi intrapresi dal *Green Deal* volti a una trasformazione profonda dell'esistente, affianca un ripensamento, a monte, delle logiche stesse di sviluppo, coinvolgendo i singoli cittadini a partire dalla messa in discussione delle proprie, consolidate, abitudini.

Il Nord Est, qui inteso come macroarea che comprende Trentino Alto Adige, Veneto e Friuli Venezia Giulia, nella sua parte orientale è costituito per il 30% da pianura alluvionale, una geografia intrinsecamente energivora, in quanto il livello stabile delle acque, e dunque l'abitabilità, sono garantiti proprio dal complesso sistema di idrovore che drenano meccanicamente l'acqua in eccesso. Energia, in questa geografia, dunque significa non solo benessere, ma incolumità. Eppure, a dispetto della vulnerabilità dell'area, tra le più esposte alle conseguenze del cambiamento climatico, qui si concentra la maggior parte della popolazione e del costruito dell'intero Nord Est. Le sfide ambientali, insieme alle questioni energetiche, richiedono un adattamento selettivo del patrimonio edilizio che qui si presenta, nella sua natura produttiva, residenziale e della mobilità, come un esteso sistema metropolitano policentrico e diffuso. Macro-

regione tra le più produttive del Paese, costituita, a differenza della Lombardia, da una moltitudine di piccole imprese sparse nel territorio, collegate da un fitto sistema di reti infrastrutturali minute. Un territorio che, proprio nella sua natura umida, trova un certo equilibrio tra emissione e assorbimento di gas climalteranti grazie alla funzione di *carbon sink* svolta dalla densa rete di acque superficiali. Un equilibrio fragile, compromesso dall'estesa cementificazione dell'ultimo mezzo secolo dovuta alla necessità di collegare mobilità e energia in questa urbanizzazione sparsa. Oggi, i piani di decentralizzazione energetica e la tendenza a limitare il consumo di suolo rimettono indirettamente in discussione quelle scelte, invitando a un ripensamento anche della mobilità nella lontana prospettiva di riguadagnare aree verdi umide.

Se oggi l'accentramento delle fonti energetiche nelle mani di pochi mostra i suoi limiti in termini di gestione, costi e vulnerabilità, l'EU *Green Deal* favorisce il decentramento, promosso nelle forme dell'auto-produzione e autoconsumo. Tuttavia decenni di modelli di concentrazione della produzione e di gerarchia della distribuzione, in una topologia fragile, dispendiosa e inefficiente, che sopravvive in memoria della grande storia industriale, qui in capo alla Sade (Società Adriatica di Elettricità) operante nelle tre regioni del Nord Est prese in esame, rende ancora difficoltoso il distacco dalla grande rete e la possibilità di gestire autonomamente in modo imprenditoriale il proprio eccesso di produzione energetica da parte dei singoli produttori e consumatori. Per contro, proprio la particolare struttura continua dell'urbanizzazione sparsa del Nord Est può favorire la possibilità di individuare nuclei piccoli e autonomi all'interno dei quali potere ipotizzare sistemi localizzati di produzione e consumo di energia, reti di trasmissione intelligenti, favorendo la transizione da un sistema verticale e centralizzato a un sistema orizzontale, de-centralizzato, più capillare e diffuso, e per ciò stesso più resiliente.

Gli scenari relativi ai due casi studio riportati di seguito si costruiscono sdoppiandosi, in filigrana, come due diverse modalità prospettiche, da una parte lo scenario normativo, dall'altra quello che qui è stato chiamato *di adattamento attivo*.

La particolare struttura continua dell'urbanizzazione sparsa del Nord Est può favorire la possibilità di individuare nuclei piccoli e autonomi all'interno dei quali potere ipotizzare sistemi localizzati di produzione e consumo di energia, reti di trasmissione intelligenti.

Cosa si intende qui con scenario normativo e scenario di adattamento attivo

La ricerca prende in esame le principali policy in materia di de-carbonizzazione e adattamento al cambiamento climatico del paesaggio costruito, con particolare focus sui settori della mobilità e su quello industriale, nell'ottica di elaborare scenari di retrofitting energetico (EU Green Deal, RePowerEU, Strategia Nazionale per l'Idrogeno, Fit for 55, EPBD 2024/1275, Roadmap GBC Italia). In particolare, lo studio si concentra su due scenari. Il primo è quello delle policy con le rispettive scadenze, intermedia al 2030 e di completamento dei processi di neutralizzazione al 2050. Il primo, indicato in seguito come *scenario normativo*, rappresenta un quadro nel quale si prevede di trasformare l'intero comparto, allacciandolo a fonti rinnovabili, continuando a garantire le medesime abitudini attuali, senza cambiare in maniera sostanziale i nostri stili di vita altamente energivori.

Dall'altra parte, si prende invece in considerazione uno *scenario di adattamento attivo*, l'idea di omeostaticità che sottende gli studi di Walter Cannon sull'autoregolazione e saggezza del corpo umano, e ambientale. Una modalità di transizione energetica diversa, sottesa dall'idea che solo cambiando completamente le abitudini dei consumatori sia possibile imprimere, per processo inverso, un cambiamento favorevole nei processi di ripristino della natura a maggiori gradi di complessità. Questo secondo scenario, a differenza del primo, elabora una coscienza dell'autonomia della natura, contro la visione che la vuole strumento in funzione della civiltà (Morton, 2009), nella consapevolezza della nostra innecessità per l'ambiente, di cui noi abbiamo bisogno, ma non viceversa (Serres, 2019; Leopold, 2019).

Questo secondo scenario elabora una coscienza dell'autonomia della natura, contro la visione che la vuole strumento in funzione della civiltà.

Se dunque la funzione dello scenario "normativo" diviene quella di spazializzare nel Nord Est gli impatti di alcune policy, visualizzandone le conseguenze nella realtà territoriale per comprenderne la portata concreta di trasformazione – quale è il caso del progetto di transizione all'idrogeno verde per il comparto industriale – lo scenario "di adattamento attivo" invece esplora assetti più radicali, spesso già indagati in letteratura ma non assimilati nelle strategie normative vigenti. Questi non contemplano l'idea massiccia di controllo e trasformazione di interi comparti, ma

una sorta di laico *Gelassenheit* (Heidegger, 2019), di abbandono del dominio e del consumo per fare un passo indietro, avviandosi a un lasciar essere la natura, riaprendosi al suo mistero. Gli scenari avviati in questa ottica sono quello della *Urbanizzazione dei 15 minuti* e l'auto-sufficienza a 360 gradi del comparto residenziale.
Laddove lo scenario normativo rafforza l'attuale mercato tecnico capitalistico dei consumi, senza potersi esimere dalla contraddizione di fare ricorso massiccio a filiere lunghe e di provenienza fossile per i dispositivi messi in opera per la transizione, pannelli fotovoltaici, elementi isolanti, ecc., il secondo scenario, al contrario, promuoverebbe nuove figure professionali chiamate a lavorare sul fine vita dei materiali, sulle loro possibilità di reimpiego, in un mercato costruito più sulla circolarità che sulla nuova produzione. Una transizione dalla tradizione dell'*homo consumens* a un ritrovato *homo faber* (Bauman, 2007). In questo articolo, per semplicità e limiti di spazio ci si limiterà a riportare due casi studio esemplificativi dei due scenari.

Metodologia dello scenario
Lo scenario costituisce la cornice di senso entro la quale si possono collocare le differenti ipotesi di progetto. L'urbanistica, negli ultimi decenni, ci ha allenato al *what if* come strumento critico del progetto per rappresentare futuri potenziali, plausibili, auspicabili. La costruzione di scenari, di visioni e di immaginari ha una tradizione fertile: il *cosa succederebbe se* rispondesse alla necessità di visualizzare nel medio e lungo periodo, a partire dalla contemporaneità, scelte progettuali che hanno vivide ricadute nello spazio.
La teorizzazione e lo sviluppo sistematico di scenari è un fenomeno relativamente recente. Gli studi strategici sul futuro sono nati in ambito militare negli anni Cinquanta del Novecento, nelle fasi iniziali della Guerra Fredda, quando emerse che nella nuova situazione le usuali tecniche di pianificazione non sarebbero state sufficienti. L'analisi di trend, il *forecast*, non bastava più. Serviva qualcosa che funzionasse più a lungo termine, poi chiamato *foresight*, capace di far vedere non solo la continuazione dei cambiamenti già in corso, ma anche le novità, le sorprese, gli imprevisti, i punti di rottura. Herman Kahn, uno dei padri fondatori degli

Cosa succederebbe se rispondesse alla necessità di visualizzare nel medio e lungo periodo, a partire dalla contemporaneità, scelte progettuali che hanno vivide ricadute nello spazio.

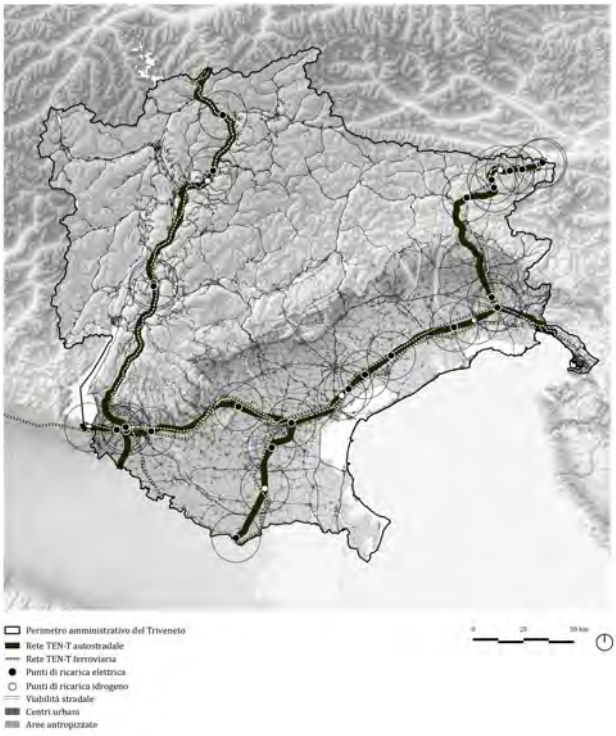

Fig. 1 - Scenario normativo: infrastruttura per i combustibili alternativi sulla rete stradale TEN-T, con indicate le stazioni di ricarica elettrica (verde) e di idrogeno (bianche). Fonte: elaborazione su dati della Commissione Europea.

Le intuizioni di Kahn sui vantaggi dell'uso degli scenari come strumenti di pianificazione strategica si estesero oltre le questioni militari e il pensiero di scenario iniziò a diffondersi nei diversi ambiti dalla politica all'economia.

Studi di futuro, parlava esplicitamente di una capacità di pensare l'impensabile *thinking the unthinkable* (Kahn, 1962). Quello che oggi è impensabile perché è totalmente diverso dalla nostra esperienza e dai nostri quadri mentali, domani sarà realtà. Se vediamo in anticipo quello che potrebbe succedere, possiamo provare a prepararci, sia per diminuirne gli eventuali impatti negativi, sia per poter accrescere gli effetti eventualmente positivi. Le intuizioni di Kahn sui vantaggi dell'uso degli scenari come strumenti di pianificazione strategica si estesero oltre le questioni militari e il pensiero di scenario iniziò a diffondersi nei diversi ambiti dalla politica all'economia e, dagli anni Settanta del Novecento, ha cominciato ad affermarsi nel dibattito internazionale attraverso i temi dei limiti dello sviluppo, dell'esaurimento delle risorse e della sicurezza del territorio.

Urbanizzazione dei 15 minuti nel Nord Est: uno scenario di adattamento attivo

Il segmento di studio che analizza la filiera della mobilità prende avvio dalla costruzione dello scenario normativo per visualizzare l'entità della trasformazione richiesta dal territorio. In seguito, alla luce dell'im-

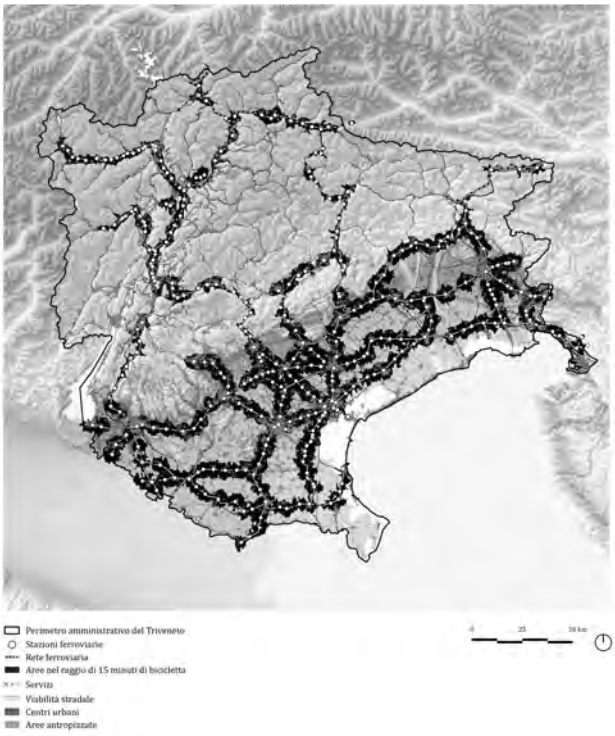

Fig. 2 - Aree a 15 minuti dalle stazioni ferroviarie per densità di popolazione residente contrapposte alle e aree urbanizzate non coperte dalla mobilità ferroviaria.

ponenza del dispendio richiesto, elabora uno scenario parallelo di tipo adattivo-attivo.
Scenario normativo: i numeri del *Green Deal* attribuiscono al settore dei trasporti il 25% delle emissioni climalteranti, riconoscendo al solo trasporto su ruota la responsabilità del 70% di quella quota. A contrasto dell'impatto, il *Green Deal* introduce una stretta sui limiti delle emissioni di auto e furgoni (COM/2021/556 final), incentivando il passaggio a fonti elettriche o all'idrogeno attraverso sgravi e attraverso la costruzione di apposite infrastrutture di ricarica o rifornimento (COM/2021/559 final). Tradotta in numeri effettivi del territorio, il Nord Est dovrà attrezzarsi di almeno una stazione di ricarica elettrica ogni 60 km e una di idrogeno ogni 200 km entro il 2025 per aumentare di numero negli anni successivi. Considerando le autostrade facenti parte della rete stradale transeuropea dei trasporti (TEN-T), si prevede la costruzione di 25 stazioni di ricarica elettrica, 7 stazioni di rifornimento di idrogeno e punti di rifornimento di metano liquefatto secondo le quantità previste dalla direttiva europea. Alla trasformazione del parco veicoli corrisponde inoltre la necessità di rottamare i 3,4 milioni

di auto in circolazione nel territorio, per la maggior parte alimentate a benzina e gasolio. Un dispendio economico e un conseguente impatto ambientale importante.
Scenario di adattamento attivo: la particolare configurazione urbana sparsa e diffusa del Nord Est, caratterizzata da un deposito strutturale minuto di strade e linee ferroviarie (Secchi, 2010) che nel tempo è divenuto il principale supporto nei processi di dispersione insediativa e dipendenza di massa dall'automobile, pensata all'inverso può rappresentare un supporto nella promozione di politiche di decrescita e adattamento. Ci sono più ragioni infatti per considerare la ferrovia regionale l'infrastruttura dalla quale partire per una revisione radicale del sistema della mobilità: energetiche, di razionalità dei trasporti, di significativa valorizzazione del capitale sociale e infrastrutturale costruito. In Veneto la strada ferrata è infatti l'infrastruttura che, un secolo prima dell'automobile, consentì la mobilità di cose e persone su un territorio vasto ed endemicamente disperso. Nell'infrastruttura ferroviaria si sono consolidate le prospettive e le aspettative sociali, economiche e di innovazione tecnologica di una rilevante stagione dello sviluppo del territorio italiano.
Lo studio si è dunque concentrato sulla mobilità pubblica garantita dalla rete ferroviaria, assumendo le stazioni come centri di alta accessibilità rispetto al tessuto urbano circostante. A partire dalle stazioni ferroviarie esistenti, che nel caso studio si ipotizzano rafforzate e ben connesse tra loro dal servizio ferroviario locale, si è avviata la costruzione di uno scenario di *comunità di un quarto d'ora* individuando gli spazi che vi ruotano attorno con un sistema di mobilità dolce. Attraverso la mappatura di isocrone, che hanno per centro la stazione ferroviaria, sono state individuate le aree contenute entro una percorrenza massima di 15 minuti a piedi, in bicicletta e in bici a pedalata assistita.
L'obiettivo è quello di individuare nuclei funzionalmente autonomi perché dotati di servizi di prossimità, all'interno del macro-paesaggio della città diffusa. Al proprio interno, la maggior parte dei nuclei può già oggi garantire un presidio sanitario coincidente con l'attuale farmacia locale da potenziare a livello medico e un punto di approvvigionamento alimentare.

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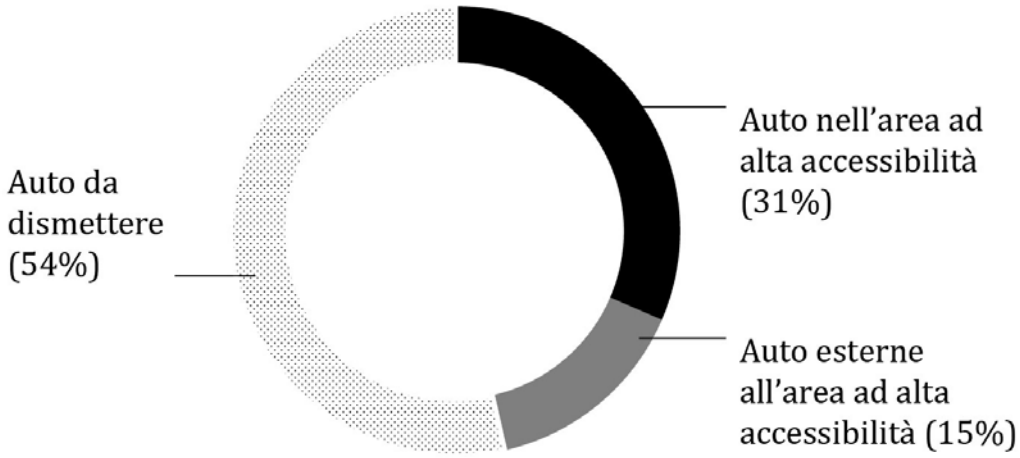

Fig. 3 - Distribuzione del parco veicoli rispetto alle aree di accessibilità al treno in bicicletta. Fonte: elaborazione su dati ACI.

La sempre maggiore possibilità di lavorare in remoto rende questo scenario progressivamente più attuale (Parametri della strategia nazionale aree interne SNAI). Dall'elaborazione delle isocrone ottenute in ambiente GIS con i dati del Censimento della popolazione e delle abitazioni 2011 dell'ISTAT, nell'area individuata come ad alta accessibilità ferroviaria risiede il 63% della popolazione del Triveneto se si considera l'uso della bicicletta; si raggiunge il 70% con la bicicletta a pedalata assistita; il 22% considerando i soli spostamenti a piedi. La concentrazione edilizia, in virtù della storia stessa del territorio, rispecchia la distribuzione della popolazione e oltre il 50% delle abitazioni del Triveneto si trovano entro il raggio delle stazioni raggiungibili in bicicletta, il 18% a piedi.
Lo scenario così individuato consente di ipotizzare un diverso impatto per le politiche europee del parco veicoli rispetto alle diverse aree del territorio. Nelle aree di alta accessibilità al trasporto ferroviario, si ipotizza di limitare il parco veicoli complessivo distinguendo tra i territori serviti dal treno e quelli scoperti.
Il nuovo parco veicoli ipotizzato, calcolato sui dati 2022 (ACI, 2022), considera inalterato il numero di auto private rapportate alla popolazione che risiede nei territori che non hanno un'alta accessibilità alla rete ferroviaria, mentre per quelle ricadenti al suo interno si è stimato un fattore di riduzione del 50%. Alla popolazione residente che può facilmente accedere alla mobilità ferroviaria a piedi o in bici corrispondono rispettivamente 0,7 e 2,1 milioni di auto che

potrebbero essere dimezzate con un passaggio alla mobilità pubblica. Le aree fuori dai territori ad alta accessibilità ferroviaria corrisponderebbero invece a circa 1 milione di veicoli ai quali possono essere più rapidamente applicate politiche per il passaggio all'elettrico o ai combustibili alternativi.

Conversione del comparto industriale in idrogeno: esempio di scenario normativo

L'Italia si colloca al terzo posto come produttore di energie rinnovabili in Europa (rapporto Enel 2020). Alla scala del Triveneto, le rinnovabili rappresentano il 50% della produzione lorda di energia elettrica (Terna, 2022) e derivano principalmente dall'idroelettrico e dalla produzione fotovoltaica.

L'avanzare della crisi climatica e la crescente incertezza geopolitica relativa alla distribuzione dell'energia e alla definizione del prezzo richiedono oggi con urgenza una strategia per il raggiungimento dell'indipendenza energetica e la transizione verso un sistema produttivo sostenibile soprattutto per quanto riguarda i settori *hard-to-abate*.

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A tale proposito, l'Unione Europea promuove tramite lo *EU Green Deal* un significativo aumento della produzione elettrica da fonti rinnovabili e favorisce – tramite *l'Hydrogen Strategy* – l'investimento sull'idrogeno come vettore per un uso efficace delle rinnovabili per sopperire all'intermittenza che le caratterizza. La ricerca si è dunque concentrata sulle conseguenze e sulle trasformazioni che queste spinte verso una maggior produzione di rinnovabili potrebbero comportare nel territorio del Triveneto, per l'uso diretto di elettricità che ne deriva o per la produzione di idrogeno verde.

Lo studio incrocia le indicazioni del *Green Deal* contenute nel pacchetto *RePowerEU* (2022), l'*Hydrogen Strategy* con la ricezione italiana nella Strategia Nazionale per l'Idrogeno e la "Direttiva rinnovabili". Ripercorrendo sinteticamente le strategie prese a riferimento. *RePowerEU* pone come obiettivo la copertura del 45% dell'energia lorda consumata con le rinnovabili entro il 2030; la *Hydrogen Strategy* favorisce lo sviluppo e la promozione del mercato e dell'infrastruttura per l'idrogeno (COM/2021/804). Obiettivo UE entro il 2030 è quello di produrre 10 mln di tonnellate di idrogeno rinnovabile con 40 gigawatt di capacità di elettrolisi

grazie alle tecnologie per la produzione di idrogeno blu e verde. Nella declinazione italiana, la Strategia Nazionale per l'Idrogeno prevede alla scadenza del 2030 una penetrazione dell'idrogeno almeno del 2% nella domanda energetica finale, ed entro il 2050 prevede una penetrazione dell'idrogeno del 20%.
Per spazializzare le conseguenze delle implementazioni di misure atte a raggiungere gli obiettivi proposti dalle strategie appena menzionate, è stato ipotizzato uno scenario energetico per il Nord Est. Per quanto riguarda l'idroelettrico, che a oggi predomina nel panorama delle rinnovabili del Triveneto, si immagina il mantenimento costante dell'attuale produzione. Non è stato previsto un aumento della produzione da idroelettrico, perché avrebbe un impatto negativo sugli habitat e sullo stato di salute dei corsi d'acqua. Considerato il contesto in cui si opera, caratterizzato da ridotta ventosità e con moniti circa la produzione da biomassa (per conflitti potenziali con la produzione agricola e per le emissioni di PM), immaginiamo che la nuova produzione da rinnovabili per il raggiungimento del 45% richiesto dallo *EU Green Deal* e richiesto per la produzione di idrogeno (verde) venga interamente coperta dalla produzione di energia elettrica tramite sistemi fotovoltaici. Dunque il lavoro si organizza in tre step progressivi: stima dell'energia elettrica da produrre da rinnovabili al 2030; stima della superficie necessaria per produrla tramite sistemi fotovoltaici; mappature delle superfici a disposizione in Triveneto per capire se la transizione sia possibile senza implicare ulteriore consumo di suolo.
Per quantificare l'obiettivo di copertura del 45% dell'energia elettrica con fonti rinnovabili entro il 2030 richiesto dalla Direttiva europea sulle rinnovabili è stato in primo luogo necessario indagare la stima del futuro fabbisogno elettrico del Triveneto. In continuità con una tendenza già in atto, si prevede infatti una maggiore elettrificazione degli usi finali (Confindustria, 2023) che sono stati calcolati a partire dalla serie storica dei dati Terna dal 1931 al 2022 per le tre regioni in esame (Veneto, Friuli Venezia Giulia e Trentino Alto-Adige). La stima proietta dunque al 2030 lo stesso trend di crescita consumo avvenuto dal 1931 a oggi e prevede così il passaggio da un fabbisogno di energia elettrica di 46.906 GWh in Triveneto nel 2022 a 51.798 GWh per il 2030 (Terna, 2022a).

Il lavoro si organizza in tre step progressivi: stima dell'energia elettrica da produrre da rinnovabili al 2030; stima della superficie necessaria per produrla tramite sistemi fotovoltaici; mappature delle superfici a disposizione in Triveneto per capire se la transizione sia possibile senza implicare ulteriore consumo di suolo.

Regione	Produzione lorda di energia elettrica in Italia (2022) [GWh]				Consumi di energia elettrica [GWh]	
	Idroelettrico	*Termoelettrico*	*Fonti Rinnovabili**	*Totale*	*2022*	*2030*
Trentino-Alto Adige	6.274	1.334	7.119	8.309	6.679	7.376
Veneto	2.461	9.613	6.852	15.402	30.535	33.719
Friuli-Venezia Giulia	875	7.172	2.299	8.993	9.692	10.703
Triveneto	9.611	18.119	16.270	32.704	46.906	51.798
ITALIA	29.904	196.726	100.466	283.953	295.853	318.437

* tra le Fonti rinnovabili è compresa anche l'energia idrica, parte dell'energia idroelettrica ottenuta dai soli apporti naturali

Fig. 4 - Produzione e consumi di energia elettrica in Triveneto. Fonte: elaborazione su dati Terna.

Sulla proiezione finale al 2030 è stato dunque possibile calcolare la percentuale del 45% di energia da fonti rinnovabili richiesta, pari a 23.309 GWh.
In parallelo, sulla proiezione dei consumi è stata applicata la percentuale del 2% di penetrazione dell'idrogeno sui consumi finali prevista dalla Strategia Nazionale per l'idrogeno ottenendo i GWh elettrici che copriranno l'obiettivo: 1.036 GWh entro il 2030.
Il fabbisogno di energia elettrica "nuova" da produrre da rinnovabili per raggiungere gli obiettivi al 2030 è quindi la differenza tra la quota da raggiungere e l'energia elettrica già prodotta nel Triveneto da rinnovabili, costituita da 9.611 GWh da idroelettrico e 16.270 GWh da altre fonti rinnovabili (Terna, 2022b). A ciò aggiungiamo la quota necessaria per l'idrogeno verde (1.036 GWh). Il risultato mostra che l'energia da produrre tramite sistemi fotovoltaici in Triveneto a 2030 ammonta a 18.991 GWh.
Sulla base della quantità di energia mancante è stata dunque calcolata la superficie necessaria per produrre rinnovabili per il raggiungimento del target del 45% previsto dallo *EU Green Deal* e per la produzione del 2% da idrogeno verde. Secondo il metodo illustrato in Zardo et al. (2024), l'equivalenza tra GWh elettrici e mq di fotovoltaico è stata calcolata considerando l'impiego di un pannello serie Sunpower E20 series con una superficie di 1,63 m2, l'utilizzo annuo, dato dal prodotto tra le ore medie di funzionamento di un impianto fotovoltaico in nord Italia (1073 ore), l'efficienza dell'impianto (0,22 x 0,84, celle per totale impianto) e un fattore dust (prudenziale). In estre-

Regione	**Penetrazione dell'idrogeno nella domanda energetica finale [GWh]**		**Quota finale nuove rinnovabili [GWh]**
	2030	*2050*	*2030*
Trentino-Alto Adige	147	1.770	0
Veneto	674	8.093	17.643
Friuli-Venezia Giulia	214	2.569	2.518
Triveneto	1.036	12.431	18.991
ITALIA	6.369	79.654	42.831

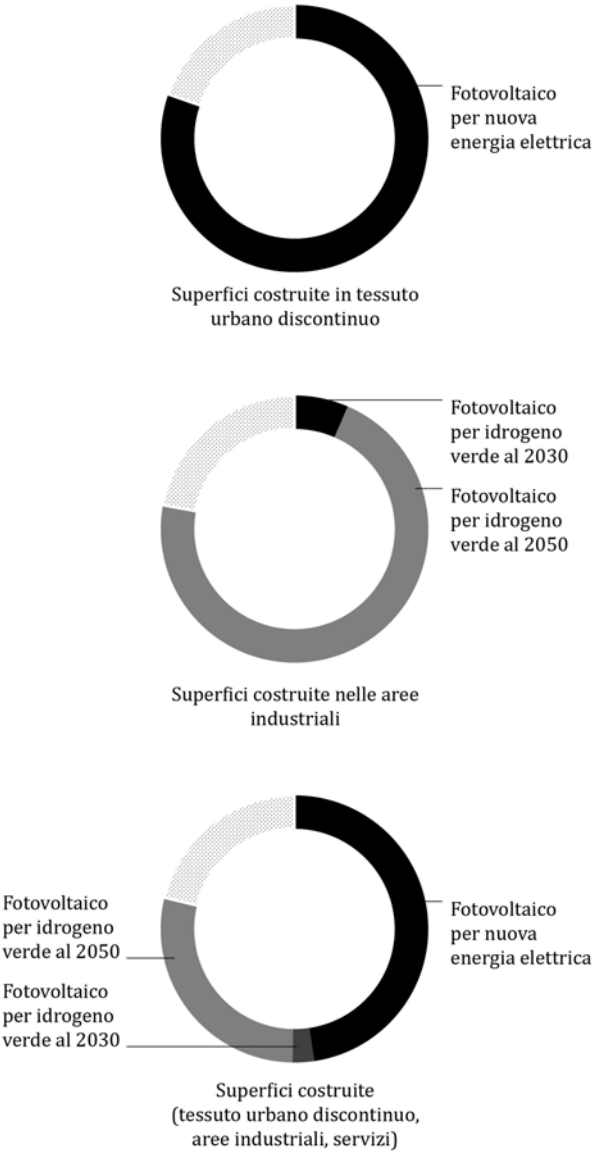
Regione	**Costruito totale**	**Costruito in tessuto denso**	**Costruito in tessuto discontinuo**	**Costruito in aree industriali**	**Costruito in aree per sport e servizi**
Trentino-Alto Adige	67.349.900	3.221.950	33.411.200	6.889.720	97.827
Veneto	442.596.000	4.832.460	204.253.000	79.371.400	1.684.010
Friuli-Venezia Giulia	129.118.000	2.621.860	76.789.700	19.968.400	197.603
Triveneto	639.063.900	10.676.270	314.453.900	106.229.520	1.979.440
Triveneto con fattori di riduzione		*0*	*78.613.475*	*53.114.760*	*989.720*

ma sintesi, la proporzione che ne deriva ipotizza la produzione di 3.327 GWh tramite 1m2 di superficie fotovoltaica.
Ne risulta che in Triveneto entro il 2030 occorreranno 3.446.763 mq di fotovoltaico per la sola produzione di idrogeno verde e 63.185.473 mq per la produzione della restante energia elettrica (per il raggiungimento del 45%, sempre a 2030) .
Per individuare quali e quante superfici potrebbero essere destinate al fotovoltaico è stato infine incrociato l'edificato delle tre regioni con la Corine Land Cover aggiornata al 2018. Individuata la superficie di edificato corrispondente alle voci della copertura del suolo, è stata posta particolare attenzione a quelle ricadenti nel tessuto urbano discontinuo, in quello industriale, negli edifici destinati a sport e servizi e alle superfici autostradali, indicate come riferimento nella Strategia europea per l'energia solare (European Commission, Directorate-General for Energy, 2022).
Gli edifici ricadenti nelle aree di tessuto denso, coincidenti con i centri storici, sono state esclusi in virtù dei vincoli paesaggistici che vietano l'installazione di pannelli fotovoltaici. Alla superficie complessiva dei

Fig. 5 -Target di produzione di energia elettrica fissati dalla strategia dello *EU Green Deal* e contenuti nella Strategia Nazionale per l'Idrogeno e nella Direttiva europea sulle rinnovabili. Fonte: elaborazione delle autrici su dati Terna.

Fig. 6 -Superfici costruite del Triveneto per tessuto e superfici disponibili per la potenziale installazione di fotovoltaico. Fonte: elaborazione delle autrici sulla CLC *Corine Land Cover* aggiornata al 2018.

Fig. 7 - Superfic
necessarie per l'instal-
lazione del fotovol-
taico in Triveneto in
prospettiva 2030 solo
per l'idrogeno.



restanti edifici è stato invece applicato un fattore di riduzione del 25% (Zardo et al., 2024), per considerare il grado di utilizzabilità medio dei tetti a falde.
Ne emerge che i 66 milioni circa di mq complessivi richiesti sono già disponibili se si pensa a un impiego di tetti e aree già impermeabili nel Triveneto. Le sole coperture presenti nel tessuto urbano discontinuo sarebbero sufficienti al raggiungimento della quota di rinnovabili al 2030 mentre le superfici degli edifici in aree industriali coprirebbero la produzione di idrogeno

verde anche per la successiva scadenza del 2050. La conclusione è che si possono coprire i nuovi fabbisogni di produzione di rinnovabili senza costruire impianti a terra e dunque senza sottrarre superfici utili ad altri usi.
I risultati ottenuti consentono di elaborare un nuovo scenario territoriale per la produzione energetica. La metodologia è sintetica e non vuole proporre un approccio valutativo, presenta infatti semplificazioni importanti in termini di conversione di energia da fotovoltaico a idrogeno, ad esempio. Inoltre, non sono qui presi in esame temi fondamentali per il funzionamento del sistema, quale la messa a punto di batterie e dispositivi per lo *storage* e l'aggiornamento della rete per far fronte ai nuovi picchi di energia che la produzione decentralizzata da fonti rinnovabili comporta. Nonostante queste semplificazioni, lo studio mette in luce una considerazione delle politiche e dei target messi a punto a livello europeo e nazionale e uno scenario preliminare di ciò che la spazializzazione di tali target può significare per il territorio. In particolare, lo scopo dello scenario normativo, qui, è quello di quantificare e visualizzare la significativa produzione di dispositivi richiesta dalle direttive europee per la generazione di energia rinnovabile mostrando, indirettamente, come questo indirizzo possa potenzialmente trasfigurare e compromettere il territorio, per esempio attraverso l'esteso uso di agrivoltaico, se non si progetta di volta in volta l'atterraggio della transizione nelle specificità di ogni territorio.

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hydro-power • dams • docu-mentary cinema

Past Futures of Hydroelectricity. Swiss Dam Projects in Documentary Cinema

Jacqueline Maurer

Abstract

The climate crisis obliges us to rethink landscape protection due to the need for renewable energy. Images and narratives of historic documentary films on the most important Swiss dam projects demonstrate that hydropower has always been a controversial endeavor in the Alpine republic. The films deal, in pro- or retrospect, with measures and discourses around the planning and construction of such infrastructures for expected futures. Four crucial moments in the Swiss context are covered: Karl Sauer explores the early Lake Sihl project commissioned by Swiss Federal Railways in the 1930s. Jean-Luc Godard documents in the 1950s the construction of the Grande Dixence dam to save Switzerland from electricity shortage. In the 1990s Peter Liechti entered the critical discourse of planned expansions of existing projects, whereas my photographs on site of Grande Dixence give insight into a communication programme to foster local tourism and to reach for acceptance for hydropower extension.

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Democracy versus electricity

On 9 June 2024 Switzerland decided that the Federal Act on a Secure Electricity Supply from Renewable Energy Sources will come into force on 1 January 2025: "The bill [on a secure electricity supply] lays the foundations for a rapid expansion of Switzerland's energy production from renewable sources such as hydropower, solar, wind and biomass. This will lessen the country's dependence on energy imports and reduce the risk of critical supply situations. The bill includes funding instruments as well as new regulations for electricity production, transport, storage and consumption. It also introduces a mandatory hydropower reserve."[1] The Federal Act was subject to a popular vote as the referendum had been called. Organisations advocating for the protection of landscapes, as well as the right-wing Swiss People's Party, were against it. They argued differently in a highly complex historical and political challenge, which must face the dilemmas of the contemporary energy and climate crisis.

The significance of hydropower in Switzerland

One of the aspects within the Federal Act regards the expansion of existing hydropower stations and the construction of new ones. Switzerland's topography and the significant precipitation amounts are ideal conditions for hydropower. Four types of power plants can be distinguished: run-of-river power plants, storage power plants, pumped storage power plants, and pure circulation power plants. Planning and construction of such infrastructures started already at the end of the nineteenth century. The most important phase was between 1945 and 1970 when a high number of run-of-river power plants were built in the lowlands as well as several dams in the Alps. At the beginning of the 1970s, almost 90% of the national electricity production derived from hydropower. This number diminished to around 60% in 1985, with the introduction of nuclear plants. Today, hydropower still plays a significant role in Swiss energy production, with a share of around 58%.[2]

Storage power plants as cinematographic subjects

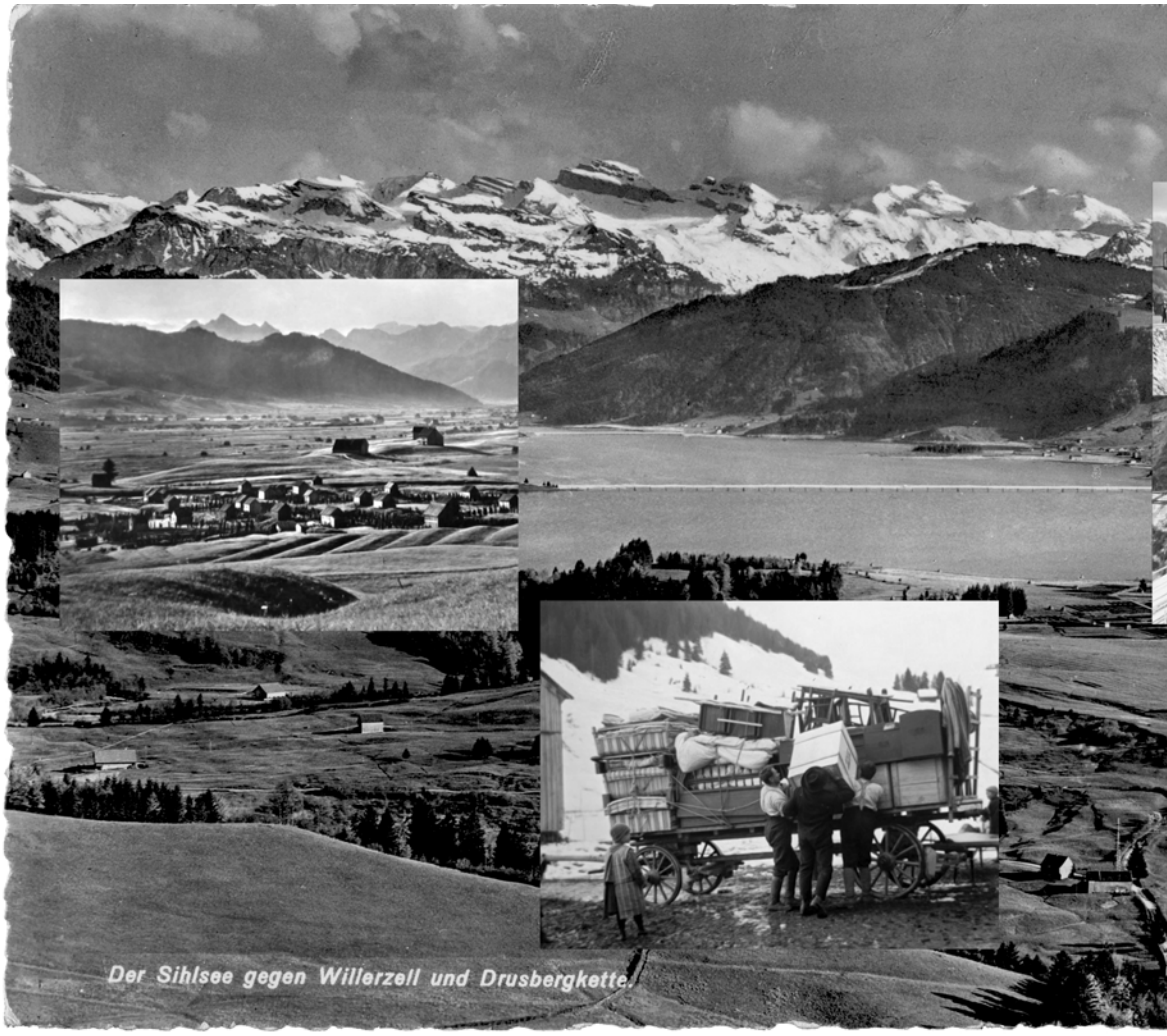
Storage power plants with artificial lakes held back by dams are not only the biggest hydropower infrastructural projects in terms of planning, construction, and labour. They also imply the major impact on the surrounding ecosystem and often on the local population too, especially when their villages were flooded. The huge building projects created energy landscapes that attracted the interest of filmmakers: Jean-Luc Godard saw the possibility to create his debut in the style of modernist films of the interwar and postwar period that were meant to celebrate progress. The experimental filmmaker Peter Liechti and the documentary filmmaker Karl Saurer, instead, created critical contributions by involving locals and experts.

1 - Swiss Federal Office of Energ (17.04.2024), ***Bill on a secure electricity supply: Vote on 9 June 2024*** [Online]. Available at: https://www.bfe.admin.ch/bfe/en/home/supply/electricity-supply/federal-act-renewable-electricity-supply.html [Accessed 26 June 2024].

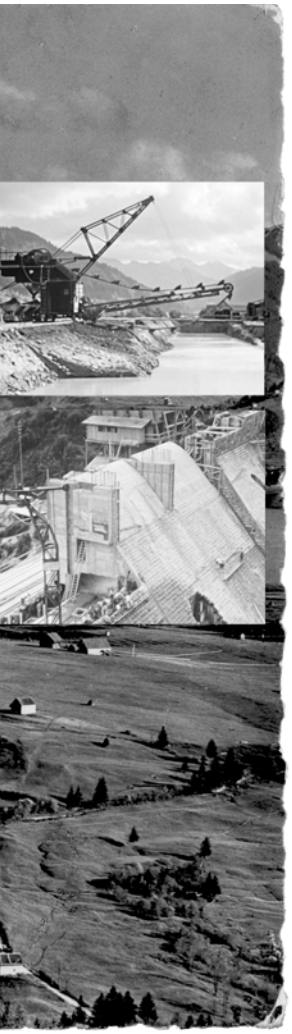
2 - Swiss Federal Office of Energ (02.05.2024), ***Hydropower*** [Online]. Available at: https://www.bfe.admin.ch/bfe/en/home/supply/renewable-energy/hydropower.html [Accessed 26 June 2024]; Swiss Federal Office of Energ (02.05.2024), ***Large-scale hydropower*** [Online]. Available at: https://www.bfe.admin.ch/bfe/en/home/supply/renewable-energy/hydropower/large-scale-hydropower.html [Accessed 26 June 2024].

From edited moving images to collaged still images

The backdrop images that serve as the background for each of the three collages that are displayed here are related to the mediation of the energy landscape associated with the three dam projects. While the Lakes Sihl and Grimsel are depicted on historical postcards, we are invited to visit one of today's Grande Dixence dam's caves, which has been used to screen an adapted version of Godard's original work. The chosen film stills either contrast sharply to stand out or blend in with the space created by the background image. The stills can be understood as a literal zoom into the corresponding energy landscape, or they present key scenes from the movies that depict the building process and its stages of completion, critical oral accounts about it, or images of an information film, based on historical documentation, in the case of Grande Dixence. The following paragraphs are dedicated to each of the three selected films and discuss how they appropriate and reflect the related dam project by narration and cinematographic means.



Karl Sauer's (1943-2020) documentary film "The Dream of the Big Blue Water" from the beginning of the 1990s focuses on the human fates associated with the Lake Sihl dam project, realised in the 1930s. It served as part of the expansion of the state's energy policy and the Swiss Federal Railways. By interviewing various people affected and witnesses who were still alive and reenacting local council meetings orally, the filmmaker provides an insight into the highly problematic political measures that had a massive impact on cultural landscapes and their inhabitants. They were forced to abandon their farms and were either given land that needed to be improved upon or they emigrated to the United States and worked laboriously to establish themselves anew. Etzelwerk's planning



Lake Sihl: "Der Traum vom grossen blauen Wasser" (Karl Saurer, CH 1993)

started at the end of the nineteenth century. It is situated close to Einsiedeln, a well-known pilgrimage place. A monastery monk was even inspired to make a proposal, which would have also flooded his nearby village of origin. "Fellow citizens, let us not lag behind, let us in our remote mountain valley also participate in the general competition of the spiritual and physical forces of the gigantic progress and achievements of mankind. The electric spark ignites powerfully into the new century," a politician is quoted in the movie, demonstrating the people's tangible belief in and pressure for the pathos of progress.

Fig. 1 - Lake Sihl
Film stills from Karl Saurers "Der Traum vom grossen blauen Wasser" (CH 1993) on historic postcard "Der Sihlsee gegen Willerzell und Drusbergkette", photographed by Jean Gaberell (undated, before 1 June 1941). Processed by the author, with materials courteously provided by Karl Saurer Filmproduktion, Elena M. Fischli, Nachlass Karl Saurer, RECK Filmproduktion; ETH-Bibliothek-Zürich, Bildarchiv (PK_006242).

With *Grimsel*, which is rhythmized by experimental image and sound recordings, Peter Liechti (1951-2014) audiovisually explores the scenic surroundings of the Seeuferegg gravity dam, which was completed in 1932. It keeps back Lake Grimsel in the Bernese Oberland. The images are accompanied by the speeches of commentators who are not specified – for example by indicating the names and personal or professional relations to the location. They criticise the planned expansion to Grimsel West by Kraftwerke Oberhasli AG (KWO) since the 1980s, which is also depicted in the film. The philosophical thoughts on socio-political and ethical aspects of human intervention in natural and cultural landscapes described by these people at the time can also be found in today's discourse: "If they will build, what shall we do? The last unspoilt landscapes destroyed, all the water trapped… Emigrate? Like they used to? As some kind of

Lake Grimsel: "Grimsel" (Peter Liechti, CH 1990)

economic refugees, because of too much economic wealth, not too little? That's the new paradox. It is an interesting process that's occurring today. We are creating more and more artificial nature for ourselves [...]. And to build and run all this artificial nature, we have to curb and destroy more and more genuine nature. That is an interesting process." The expansion project Grimsel West was finally suspended at the end of the 1990s due to strong opposition. Maybe Liechti's documentary might have contributed to this outcome. However, within the contemporary context of the growing need of renewable energy, construction of the Spitallamm gravity dam has begun in 2019 to replace the first dam. The project was even driven forward at the federal level by the so-called "Grimsel paragraph" (2022) and should be completed in 2025.

Fig. 2 - Grimsel
Film stills from Peter Liechtis "Grimsel" (CH 1990) on historic postcard "Grimselsee gegen Finsteraarhorn" photographed by Emanuel Gyger (ca. 1940). Processed by the author, with materials courteously provided by Liechti Filmproduktion, Look Now!, Rec Film, absolut MEDIEN; ETH-Bibliothek-Zürich, Bildarchiv (PK_000601).

In his debut film, the short documentary “Opération ‘Béton’”, Jean-Luc Godard (1930-2022) follows the production and processing of concrete used in the Grande Dixence dam’s construction. The project was designed to be the most efficient way to counter the anticipated power shortfall in the nation, and it produced Switzerland’s largest construction site in the post-war era. As an employee at Grande Dixence SA, Godard used the resources of many assistants, his understanding of the location, and the construction site’s infrastructures to create his debut film. “Opération ‘Béton’” chronologically traces the manufacture of concrete on the numerous construction sites and documents the infrastructures required for this. They in turn served to realize his film, which was literally grafted onto them. After he finished his work, the 24-year-old director was able to sell it to the company Grande Dixence SA by using the affirmative approach of commissioned industrial films. He proved his authorship by

Lac de Dix: "Opération 'Béton" (Jean-Luc Godard, CH 1955) & the mediation of hydropower

working entirely on his own initiative and therefore did not have to obey any corporation directives typical for commissioned films.
A revised and updated version of "Opération 'Béton'" by the Lausanne based "identity company" essencedesign SA has been on display for the general public on dam tours since 2006. This is a component of the hydropower communication strategy that has been grafted into the energy landscape. The movie is thus projected in the same location it was shot – in a cavern within the dam, nestled between the dam wall and the surrounding natural rock. Its career was left open by the filmmaker, who went on to make his own career. Strangely, "Opération 'Béton'" is arguably the most often screened Godard film today. This is solely to support and legitimize hydropower, which has drawn harsh criticism from environmental groups on numerous occasions.

Fig. 3 - Grande Dixence
Film stills from Jean-Luc Godard's "Opération 'Béton'" (CH 1955) and "Film historique – J.-L. Godard" (CH 2006) combined with two photographs by Jacqueline Maurer (2015).
Processed by the author, with materials courteously provided by ACTUA FILMS SA, essencedesign SA; Jacqueline Maurer.

Three audiovisual discursive contributions, three different approaches
Jean-Luc Godard's short film "Opération 'Béton'" combines two aims: Godard's interest to produce his first film motivated by the audio-visually highly fascinating production and processing of concrete and his idea to sell his work to Grande Dixence SA to make a living and to start his film career. The young filmmaker benefitted from the knowledge of the site by his colleague Jean-Pierre Laubscher and engaged with Adrien Porchet a former war-film photographer who knew how to shoot on a complicated terrain. He recorded direct-sound, edited in a Geneva based film studio, provided an audio-comment and stressed the sublime site and undertaking by Händel's and Bach's baroque music.
Karl Sauer created "Der Traum vom grossen blauen Wasser", a critical historic documentary about an energy landscape near his hometown Einsiedeln. In his spirit of reflecting power structures and giving voice to "simple women and men," he integrated oral history accounts by victims of the Lake Sihl project, as families lost their land when they had to move away. The film is also a research project which combines historic photographs and film documents with statements from historic council meetings leading to the project. Further, it involves experts, reconstructs digitally different proposals for the project, and comments on their potential consequences for the existing landscape.
Peter Liechti's "Grimsel" was originally conceived as an expression of opposition against the expansion of the two existing dams in Hasli Valley. The middle-length film tries to trace the intuitive skepticism against such plans. Liechti's camera explores different locations in the area, combines the filmed landscapes with text, drawings, and graphs from information brochures, and accompanies a few people with different backgrounds and explicit critical opinions about the expansion project: a housewife, a sculptor, a mountain guide, and a botanist. "Grimsel" is a fascinating experimental audiovisual approach to the meeting points of the natural and technological sublime, using at times uncanny blue filters, and combining the expressive images with the realities and down-to-earth attitudes of people who would not be seen and heard otherwise.

Histories of contemporary challenges
The three collages are visual statements inspired by three important historical films that describe three of the largest dam constructions in Switzerland and how postcards and local communication concepts have been used to mediate the related energy landscapes. The selected writings and images contextualize and convey significant events and conversations in the history of the contentious development, building, and extension of storage power plants in Switzerland. This happens right within the heated contemporary societal and political debate which needs to find a compromise between landscape projection and the provision of national infrastructures for renewable energy production within the global climate and energy crisis.

Acknowledgements
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RE: Key words • works • existences

Words before and after Works

Commentary
-
James Bowman Fletcher

Abstract
As a counterpoint to the publication of "Ardeth" Issue 12, this reflective addition supplements the previous issue's theme, key words, with the support of a built-research work, "A House from Another House" (2022-2023).[1] The piece draws attention towards a potential category mistake between the occurrences of words before they are related to specific architectural works and words after they are related to specific architectural works. With a contained focus on the sequence and proximity of their occurrences, we might be able to suggest that words before and after works actually exist quite differently and give something quite different in experience for those concerned with them.

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1 – This piece and the built-research work that informed it was put together by the author following an invitation from the "Ardeth" editors.

Several things happen when words are put in relation to architectural works, as many authors do throughout "Ardeth" Issue 12. (When I say that several things happen, I am considering architects in particular.) As merely one way of following the relationship between words and works, I want to focus on the sequence and proximity of words and works to ask if this changes what is given in experience. Within this focus, I suspect that words and works can exist quite differently depending on their relative occurrences, and I want to ask if we are taking enough care in how we relate to them accordingly.

We need to do a few things before we begin. First, we need to agree that a subset of those of us concerned with the architectural project consider that there is something at stake in words, architectural works, and their relationships. Words might even be similar but distinct from the bird described below by Bruno Latour and various architects may be similar but distinct from the biologist and the ethnologist. Birds are not words, of course, and architects are not biologists or ethnologists; there is deformation required:

> It is because the bird [word] endures in its existence that another interpretation, *proper to the biologist* [*architect*] interested in the extent of this duration, can be made. In this new version, biologists [architects] add their own grain of salt to the broth—but only as long as there is a bird [word]. The ethnologist [another architect or even an engineer, perhaps] is not destroying the romantic, superficial, and superfluous poetry of the singing bird [or poetic word] by substituting for them cold facts [or other 'content']. She [the architect or engineer] is *allowed* by the poet [another user of the word] to look for what in the bird [word] *responds* when interrogated in *another* way (Latour, 2005: 231, Latour's emphasis).

Like and unlike the bird, I want to ask if there is something in the existence of words in relation to architectural works that endures to support *another interpretation* of them *proper to the architect*? Can this lead to the words responding to the architect when interrogated in *another* way? To follow these questions, I have chosen to use the three words that were the focus of Issue 12 – *beautiful*, *sustainable*, and *together* – as a starting point, expanding out to other words. There is no intention to match or test a correspondence between words and architecture or explore if an architectural work *is* words or if any words *are* architecture – I will return to this notion later. We also need to constrain our focus to make what I am drawing attention to make sense in the space available.

I want to focus on the relation between a built architectural work and words, such that there are (1) words that exist *before* they are related to (or are yet to be concerned with) specific architectural works and (2) words that exist *after* they are related to (or are yet to be concerned with) specific architectural works. The specific architectural work, "A House

from Another House" (2022-2023), and related occurrences of words have informed these notions of 1 and 2, as I will clarify. There are many implications related to claiming that there are words before (1) and words after (2) works. I do not consider that there is any simple binary division of 1 such that 1 has no proximity to an architectural work and 2 has *complete* proximity. Words can also exist before they are related to a specific architectural work, and architectural works can exist before words. Architectural works and words also exist as both one and many things; they are a momentary stability, never complete while existing in the making. For me, these notions, alongside others, do not cause too many problems in talking about 1 and 2. I hope I can start without a more extensive list of implications and the need to reconcile such a list here.

This focus on words before (1) and words after (2) works acknowledges that words and works are used, related, and situated in a context that includes their relative occurrences in time. This use-time context of words and works is related to their particularity. This is why I have chosen to demonstrate particular words, a particular architectural work, and their particular and relative sequences. There are sympathies between this and notions associated with Ludwig Wittgenstein, whose quote frames "Ardeth" #12. One example is his warning in relation to generality and his emphasis on the problems we have and had with the particular case (Wittgenstein, 2007 [1958]: 17-19). There are also some connections with others with associations to Wittgenstein's contributions, such as J. L. Austin (Austin, 1962). This piece, however, is most indebted to an ontological pluralism and radical empiricism presented by Latour (2011, 2018) through his engagements with William James, Étienne Souriau, Alfred North Whitehead, and others.

My aim here is to warn against a potential category mistake that appears when we guess at and then follow words before (1) and words after works (2). This is because, if we agree, for a moment, that 1 and 2 exist differently for those of us concerned with them, then we should also take care in demarcating them as distinct and relate to them as such, and not relate to them as though they are the same. This potential category mistake, in place of another potential category mistake, is akin to the different ontological categories emphasised in Gilbert Ryle's example of John Doe, Richard Roe, and the *Average Taxpayer*. John or Richard *can be* a *relative*, *friend*, *enemy* or *stranger* to John or Richard, while John or Richard *cannot be* a *relative*, *friend*, *enemy* or *stranger* to the *Average Taxpayer*; John can speak about and easily conceive of the *Average Taxpayer*, but he cannot come across the *Average Taxpayer* in the street like he can Richard (Ryle, 2009 [1949]: 7-8). Like John and Richard and their relations to one another and the *Average Taxpayer*, the possible relations between words before (1) and words after (2) works may be quite different, and we may not want to be caught making the mistake that they are actually similar.

Let us take the three keywords of Issue 12 (*beautiful, sustainable,* and *together*), which can exist *before* they are related to specific architectural works (1) or after (2). If we pulled these words from the *New European Bauhaus* (*NEB*) *Compass* document (New European Bauhaus, 2022), and we did not, or could not, engage with the *exemplary NEB projects*, they would be something close to what I am calling 1. If the words occurred after specific exemplary NEB projects and fulfilled the requirement of proximity, then they could be close to what I am calling 2. Depending on when the architectural works in the exemplary NEB project pages occurred, when the words were put in relation to these works, and how they were related, they are words before (1) or words after works (2). As we know, words can be severed (this would be close to 1), and new or the *same* words can be related to an architectural work after it exists (this would be close to 2). In their particular occurrences, we can quite easily conceive of words that can exist as either 1 or 2 and 1 and 2 at the same time. Throughout Issue 12, you will find examples of such occurrences, not just in relation to the three keywords. Many of the authors in Issue 12 address *beautiful*, *sustainable*, and *together* (as words) by addressing other words. It is as if following these words leads the authors on paths away from these words, although they are indebted to these words in particular. Moving beyond these three words, however, does not mean we have to take them away from their use-time context.

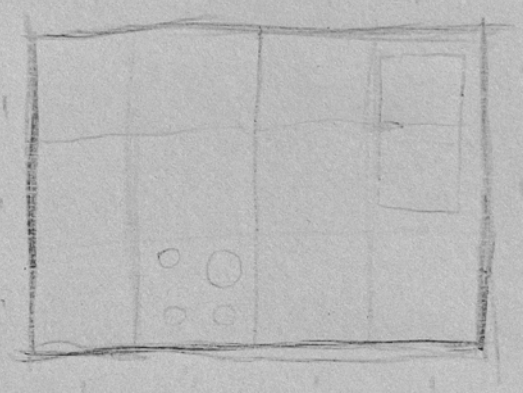
Now, take these words (Figure 1): (a) “new whole or new parts of a whole”, (b) “no room names; rooms with equipment”, and (c) “living-bench-stove-sink”. Today, these words are sitting collected within my project file for a work that is now built and occupied, “A House from Another House” (2022-2023). I have chosen to separate them according to their bullet points, not as separate words or as a subset of certain words within the bullet points. These words do not form complete sentences, and they do not follow several grammatical conventions. The first (a) is an approach of sorts, the second (b) a rule of sorts, and the third (c) seems to suggest a thing that is not made of pre-formed, pre-categorised, pre-delineated *things*. As they occur to you now, these words are close to what I have been calling 1. They are words with a distant proximity to specific architectural works. Although distant, they already oblige, inform, and associate themselves with one another, other words, and distant works; their proximity to other words and works is not zero. The words are indebted to and relate to previous words and works. They are caught up with other words and formed from innumerable associations and dependencies to exist as they do here. For me, they are not less connected or gathered merely because they are not linked or tied to a specific architectural work, as they would be if they existed as closer to 2.

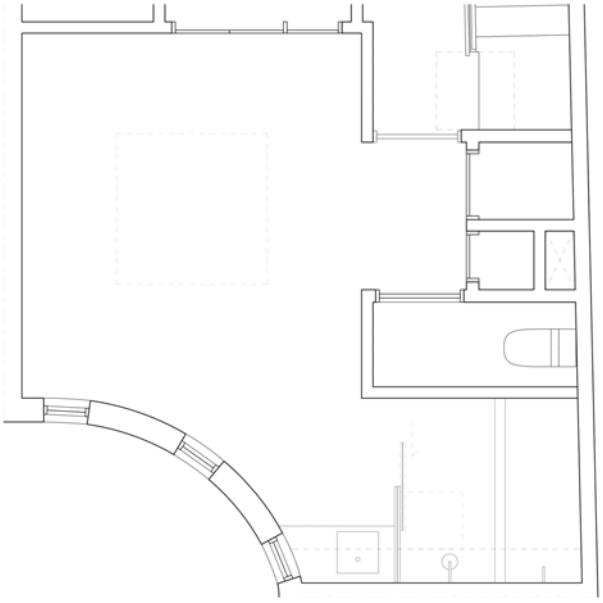
Fig. 1 - Words on loose paper in the “A House from Another House” (2022-2023) project file written by the author in approximately January or February 2022.

Fig. 2 - Pencil drawing on loose paper in the same project file drawn by the author in April 2022.

In the same project file, there is also this pencil drawing (Figure 2). Some of the words seem relevant, most explicitly “living-bench-stove-sink” (c).

- near whole or near parts of a whole
- no room names; rooms with equipment
- "living-bench-stove-sink"





The stove and sink are, in one *thing*, an *island* of sorts that is approximately 4:3 and comprised of 12 units. In this pencil drawing, there is not much implication of expression, colour, height, details, contractors, orientation, or placement, nor much implied in terms of this thing's relationship to existing and modified conditions of the house, which are also parts of the thing. Also in the file is this plan (Figure 3) of another part of the house. A room with no name has its entrance modified. An existing bathroom becomes something more like a sink, shower, and bath within the modified and reincorporated extents of the existing room now with no name. The words in Figure 1 have some proximity here, especially "no room names; rooms with equipment" (b). Looking at the photograph (Figure 4), also in the same project file, reconciling or correlating the words (Figure 1) seems difficult with our contained focus. Things seem quite different once the words-drawing thing – Figure 1, Figure 2, and Figure 3 – starts to be what it is on site. Even now, looking at Figure 1 through to Figure 4, we can grasp that there are many things with many existences, not one, or a notion of one – a building, for instance – that is yet to become that one.

This photograph (Figure 5) is more recent than Figure 1, Figure 2, Figure 3, and Figure 4, taken the day the contractor handed the keys back to the

Fig. 3 - Digital drawing in the same project file drawn by the author in May 2022.

Fig. 4 - Photograph in the same project file taken by the author in January 2023.

Fig. 5 - Photograph in the same project file taken by the author in May 2023.

owner. Like Figure 1, Figure 2, Figure 3, and Figure 4, this photograph captures only a partial aspect of the architectural work. It does, however, let us now follow 1 and 2. That sink there is equipment (b), and it is in a room not labelled or named a laundry – which is not really a laundry, despite also having a washing machine. The floor and walls shown in the frame of the photograph are not part of this architectural work; they belong to the previous architectural work but were refinished as part of this work. These *new parts* have a relationship to the previous *whole* (a) of the existing house, as much as the cupboards' grain and colour have a relationship to the framing throughout the existing house. The built work has a version of the "living-bench-stove-sink" (c) sketched in Figure 2, but it may relate to words more like "living-bench-sink and a nearby stove." However, remember, as tempting as this may be, I do not want to track the correlations between these words and this work. I want to convince us to ask ourselves quite seriously: do the words in Figure 1 *before* Figure 5 (words *before* works, or 1) and Figure 1 *after* Figure 5 (words *after* works, or 2) exist differently to us? Does 1 give something different to experience than 2? Can we already answer with something closer to yes than no?

For those for whom this still seems strange, further examples might be helpful. While some disciplines may have words that are mostly 1 or 2, architecture seems to have established portions of 1 and 2. At the risk of considering words more generally, we can say that when the words in Pierre Jeanneret's and Le Corbusier's "Five Points of Architecture" (1971 [1926]) occurred, they were and are still pretty different from those that occurred in Albena Yaneva's (2009, 2017) ethnographies. The obvious distinctions are not my point. Within our contained focus, we might say that the former is closer to 1, and the latter is closer to 2. Similarly, an off-the-plan apartment marketing description and a good building review exist differently and give something quite different to experience; the words of the former are more 1, and the words of the latter are more 2. Antonio Sant' Elia's "Manifesto of Futurist Architecture" (2006 [1914]) is also unlike Robin Evan's "Figures, Doors and Passages" (1997 [1978]). Again, the former seems closer to 1, and the latter seems closer to 2. What we can say and do with 1 and 2 is quite different. Occurrences of 1 seem to exist through an incorporated assumption that words – and their words in particular – can be linked to, connected to, related to, and be caught up with specific yet-to-be architectural works. Words before (1) do not seem to need to bring as much back to us as words after (2); this might suggest they *respond* quite differently to our interrogations. Speculation is also seemingly more at home in the occurrences of 1 and less so in the cases of 2. While there are already more agreed ways to split up or not split up words – some may say that 1 and 2 are both just instances of words or that 1 and 2 are different genres of words – I still think we need to ask if such categorisations take care of whatever is in words *proper* to the architect concerned with them.

Without being convinced of everything said about words before (1) and words after works (2), we might still agree that the notions of 1 and 2 help to raise some suspicion. After all, caring for the different existences of 1 and 2 may help us dissolve seemingly sensible but irreconcilable questions about words and works. Questions such as, I am looking for the words that *are* an architectural work; where can I find them? Or these words do not *correspond* to this work; can you find me the ones that do? Even if we merely suspect that 1 and 2 exist differently, then we should probably avoid asking questions that follow 1 and 2 as if they are the same. Even with more particular cases beyond those introduced in relation to "A House from Another House" (2022-2023), such questions *may never be able to care* for 1's and 2's different existences. Dissolving these questions is then about acknowledging the flaws in the assumption that 1 and 2 are comparable in the ways these questions imply. Therefore, 1 and 2 should not be thought of as two components or parts of one thing for us; we can relate to them as two quite different existing things that endure differently for those of us concerned with them. This could also mean that we pave the way for many more existences, as Latour hopes we can (Latour, 2011). Remember Ryle's warning that John Doe or Richard Roe should not be considered as able to bump into the *Average Taxpayer* in the street as they might with one another. Their different existences mean we should follow them distinctly and accordingly. If we do so, and if we are ontologically prepared to do so, we might shift our attention towards questions such as: how are words before works (1) and words after works (2) actually *incomparable* and *incompatible*? Such a shift might help us read "Ardeth" Issue 12 differently – as an additional difference that can add further to the contributions of the authors.

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RE: Key words • defuturo • queer • sel-vatico • discomfort • rovina

Discomfort, queer e selvatico
Discomfort, Queer, and Wild

Commentary
-
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Abstract

This article proposes a critical discourse around the notions of sustainability, beauty, and togetherness in the field of design thinking by placing them in a field defined by terms such as discomfort, queer and wild. One can, given the uncertainty of the current operating and living conditions, adopt a wild meaning, queer in the sense of a search for perverse beauty, a rejection of sustainability, situating design thinking outside its patina of objectivity, positivity, and transparency, seasoned with the omnipotence of the universal.

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ARDETH #13

She fills the room with dark blades of grass
That she couldn't revive
The plastic trees
On a winter's end
The plastic trees
On a winter's end
The plastic trees of the wasted time
On a winter's end are fading her mind (fading her mind)
The crucifix on the liquor's blue
Hits the comforting of a transparent life.
(The Comforting of a Transparent Life, Punk not diet, Giardini di Mirò, 2003)

Cosa succederebbe se ponessimo in tensione critica le nozioni di sostenibilità, bellezza e togetherness, proprie del pensiero progettuale della modernità, collocandole in un campo definito da termini quali *discomfort*, *queer* e selvatico? A nostro avviso tale mossa potrebbe *colpire* "the comforting of a transparent life" corrispondenti alla ricerca di quelle visioni acquietanti, non conflittuali, che connotano buona parte delle pratiche del progetto neoliberale contemporaneo. Ciò che perseguiamo è una diversa operatività del progetto che vada al di là della ricerca di forma di una confortevole alternativa al *disumano* o alla rivendicazione di un qualche *nuovo umanesimo* (Vernaglione Berardi, 2021). È possibile, quindi, una riflessione sul pensiero progettuale al di fuori della sua pretesa di obiettività, positività e trasparenza? La costruzione di un futuro, contro le forze che lo hanno *defuturato* sostiene Tony Fry (2020), richiede l'identificazione, la critica e la messa in discussione dell'onnipotenza dell'universale incarnato dalla triade di bellezza, sostenibilità e comunità. Occorre, piuttosto, continua Fry, abbracciare la defuturazione. Ciò significa affrontare e mettere in discussione l'autorità dei fondamenti del pensiero su cui si fondano le narrazioni oggi dominanti su *mondo*, *futuro*, *produzione* e *progresso*.
Due esperienze progettuali possono essere utili a mostrare il senso e possibilità di tale ricerca. La prima è il progetto intitolato "La strada" proposto dagli architetti polacchi Oskar e Zofia Hansen per il campo di concentramento di Auschwitz. La seconda esperienza è quella relativa alla riconversione della pista dell'aeroporto di Bonames, vicino Francoforte sul Meno, proposta dal gruppo di architetti GLT.

La Strada
Vienna, gennaio 1957: un'organizzazione internazionale di sopravvissuti ad Auschwitz, in collaborazione con l'Unione Internazionale degli Architetti, lancia un concorso per un monumento alle vittime delle politiche razziali naziste. Il progetto vincitore avrebbe dovuto essere eretto tra le rovine dei crematori del campo di sterminio di Auschwitz-Birkenau.
La proposta del team di Oskar Hansen è una strada asfaltata, larga 70 metri e lunga circa un chilometro, che taglia diagonalmente il campo

di concentramento, pietrificando tutto ciò che incontra sul suo cammino. Tutte le vestigia del campo intercettate dalla strada, le baracche, le ciminiere, i recinti di filo spinato, le latrine, la rampa ferroviaria e i forni crematori, sarebbero state lasciate consumare dagli effetti del tempo e dell'entropia.[1] Il tracciato non intercetta il cancello principale di Birkenau, attraverso il quale i treni avevano trasportato le vittime. Nessuno avrebbe mai più attraversato quel cancello. Dopo aver raggiunto i forni crematori, il tracciato termina bruscamente tra i campi e i boschi. Solo la strada doveva testimoniare l'orrore dei crimini commessi in questo luogo. Hansen pensa l'azione dell'asfalto in analogia a quella della lava a Pompei. La strada si allontana dalla vita, trasgredisce la morte e ritorna, di nuovo, ad un'altra vita. La vita e la morte si definiscono l'una attraverso l'altra. La strada è pertanto un dispositivo lineare che sostiene però un movimento a spirale. Attraverso la strada si abita la rovina, la distruzione, il fallimento. Tutto il resto del campo avrebbe dovuto essere lasciato intatto, secondo i desideri dei prigionieri, e inevitabilmente l'ex campo si sarebbe arreso all'azione corrosiva di alberi e arbusti.

La diagonale è pensata con l'obiettivo di mostrare il meccanismo spaziale e produttivo del campo ma, al contempo, qualcosa di più: l'attraversamento della forma del campo crea condizioni di partecipazione, visualizzando un sottotesto complesso di interazioni spaziali. La strada è inoltre il luogo di gesti spontanei. Se qualcuno avesse voluto lasciare un biglietto, o disegnare sul suolo la figura di un Angelo, avrebbe potuto farlo sull'asfalto. Al di fuori del tracciato lo spazio si modifica come una macchina ecologica. Già negli anni Cinquanta del Novecento vi crescevano alberi, si vedevano correre caprioli e lepri. Hansen in tal modo ha messo in discussione il concetto di monumento commemorativo come oggetto, che per lui è espressione di una *forma chiusa*. Al contrario, il progetto fu espressione della sua nozione di *forma aperta* intesa come condizione capace di dare forma allo spazio sociale, di decentrare la soggettività del progettista e di coinvolgere altri elementi nel processo di creazione spaziale, aprendo il progetto all'intervento del pubblico e del tempo.

In un primo momento vinse all'unanimità la proposta di Hansen. Ma poi furono i sopravvissuti di Auschwitz a non riuscire a identificare la loro sofferenza con un'espressione di ricordo così astratta.[2] Moore ha dovuto destreggiarsi in questo conflitto e, in una dichiarazione molto pubblicizzata dopo la sessione, ha sollevato la questione di come commemorare l'omicidio e l'orrore e se un'opera d'arte può esprimere le emozioni suscitate da Auschwitz. Hansen si dimise dalla partecipazione alle fasi successive del progetto, non essendo in grado, secondo le sue stesse parole, di sopportare la suggerita contaminazione del suo manifesto antimonumentale con l'inserimento di una scultura figurativa.

Quella di *forma aperta* è l'idea a cui Hansen dedicò tutta la sua ricerca. La nozione fu formulata compiutamente nel 1959 durante il congresso del CIAM di Otterlo, dove fu accolta con entusiasmo dai giovani architetti che avrebbero poi fondato il Team X e il Groupe d'Etude d'Architecture.

1 - Il team di progettazione, guidato da Oskar Hansen, era composto da Zofia Hansen, Jerzy Jarnuszkiewicz, Edmund Kupiecki, Julian Pałka e da Lechosław Rosiński.

2 - Un'opera concepita collegialmente da tre dei sette finalisti fu infine presentata nel 1967, dopo che le versioni precedenti erano state scartate per motivi finanziari o politici

Per Hansen, la forma aperta riguarda composizioni variabili, processi e conflitti della vita.

Aeroporto di Bonames
Bonames, parco regionale Reno-Meno: 2003. La pista di un aeroporto dell'esercito americano intitolato al generale Maurice Rose, reliquia della guerra fredda, si presenta come una "lastra contaminante nella pianura alluvionale del fiume Nidda" (Gnüchtel, 2015), posta in una zona di transizione tra la città e campagna. Con i suoi quattro ettari e mezzo di superficie asfaltata, questo luogo dai primi anni Novanta si presenta come una sorta di grande parco implicito. Dopo aver acquisito il terreno del vecchio aeroporto, il Comune di Francoforte avvia un processo di rigenerazione attraverso un investimento economico minimo volto a ridefinire caratteri materiali, ecologie e possibilità d'uso del vecchio aeroporto militare. Il gruppo GTL, incaricato del progetto, ha definito un intervento in cui metà della pavimentazione delle vecchie piste è stata demolita, frantumata e ricollocata secondo diverse granulometrie che variano dalle zolle di cemento di 10 metri quadrati fino alla ghiaia fine, creando così un'ampia gamma di condizioni di habitat, di umidità e di proliferazione di sostanze nutritive. Il progetto ha di fatto spezzato la pista in porzioni irregolari che, invece di essere rimossi, sono lasciati sul terreno e, dove prima formavano uno strato impermeabile e continuo, ora presentano una superficie piena di fessure e cavità che piante e animali stanno progressivamente colonizzando. Alcune placche di cemento sono state accatastate per formare volumi scultorei di diverse altezze, mentre le zone più contaminate sono state rimosse e sostituite da una distesa di macerie di cemento. Una striscia longitudinale è stata conservata per facilitare le passeggiate e dare il senso della lunghezza totale dell'ex aeroporto, così come alcuni padiglioni minori.
In questo progetto, la demolizione, spesso considerata come fase meramente preparatoria, diventa essa stessa azione progettuale consapevole, lasciando il processo sospeso attraverso una sottrazione ed una frammentazione che innescano una serie di processi di successione di comunità vegetali e animali, in continua evoluzione. Non c'è un'immagine guida o prefigurazione degli assetti definitivi del progetto. L'intervento, concettualmente, è ridotto a un minimo assoluto, mettendo in scena la sua stessa distruzione, perseguendo la massimizzazione dell'apertura e delle possibili conseguenze delle sue azioni, invitando a nuovi orizzonti che sperimentano l'inimmaginabile nel suo spazio reale. L'aeroporto è stato palesemente distrutto, il suo valore ridimensionato, le lastre di cemento sono state spezzate e lasciate sul posto. I detriti non sono divenuti scarti senza valore ma sono rimasti a disposizione per poter creare nuovi assemblaggi, selvatici.

Profanare i linguaggi progettuali della pacificazione e della quiete
"La Strada" di Auschiwtz e "la Pista" di Bonames corrispondono a pratiche progettuali *defuturanti*, che definiscono territori *queer*, instabili e

mutevoli, connesse ad una forma di pensiero selvatico. Entrambi, seppure in spazi e tempi distinti, lavorano con stati di incertezza sistemica, esprimendo una bellezza perversa, un rifiuto della sostenibilità e una manifesta indifferenza a valori e discorsi progettuali dominanti segnati dalla pretesa di obiettività, positività e di trasparenza. Con il termine *queerness* ci riferiamo ad un orientamento politico. Ciò che lo connota è "un risultato di strane temporalità, programmi di vita fantasiosi e pratiche economiche eccentriche" (Halberstam, 2005: 1). *Queerness* come stranezza, immaginazione ed eccentricità. La *queerness* "non può mai definire un'identità; può solo disturbarne una" (Edelman, 2004: 17). Disturbante, non confortevole, fatto di materiali e stati incerti, segnato da conflitti non composti. Un progetto *queer* è esitante nelle prefigurazioni chiare di stati e assetti futuro ma, allo stesso tempo, è capace di attraversarli.
Il progetto è solo luogo di conforto, o è ancora forma di conoscenza, oggi? Quella conoscenza che avviene attraverso il perdersi, lo spavento, e poi ritrovare, trasformati, la strada. Amitav Gosh, nel suo saggio "La grande cecità. Il cambiamento climatico e l'impensabile", scrive qualcosa di apparentemente inaccettabile: che una tigre, che una tempesta, un cataclisma, ci guardano con intenzione. Questo è per noi impensabile. Lo è anche se attribuiamo alla parola intenzione un senso non umano. Ma il selvatico, da dentro di noi, ci guarda in questo modo. Come qualcosa che è inventato da noi, in relazione a qualcosa che non lo è. Il selvatico è infinito, nel senso di sconfinato. Non ha confini, o meglio noi non li conosciamo. Le mappe riportano *hic sunt leones.* È un luogo dove non ci siamo mai addentrati, e chi vi si è addentrato non ha fatto ritorno. Lo sappiamo. È l'inquietudine che prende guardando fuori, aprendo la porta che dà sul bosco. In realtà, quei confini li conosciamo benissimo, solo non desideriamo attraversarli. Il selvatico, quindi, è sempre deciso da noi. Si crea nel momento in cui chiudiamo la porta di casa, definiamo un dentro. Più il mondo esterno diventa un *interno* in apparenza governabile, più i nostri corpi si rivelano come il ridotto irredimibile del selvatico. Come ciò che ci sfugge, ciò che non riusciamo a controllare, anche se sappiamo che controllo non è la parola, la cosa, che dovremmo fare.
C'è un libro, a metà tra saggio e narrazione, di Antonio Franchini, intitolato *Quando vi ucciderete, maestro?* (Marsilio, 1996), che parla di combattimento e letteratura, delle loro somiglianze e della loro diversità. In questo libro si parla di *ostea leukà*, di *ossa biancheggianti* e, leggendo, ci si accorge di trovarsi di fronte ad una interessante intuizione: nell'antichità, del corpo dei guerrieri greci caduti in battaglia e bruciati sulle pire, al dissolversi dei tessuti, della muscolatura, degli organi interni, sopravviveva, ancora immerso nel fuoco, solo un residuo biancheggiare d'ossa. Allo stesso modo, nell'esperienza del progetto, dissoltasi l'impalcatura della trama, del contesto o delle figure progettuali, si generano, a loro modo, altre ossa biancheggianti, microimmagini, istantanee (ma anche rumori e riflessi sensoriali). Immaginiamo la *togetherness*, l'insieme dei corpi, delle loro menti, come una comunità animale, come api che fanno

miele, come formiche intente al formicaio. Abbiamo una comunità? Risponderemmo di no. La desideriamo? Sì. Ci sono poche cose che oggi si desiderano di più di una comunità. Ci sono anche poche cose che si temono di più. Il progetto allora è come un acido organico che le tiene insieme, come un nastro di segnali che avvolge i corpi. Ma quest'immagine non tiene, si sfilaccia. Non c'è funzione dei singoli, e, fortunatamente, non c'è destino o bellezza programmata.
In questo senso, il progetto deve essere aperto, ricercare l'apertura del campo. Il progetto come strumento per porre, bene, domande.
Oggi questo tipo di pensiero attorno al progetto è minoritario, perché è in qualche misura disturbante, o forse sarebbe più giusto dire che è perturbante, *unheimlich*. Teso a trasformare ciò che è familiare in qualcosa di lontano, a volte di estraneo, rinnovando in tal modo la vista, gli occhi che posiamo sul mondo. Un progetto quindi, defuturante, che riapre ferite, cesure. La dimensione della ferita, a pensarci bene, pervade tutto il mondo a cominciare dai nostri stessi corpi. La cesura tra natura e cultura, ad esempio, è qualcosa che, in quanto occidentali, inevitabilmente, ci accompagna, a livello fisico. Questo perché attraverso la scissione tra natura e cultura abbiamo acquisito un potere enorme e allo stesso tempo una sempre maggiore vulnerabilità, e di questa vulnerabilità, lentamente, stiamo diventando, o forse la parola esatta è tornando a essere, consapevoli.
Forse pochi, ma più di quanto si pensi, sono quelli che progettano senza conforto, calandosi dentro le domande. Sono costoro una comunità? E la tentazione, il bisogno di conforto, non gli balenano mai dentro? Sì, perché sono corpi, e la risposta va data ai corpi, che sono menti, ma nella forma di una domanda. Tra conforto e non-conforto. Occorre saper entrare e uscire dalle zone di comfort. Non rimanere immobili in un luogo, con una carezza sulle spalle e la schiena, e neppure accamparsi, soltanto, là fuori, nell'oltre, e permanervi.
Tutto è aperto e più niente lo è? Di fronte alla prospettiva della fine del mondo, l'inconcepibile natura di Gosh che ci guarda con intenzione, i nostri stessi corpi diventano l'unico spazio, l'unico territorio, l'unico rifugio. Il conforto non viene più dall'esterno, dallo spazio (e quindi dal progetto) ma diventa nenia, lallazione, *reels* di Instagram curato, corpo che si abbraccia le ginocchia, rinchiuso in una stanza, che si culla da sé.
Il selvatico, sarebbe quindi l'ennesimo *Make it new* modernista?
No. Pensiero selvatico, defuturante, ovvero ripoliticizzare il sapere sullo spazio, sul suo progetto, creare pratiche di conflitto, non potendo più confidare in alcun paradigma dominante né tantomeno inventarne uno nuovo. Chi è che sa fare questo? Il *trickster*, ovvero l'imbroglione, una figura di solito rappresentata, soprattutto in campo letterario, indifferentemente come uomo, donna o animale antropomorfo. È un essere malizioso, sovversivo, che agisce in modi contraddittori. Occasionalmente come un ladro. Il suo compito è sminuire la figura dell'eroe altezzoso, ma anche di allearsi con i deboli, agendo rigorosamente nell'indifferen-

za totale alle regole. La sua peculiarità è quella di ribaltare i ruoli, di assumere e adottare le forme e i posizionamenti degli altri, anche se solo temporaneamente, al fine di rovesciare lo *status quo*. È inoltre una figura prettamente relazionale: ogni sua azione è indeterminata e attivata dall'agire di chi lo circonda. Il *trickster* produce antagonismo, abitando il margine.

Le trasformazioni del presente, dello spazio, delle ecologie, avvengono oggi ancora per il tramite dell'antagonismo? Quello che osserviamo è che la *Storia* si è sfaldata in una miriade di lotte minoritarie che fanno emergere soggettività antagoniste che, nelle concezioni universalistiche del pensiero, rimangono invisibili, impensabili (di Campli, Boano, 2022). Pensiamo all'enorme portata politica e progettuale di un movimento come *Ni una menos*, una forza che lotta per creare ambienti abitabili per quelle pratiche di vita invisibilizzate dal potere patriarcale, razzista, liberista o alle lotte delle soggettività migranti, forze d'urto di cui non si è ancora misurata la potenza trasformativa, la radicolite progettuale. Ma le soggettività femminili, migranti, indigene, animali, non sono né oggetti, né soggetti deboli da difendere. Pensiamo a queste esperienze minoritarie come forze capaci di trasformare il presente, impensabile attraverso i vecchi dualismi e paradigmi occidentali. Non perseguiamo, pertanto, l'uscita da un qualche stato di minorità ma il divenire minoritario delle soggettività e di come tale divenire genera spazio, ecologie, permette di pensare diversamente al progetto. Tale concezione dell'antagonismo è un tentativo, sempre in divenire, di costruire alternative selvatiche a questo mondo che appare inaccettabile proprio dal punto di vista del *minore* (Boano, 2020).

Detto altrimenti, forse, ciò significa fare i conti con la vuota e superficiale retorica ambientalista progressista della sostenibilità, la quale lascia che "le pratiche dei governi continuino ad operare nell'ambito di una economia della rapina e devastazione" (Villani, 2021: 16). Misurarsi con la crisi ambientale, con la supposta transizione ecologica, con le narrative *green*, sostenibili, significa pensare un progetto critico centrato su tutto ciò che queste ecologie sottendono, "ovvero l'immiserimento, la precarizzazione, i meccanismi di selezione controllo a fronte di rivolgimenti che operano sui bisogni, su generi, su corpi sempre più umiliati" (ibid). La modalità consolatoria della *sustainability* sembra ripiegare "di fronte alla generica critica dei modelli di sfruttamento che tale stato di cose hanno prodotto" (ibid).

Attraverso queste brevi note abbiamo provato ad avanzare un discorso critico attorno alle nozioni di sostenibiltà, bellezza e *togetherness* nell'ambito delle pratiche e del pensiero progettuale, collocandoli in un campo definito da termini quali discomfort, *queer* e selvatico. Così come questi tre ultimi termini non alludono a condizioni di chiarezza, di linearità e di omogeneità, questo scritto non è articolato secondo strutture e forme argomentativi tradizionali ma è pensato come scrittura aperta, interrotta, che si muove attraverso accelerazioni, rallentamenti improvvisi,

immersioni e movimenti a spirale. Questi andamenti si riflettono anche nel diverso peso che i concetti di discomfort, *queer* e selvatico esprimono e nelle diverse considerazioni che, da questi, ci è stato possibile muovere. In tal senso, i due progetti richiamati nel nostro articolo sono da intendersi come vere e proprie figure narrative, non semplici casi-studio utili a supportare argomenti o ipotesi ma, letteralmente, come operatori di una scrittura di rovina, di distruzione, di fallimento.

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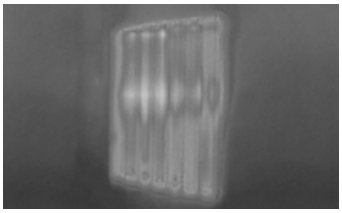
Reviews

***Power,* CIVA, Centre International de la Ville et de l'Architecture, Brussels (October 13, 2023 - March 17, 2024)**



All of this won't give us back Congo. Perched atop a hill, overlooking a reservoir supplying potable water to Brussels, the CIVA (Centre International de la Ville et de l'Architecture) has positioned itself at the forefront of architectural discourse for three years now. This shift coincided with the appointment of Nikolaus Hirsch, a renowned architect and curator, as new artistic director. Previously regarded primarily as an archive center for the contentious modern architectural archives curated by conservative architects during the fervor of the 1960s, CIVA embarked on a series of exhibitions aimed at redefining its critical stance in the lead-up to relocating from its hilltop perch to the former Citroen garage in central Brussels.

The inaugural exhibition, held over the course of 3 months in late 2021, was titled *Institution Building.* It was conceived as an evolving showcase, inviting architects worldwide to engage with the institution from various perspectives. Situated somewhere between Harald Szeeman's seminal *When Attitudes Become Form* and the iconic *This is Tomorrow* exhibition at the Whitechapel Gallery in 1956, the genesis of this initiative traces back to the temporary occupation of the abandoned Citroen garage by the CIVA team, offering a glimpse into the potential future of museums in the 21st century.

Reflecting on this evolution, it becomes evident that everything following *Institution Building* could be interpreted as a transient occupation of the institution's traditional confines. The exhibition concluded with an intervention by architect Jan de Vylder and the technical team, dismantling a circular opening between the exhibition space and the protected archives. A physical and metaphysical connection between the archives and the exhibition areas. Thus, the tone was set: CIVA will be punk or it will not be.

My own studio Traumnovelle was invited to contribute to an exhibition showcasing images from the archives. Our aim was to explore the architectural projects that emphasize the profound nexus between architecture and politics in Brussels. Sorting through thousands of images, we affixed them to the walls only to peel them away, revealing a palimpsest of concealed horrors. Initially, we contemplated removing the originals, but soon realized such a gesture was premature. At the exhibition's opening, we underscored that if we had encountered these archives before embarking on our architectural journey, we might have recoiled from the discipline. Yet, CIVA proved otherwise; its archives serve not merely as dormant repositories of horror but also as potent tools for confronting the past to shape the future.

In 2023, *Style Congo* opened to the public, prompted by a simple yet profound question: while Belgian presence in Congo is well-documented, what about the Congolese presence in Belgium? The exhibition curated by the CIVA team including Nikolaus Hirsch and Silvia Francescini, alongside studio Twenty Nine, represented by contemporary artist Sammy Baloji and researcher-curator Estelle Lecaille drew inspiration from Deborah Silverman's decade-old research highlighting the profound connections between Belgian Art Nouveau and Congo. Another cornerstone was our contribution, *Congolisation*, which unearthed from the CIVA archives Belgian pavilions from Universal, International, and Colonial Exhibitions featuring a Congolese presence. Through contributions from contemporary artists addressing similar themes, the exhibition transcended disciplinary boundaries, coalescing around the transformative potential of a transdisciplinary approach. Archives, by their nature, are not relics of the present but beacons for the future.

One of the Belgian pavilions at the 1958 exhibition, titled *Towards a More Human World*, showcased the Pavilion of Uranium, spotlighting the potential of this newfound energy source extracted from Congolese mines.

The phrase "All of this won't give us back Congo" resonates deeply in Belgium, serving as both a common expression and the title of a renowned Belgian TV show documenting reality. Embedded with Belgian irony, it underscores the futility of reclaiming lost treasures, regardless of efforts expended. Its application from a Congolese perspective adds another layer of poignancy: all endeavors, no matter how earnest, cannot restore what has been lost.

In 2023, against the backdrop of geopolitical upheavals like the Russian-Ukrainian conflict and the omnipresent specter of climate change, a striking visual installation marks the commencement of the exhibition *Power*. An infrared heating system by a TU Delft architecture studio, coupled with a live display of the building's energy consumption, made tangible the exhibition's central theme: the imperative of retrospection to comprehend the present.

The uranium that fueled the nuclear devastation of Hiroshima and Nagasaki was sourced from the Shinkolobwe mine in the DRC, reopened in 1937 to satisfy American demands for the Manhattan Project. Reciprocating this generous gift, Belgium was among the first in Europe to receive civil nuclear power technology. Architectural plans and drawings from the CIVA archive unveil the Pavilion of Uranium's layout, a centerpiece of the 1958 Universal Exhibition showcasing a piece of raw Uranium in its center. The exhibition's research team also

unearthed an alternate proposal for showcasing this Promethean energy source: a nuclear power plant along the Brussels Canal, scuttled due to objections from one particular citizen over its proximity to his abode. Laid out on a table made from an insulating panel is a letter issued by the king Albert II stating "Not in my backyard."

The exhibition delves into the broader geopolitical implications of such endeavors, shedding light on the European Economic Community's formation in 1957, juxtaposed against the colonial control exerted over member states' territories—a narrative conveniently overlooked in contemporary Europe's officia discourse. On some tables, pages of magazines showcasing the architectural potential of the other important European industry: the Steel industry, father of the Euratom project.

Navigating through the exhibition's immersive landscape, visitors encounter Claude Parent's provocative architectural renderings for a French Power Plant, challenging conventional notions of space and catastrophe. One drawing shows in the background a new concrete aesthetic of the power plant and in the foreground, people picnicking on a green lawn. Claude Parent and Paul Virilio, pioneers of the movement known as *The Function of Oblique*, championed a society capable of confronting its own turbulent history without flinching, and dancing on the slope left by modernity.

Another exploration unveils archives from the CIVA collection by Paul Duvigneaud, a figure with an enigmatic presence. Duvigneaud's work initially focused on studying Congolese lichens in the Congo, eventually establishing himself as a pioneering Belgian advocate for a systemic and ecologically informed approach to understanding the landscape of Brussels. Through his sketches, Duvigneaud prompts us to contemplate how we portray the climate. This sentiment resonates with the director and curator of CIVA, who emphasizes that climate transcends mere weather patterns. From what we once viewed as old promises, we have now ventured into the realm of new pledges with an installation crafted by the Collective On-Trade-Off. This installation delves into the extraction necessary for constructing what we perceive as the future of mobility, epitomized by a copper Tesla Car. However, this vision is intertwined with another contemporary saga: the cobalt, coltan, and lithium mines, crucial resources for a promised green future, but also the sources of fresh wounds and aspirations in the Congo Territory. Yet, despite these endeavors, none of this can give us back Congo. It appears that whenever our modern societies require a new miracle material in abundance, they conveniently *discover* it in the heart of darkness.

A supplementary segment of the exhibition focuses on lithium, featuring a discussion between researcher Marina Otero, who actively investigates lithium mines in Chile, Sammy Baloji, and two members of the Off Trade Collective. Baloji, in his intervention, chooses not to dwell on distant events, instead, he poses questions to the audience about the here and now, spurred by Belgium's refusal to publish the commissioned report on the decolonization of Belgium.

Adorning one wall is a small poster by architect Luc Schuiten for Belgium's youthful green party, portraying a wind turbine emerging from the ruins of a nuclear wind tower. Ironically, the painted turbine is intersected by a flock of jubilant birds, now known to be on the frontline of ecological disasters stemming from this new green technology.

In the main exhibition space, juxtaposed are two contrasting installations: a Dutch proposal for constructing leisure offshore wind farm islands and an installation by architect Liam Young named *The Great Endeavor*. The latter features a contemplative 3D video showcasing an offshore world dominated by machines fueling our envisioned green future, while adjacent to the entrance wall, uniforms from Shell and Halliburton serve as a stark reminder of the relentless exploitation of the planet's dwindling resources. These exhibits prompt us to ponder what lies beneath the favored images of the Anthropocene. At the heart of the main exhibition room lies *Photography* by Armin Linke, capturing ecological tragedies intertwined with global empowerment. This portrayal, ranging from aerial shots to close-ups of bureaucratic offices, challenges the aesthetici - tion of ongoing catastrophes. Reflecting on TJ Demos's essa *Against the Anthropocene*, we are urged to reject these sanitized images and acknowledge the direct human impact on a global scale, underscoring the need to confront and contest future projects as archives of impending crises. I couldn't shake the belief that the *Power* exhibition was highlighting this sense of hopelessness, while daring us to derive some enjoyment from this final show

The conclusion of *Power* unfolds with a video titled *Untitled Crude Eye* by artist Monira Al Qadrilia, offering a journey through a desolate model of a machine world, devoid of life and purpose. Only the faint whispers of factory machines persist, relentlessly producing without respite. Maybe the issue has never been power, but rather extractive productivism.

In its entirety, *Power* invites us to interrogate the consequences of spatial design critically and cautiously, recognizing that while our endeavors may shape the future, they cannot reclaim what has been lost.

All of this, indeed, will not give us back Congo.

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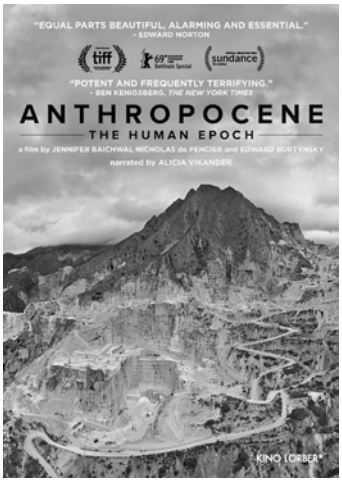
Independent researcher

Jennifer Baichwal, Edward Burtynsky, Nicholas de Pencier, *Anthropocene: The Human Epoch*, Mercury Films, 87' - 2018



The term *Anthropocene* refers to the current geological era in which human activities have significan - ly altered Earth's conditions and processes. This mutation has become more pronounced since the Industrial Revolution, leading us away from the Earth System state, typical of the Holocene Epoch that post-dates the last glaciation.

Although the Anthropocene is not currently a formally defined geological unit within the Geological Time Scale – officially we stil live in the Meghalayan age of the Holocene Epoch – many phenomena suggest an irreversible change in our relationship with the Earth. These phenomena have occurred significantly since industrialization, including: a massive increase in erosion and sediment transport; disturbances of elements such as carbon, nitrogen, phosphorus, and various metals along with new chemicals; environmental changes generated by these disturbances, such as global warming, sea level rise, ocean acidification, and the expansion of dead zones in the oceans; rapid changes in the biosphere, both on land and at sea, due to habitat loss, predation, invasions, or extinctions of animal species; the proliferation and dispersal of many new minerals and other materials, such as techno fossils produced by humans.

Science, art, and cinema are collectively contributing a diverse range of experiences and creations to help define the peculiar era in which we currently exist. Filmmakers Jennifer Baichwal, Edward Burtynsky, and Nicholas de Pencier have contributed to the debate producing the documentary *Anthropocene: The Human Epoch*, a journey across six continents to investigate the various ways in which humans are exploiting Earth's resources and altering our planet like never before. The documentary supports the theses of the Anthropocene Working Group, an interdisciplinary research group established in 2009 as part of the Subcommission on Quaternary Stratigraphy and a constituent body of the International Commission on Stratigraphy, which is attempting to demonstrate the transition to a new epoch through scientific evidence Presented in World Premiere at the Toronto International Film Festival in 2018 and included into its annual year-end TIFF's Canada's Top Ten list, the work is a prominent feature of the *Anthropocene Project*. The project encompasses exhibitions at renowned institutions such as the Art Gallery of Ontario, the National Gallery of Canada, and, among other places in Italy at MAST, in Bologna. Additionally, two books – one consisting of essays and the other of photography – have been published as part of this groundbreaking visual initiative.

Through the work of landscape photographer Edward Burtynsky, the film is conceived as a plural and impressively splendid and terrifying journey around the world through deserts, mountains, forests, and the depths of the oceans where the increasingly incisive signs of human loom: rampant deforestation, large industry, uncontrolled urbanization, indiscriminate exploitation of land and people. It shows the side effects of human dominance over 85% of the landmass not covered by glaciers, which occurs through agriculture, industrialization, urbanization, massive exploitation of fossil fuels, production of synthetic products, and nuclear testing.

The journey shows 43 places in 20 different countries: each stop represents one of the worst global environmental disasters. It begins in Kenya, where poachers kill thousands of elephants to obtain ivory. It continues to Norilsk, in Siberia, one of the most polluted cities in the world, which hosts nickel mines and other metals. The journey then takes us to the Chilean desert of Atacama, where lithium, essential for cell phone batteries, is processed. Meanwhile, in Immerath, Germany, historical architectures are demolished to expand open-pit coal mines. The documentary reveals the structure of an essay film divided into thematic chapters supporting a clear thesis. With a didactic, educational, and politically-oriented approach, it is by far both a transparent analysis and a denunciation.

The film displays a sovereign survey of the planet's overall body, focusing on its fundamental features, from the geophysical and environmental to the economic and productive, from the socio-demographic to the anthropological and cultural. The narrative unfolds through touching landscapes and struggling voices: while the linearity of the journey is held together by Oscar-winning actress Alicia Vikander's voiceover, the testimonies of the indigenous people represent the complexity and multiplicity of the disasters. The languages of storytelling are many: English, Russian, Mandarin, Cantonese, Italian, German. A global fresco

composed of testimonies that live beyond the atlas of wonders begins to take shape through fragments. The three directors of *Anthropocene* had previously worked together on the same themes. Photographer Edward Burtynsky traveled the world observing changes in landscapes due to industrial work and manufacturing to realize *Manufactured Landscapes* (2006) directed by Jennifer Baichwal. Burtynsky and Baichwal later directed the documentary *Watermark* (2013), which shows how the essential element for human existence has been used, while at the same time being wasted. Like *Anthropocene*, the narrative unfolds through a bold journey, from China to Bangladesh, from the United States to India, showing us how human action has been capable of exploiting the presence of water, but also the greed that has depleted its value to the detriment of some areas of the world. *Anthropocene* is the latest work by Burtynsky and Baichwal together with Nicholas de Pencier, previously producer, representing the completion of the trilogy of documentaries, devoted to the impact of human activities on our planet.

Laying within the fragile intersection of art and science, the trilogy shows how humans have marked territories with strong inequalities: the advantage of one area has always led to the impoverishment and condemnation of a second one. As the final chapter, *Anthropocene* seems like a dystopian feature about the dark side of prosperity, started from consumerism and the reckless consumption of Earth's resources. The film serves as a stark reminder of the urgent need to acknowledge and address the destructive forces at play in our quest for dominance.

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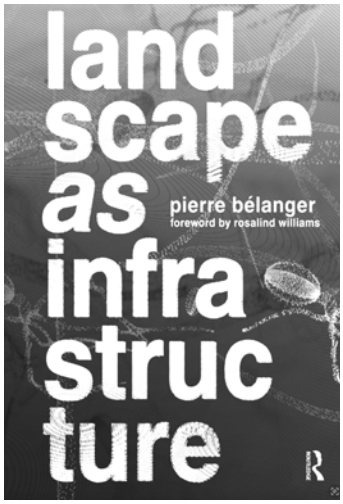
Pierre Bélanger, *Landscape as Infrastructure: A Base Primer*, Routledge, 2017, 508 pp. Paperback: € 63,50 - ISBN 9781138643925
Jeffrey S. Nesbit, Charles Waldheim, *Technical Lands: A Critical Primer*, Jovis, 2023, 252 pp. Paperback: € 32,00 - ISBN 9783868597042



How do infrastructures and technicalities articulate (and perhaps confuse) our conventional understanding of land(scape)? How do they act as a reframing of nature, through culture, value and capital? What implications does this hold in a so-called regime of modernity? According to the planetary urbanization hypothesis, geographical spaces have become so interconnected that nature has transformed into what Jason Moore defines as "cheap nature" through power dynamics, wealth distribution, and labor. Hence, making its way is a "capitalism in nature" indicating that nature is now intricately woven into the economic circuits of capital. Right after Modernism, some scholars acknowledge this epistemic shift by recognizing the value of nature as an object of design and so nature becomes landscape and urban design recognizes landscape through the discipline of "landscape urbanism." Especially following a post-structuralist perspective, there have been attempts to discuss these positions looking progressively at nature as a device.

Landscape as Infrastructure: A Base Primer, curated by Pierre Bélanger in 2017 and *Technical Lands: A Critical Primer*, edited by Jeffrey S. Nesbit and Charles Waldheim in 2023 present themselves as two examples of this reconceptualization. While *Landscape as Infrastructure* stands among the earliest works in the tradition of Landscape Urbanism, arguably acting as one of its manifestos, *Technical Lands* seeks to deliver a critical re-reading of the idea, encouraging dialogue with more recent literatures and presenting some forms of what have been defined as operational landscapes. This connection between the two volumes is reflected in their subtitles, which strongly suggest, despite an obvious six-year gap, a discernible continuity, if not an enhancement of the theory. Together, they reach the intent to grasp the metabolic interactions within the dynamics of a planetary urbanization.

Landscape as Infrastructure dismantles any romanticized view of the landscape: it should not be looked at as a setting, instead being reduced to nothing more than infrastructure. As a collection of essays spanning more than a decade, this

volume brings together ten texts exploring how the emergence of ecology and the revival of geography are radically reconfiguring the understanding and shaping of environments, unfolding the visible systems, invisible processes, and indivisible scales constituting the infrastructure that supports contemporary urban life. Keeping practitioners, policymakers, students, and educators as its audience, the book reinterprets the infrastructural turn in urban studies as an operative tool for design. Highlighting the need to break free from conventional limitations, its approach emphasizes an usage of landscape natural connections with ecology, engineering and geography. This transformative approach requires a complete review of large-scale planning and a new view of the fine surfaces, promoting both a reshaping of existing urban infrastructures and the installation of new ones. The starting point is a discussion about some of the 400,000 sites listed in the report *Recycling America's Land* (USCM 2006) – airports, harbors, roads, sewers, bridges, embankments, dams, energy corridors, terminals and treatment plants – all of them in a state of advanced decay due to lack of maintenance, a legacy of the modern industry, ultimately resulting as "failures and accidents instead of a proper design." (p. 211) For instance, the challenges faced by a landfill site in Niagara Falls, New York, and a landfill demolition site in Toronto, Ontario, shed light on the imperative to incorporate water management, waste, food, transport, and energy considerations when planning the operations. Any design of food production and energy networks then would necessitate an interpretation of the interconnected flow of waste streams and the cycle of raw material input. It is a shift in perspective, requiring landfills, farms, fishing and storage areas, as well as sorting facilities, to be conceived with their interdependencies in mind. Likewise, motorway networks, sewerage systems, and subdivisions demand an integrated design that acknowledges their environmental impact. Exploring the underlying nature of infrastructure as an invisible instrument of state power, the texts offer a perspective on the role of central powers for growth and development at different levels of understanding. The analysis of the ecological processes underlying such transformations opens up a reinterpretation of territorial powers and, in some contexts, suggests resistances to countervailing dominant forces. Overall, the volume proposes new perspectives on state and citizenship through lighter approaches in terms of engineering and planning, as well as more flexible infrastructures. In this context, landscape emerges not only as a model of thought, but also as a means of intervention, where the existing political entity can undergo a transformation through an emerging ecological one.

In Belanger's perspective, ecology reveals itself as a "constructed ground" (p. 226) built upon the interaction of hydrology, geology, biomass, and climate. Here, the importance of water and river basins emerges as a structuring system, guiding the trajectory of the built landscape. This perspective transforms the project into a telescopic process, capable of assimilating different time scales of intervention Within this telescopic view, design extends at different layers, becoming an infrastructural orchestration of surface systems, material volumes, logistics implementation: this concurs into a reorganization of territories that transcend man made borders as well as the evolution of soil transformations, the identification of synergies between different land uses and the recognition of mutual influences between different agencies.

By embracing this global approach, the project transcends traditional notions of temporal and spatial constraints, becoming a dynamic and responsive intervention that navigates through the complexities of built ecology. This perspective aligns with the evolving paradigms in landscape design, moving away from static and aesthetic representations to embrace the multifaceted dimensions of performative effects, thus reshaping the discourse on landscape planning and design. The form of design here proposed steers clearly of historical emphasis on over-engineering and over-design, offering alternative directions without excessive reliance on intensive practices.

On the other hand, landscape is often perceived as everything except for roads and buildings, a conceptualization that played a significant role in shaping the definition of "urban," which is getting more and more blurry, both in concept and in execution. The expansion of the urban scale dissolves the boundaries between city and countryside, meshing their distinctions as external areas adopt an urban character. Landscape is hence "operational," acting in the construction of vast urban transnational territories that aim to serve the "urban." As such, landscapes become sites of extraction, extensive agriculture and ancillary infrastructures that connect these systems to the city: it is not the urban that inhabits the landscape, but the landscape that gravitates around the urban. These are the focus of Technical Lands, a concept that the book seeks to explore according to various perspectives, including economic, cultural, legal, and aesthetic ones. The underlying idea is to challenge the common perception that these areas are peripheral to urban studies, though often perceived as distant or marginal in relation to what might be defined as "the urban," are not necessarily wild or remote places, at least not anymore. Indeed, they install an intertwining relationship with cities that feeds on co-production and codependency.

To do so, it is necessary – as Peter Galison explains in the first chapter – to go back to the shift from Newtonian physics to relativity: while Newton affirmed that space an

time make up the fixed stage upon which the events of the perceivable world take place on, Einstein proposed an alternative with the theory of relativity, which states that space and time are not fixed coordinates. Following this parallelism, we could easily argue that land is not a fixed stage upon which we act, instead being relative to human activities and needs, as continuously demonstrated by recurrent events such as desertification and deglaciation, historically driven by human actions which mine the fragile equilibrium of the Earth.
The technical lands are also the result of jurisdictional action, a theorization of places where global practices of knowledge and aesthetics converge to concretely transform the physical geography of the territory. These landscapes indicate a variety of sites with special legal status, especially in relation to the non-human world. They show a diverse nomenclature and include exclusion sites, administration, regulation, demilitarized zones, space bases, and sites of extractive industries and military bases, to name but a few.
A prime example of this is the Waste Isolation Pilot Plant (WIPP), located approximately thirty miles northeast of Carlsbad, New Mexico. Purposefully crafted, WIPP serves as the ultimate repository for nuclear weapons industry byproducts, housing materials tainted with plutonium and transuranic elements. Its core role is to safely contain and isolate radioactive waste until it ceases to be a threat. Beyond technical intricacies, understanding WIPP requires navigating a complex legal landscape made out of regulations that govern its every aspect. Moreover, lands become technical even through the complex mechanism of systems that allow their exploration, visualization and comprehension, such as GIS (Geographical Information System) or remote sensing and satellite views. *Technical lands*, epitomized by sites like WIPP, the 1848 Union Stockyards in Chicago, the Detention Prison-Building built in the Abandoned Mine Lands of Appalachia, and all these operations exert a transient influence on their environs. Outflows, smokestacks, and buried materials undergo transformations affecting soil, groundw - ter, and wetlands. These radioactive domains instigate environmental changes necessitating extended chronologies, often surpassing the scale of a single human lifetime. What all these examples bring to light – just like all the other parts of the book – is how areas designated as human exclusion zones emerge as sanctuaries for the non-human, ushering in a new classification of lands: and that absence is even more present in the pictures here collected where every form of life appears even by mistake.
The reflections presented in both volumes converge towards a functional definition: as the scope of infrastructure expands from local to state, from national to international, they emerge increasingly as technicalities. A kind of extension of influence is projected onto the planet, outlining the *anthropocene* as the recognition of our transforming of the sea, the atmosphere and the earth into technical entities, lines and infrastructure, with increasingly obvious consequences. Treating nature as an object means a transition from its ornamental role to an active one, where it functions as a contributing device to human life, parallel to artificial constructs. Infrastructures have entered current urban planning discourse as a strategy that supports territory's progress towards achieving environmental conservation, sustainable development and urban resilience. These kinds of infrastructures are not merely understood as machines of supply and transmission but as elements made of folds, temporalities, ecologies characterized by inherent fragilities, dispositifs which act through a different set of action

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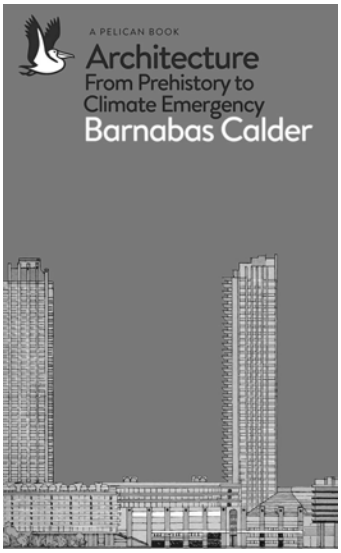
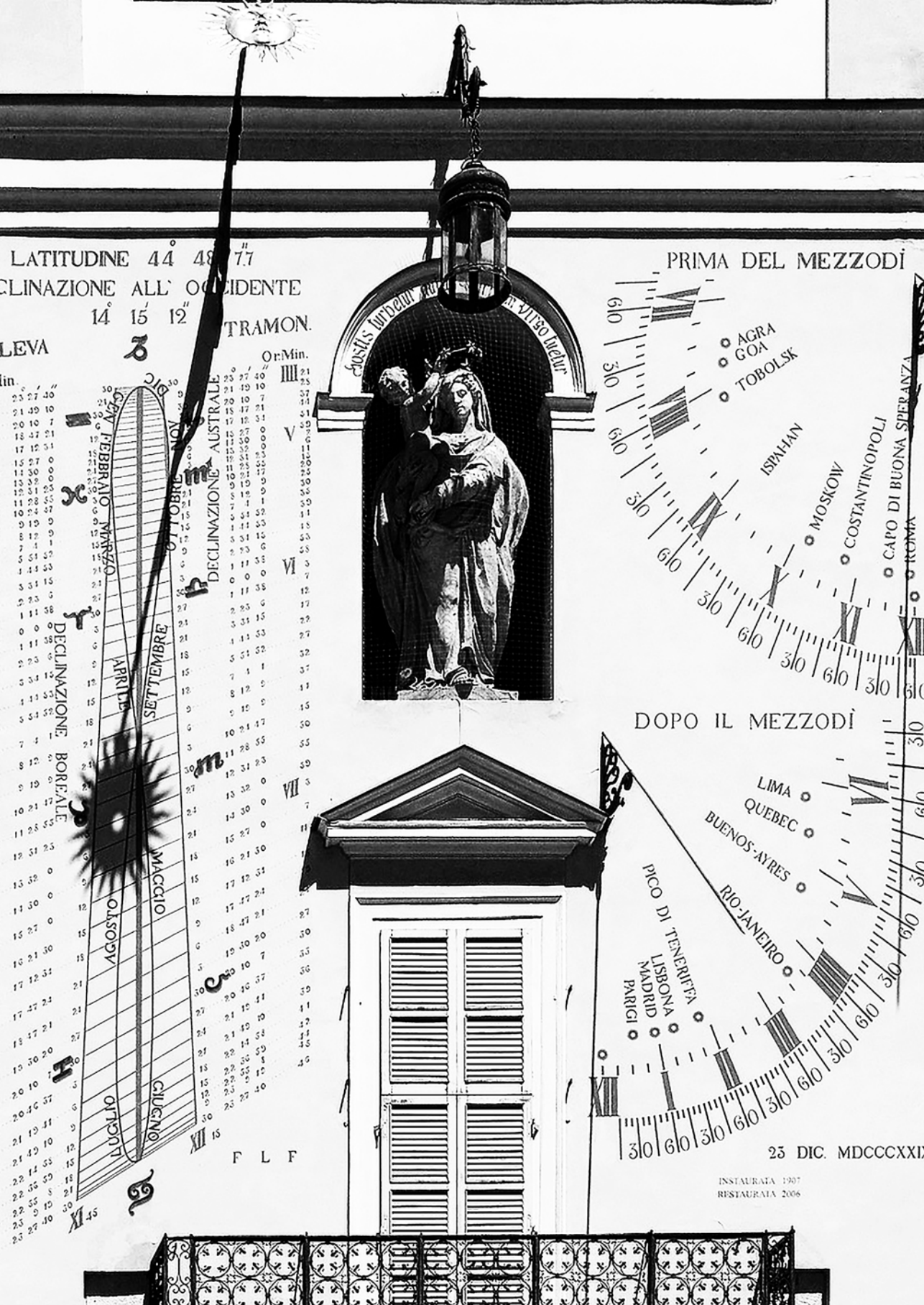
Barnabas Calder, *Architecture. From Prehistory to Climate Emergency*. Penguin, 2021, 547 pp. Paperback: € 18,52 - ISBN 9780141978208



Architecture. From Prehistory to Climate Emergency by Barnabas Calder begins with an insightful observation, namely that "the construction and running of buildings are currently responsible for 39% of all human greenhouse gas emission." (p. XI)
This sentence works both as a *memento* and as a *leitmotiv* of a text whose alternative title could be: *Architecture Reduced Under the General Concept of Energy*.
The underlying intentions of the author are highlighted immediately, in an introduction that admits the will to instill a different thought about why we create buildings and give consistency to our urban projects. In the first chapter the author's tone expresses a certain concern for the future, which becomes more enthusiastic and optimistic in the last part of the book: here, he tries to raise a sense of responsibility within the building sector that frequently does not do enough to move towards

sustainable energy consumption.
The book is divided into two sections. Part One investigates the events between two fundamental energy turning points: that of the Agricultural (or Neolithic) Revolution which occurred around twelve thousand years ago in the lands of the Fertile Crescent, and that of coal during the European seventeenth century. Afterward, Part Two moves from "the march of bricks and mortar" (p. 197) in eighteenth-century Georgian London to today's Chinese megalopolis. Unlike the first one, almost all of the themes of the second section concern Europe and North America, as they were the first regions of the globe to be i - dustrialized: "Their architectural response to fossil fuels was often the earliest and was frequently, thanks to the economic and colonial power that accompanied it, influential on other parts of the world." (p. XXIII)
The central focus of the discourse is *energy*. In particular, Calder concentrates on the concept of embodied energy, that is, the total amount of consumption necessary for something to be produced, processed and put into service. Embodied energy is such because it is effectively hidden from our sensible experience. It is the perishable trace of history *par excellence*. Calder could be considered one of the first to attempt a narrative of architectural events starting from what can no longer be seen: the energy that has been made necessary to build them and make them work. Nowadays, this effort functions as a fundamental integration to the other various historical narratives already present.
Here, from the times of Uruk (3.500-3.000 b.C.) to those of the European seventeenth century (the so-called "agrarian millennia" of Part One) humanity tried to transform the context to maximize the quantity of useful energy that it managed to obtain from cultivated fields and from the woods, as well as from waters and winds. During this era, the amount of soil for energy production was a direct contender to that necessary for food supply: fate and the prudent use of these resources periodically led a group to prosper significantly, "but every boom was followed by decline or bust, as the remorseless cycles of crop fertility and changing climate imposed scarcity and instability." (p. 193) If the energy required to construct buildings was expensive and difficult to implement, the amoun required during their life cycle was minimal. With the large-scale introduction of fossil fuels like coal, oil and natural gas, the price of materials and construction sites collapsed, but the related energy consumption grew exponentially, reaching today's peaks also caused by the fact that in the meantime the world population has increased tenfold. Following this reasoning the main concept of the book emerges: "The wonderful buildings of Modernism were the very antithesis of everything that sustainable architecture needs to become: they gloried in profligate heating, cooling, ventilation and lighting systems, in [...] energy-hungry materials, in car-based cities." (p. 446) In short, it was a season of incredible fossil-derived energy surplus that has contributed crucially to the ecological crisis that we are called to face nowadays – and which we can no longer indulge in.
In further analysis, Calder assumes a sort of cross-eyed posture: while one eye retraces the fundamental stages of the history of architecture in an exhaustive, all-encompassing and not purely Eurocentric manner, the other one remains fixed and sensitive to our present world, within which the energy theme is decisive and fundamental. Any projection of ours, going forward or backward, cannot ignore the situation in which we are immersed and living. So, having that every historical narrative is as if it (also) speaks to us in the present tense, *Architecture. From Prehistory to Climate Emergency*, ultimately, could and should be considered as a possible meta-design tool for the contemporary project. In doing so, what is referred to throughout the text is not something constrained in itself, the architecture as a substance, but rather a relationship between architecture and energy. From this, the work has to be considered very meaningful for two main reasons. Firstly, for being destabilizing and overturning compared to the most widespread historical narratives: in fact, the energetic point of view allows us to see a further face of the potentially infinite polyhedron of the history of architecture. Secondly, it is so because it takes inspiration from present energy issues, which have a crucial role in today's discussion around the ecological-environmental problem. These expedients offer new and valid ideas and references for the present and the near future project: this is why "as architects and technicians come to consider the great energy change that faces us all – decarbonizing our built environment –, architectural history needs to lead the discussion." (p. 445)
All this, finally, also to go behind and beyond the forms of architecture and to reformulate the modernist belief of "form follows function", expressed firstly by Louis Sullivan and later became a popular mantra, replacing it with a more updated (and maybe sincere): "form follows fuel." (p. 291)

Tommaso Antiga
Università degli Studi di Trieste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November 25, 2024 / 25 novembre 2024

Ardeth #14

TIME
TEMPO

Pavel Kuznetsov, Manuela Raitano
Theme Editors / Curatori

In the realm of hard sciences, time is seen as moving forward towards the future, providing a framework for navigating the entropy and disorder of systems. Time is seen subjectively in the humanities, as Bergson describes it in terms of recursive cycles exposed via sentient experience. From both angles, humanity is inevitably susceptible to time; either they die from entropic dispersion or depersonalizing repetition. Much like science, myth reminds us that time ultimately devours life. But it also points to a possible escape: though Cronus eats his offspring, except for the youngest one, Zeus, who is saved by a stratagem "devised" by his mother Rhea – that is, replacing the baby with a stone. The image of the father suppressing the next generation is then replaced by the myth of the future emerging from the past, when all children are regurgitated by means of another of Zeus' tricks. Thus, the myth implies that intellect (the trick) and intellectual works (the stones) can transcend time: if human beings cannot endure their extreme transience, they can endure the lesser transience of their "constructions" in time.

Born to last either physically or as collective memory, the very essence of architecture engages in a (titanic) survival endeavour. Yet, in an era anchored to the myths of perennial youth, shall we also allow the right to be forgotten? Where is the right to mutation and to decay until the appearance of ruin, a sign of an eternal past, that Augé defines as "pure time"? Starting from these assumptions, the issue of "Ardeth" on Time seeks reflections on the implications that the notion of time generates on architecture, caught between an idea of immortality on the one hand and its material corruptibility on the other.
This call intends to explore the different critical stances that the project (of architecture, restoration, landscape) takes when it interacts in the present on objects that come to us from the past or aspires to confront the future. This thematic issue thus proposes three blocks of questions: the first concerns the ambiguous boundary between historical time and present time; the second considers the project as an inter-temporal practice between short and long duration; the third, finally, looks at how, through the architectural project, we think about the future.

The project between historical time and the present time
The museum is an institution and the architectural place responsible for institutionalising time. In architecture, historic houses, or "house-museums", combine the material shell with historical content, making the container and the content coincide. Even ancient cities often present themselves as enormous "house-museums" to some extent. Ancient cities serve as "showcases" of tangible and intangible heritage. However, must a significant gap exist between past and present for an architecture, place, or landscape to be accredited as heritage?
The case of Ville Savoye, which became a national monument when its architect was still alive, reminds us that the present often has the strength to impose itself on the collective consciousness.
Is an extended notion of heritage possible, capable of considering the present as *memorable*? We certainly cannot forget how contemporary values, expressed today, struggle to assert themselves as ancient values do. The recognition of the present as a historical time concerns the question of value judgement, as Alois Riegl stated at the very beginning of the last century. However, there are significant differences, on which "Ardeth" invites reflection, among cultures and specialised practitioners, linked to the notions of *authenticity* and *reproducibility*. If, with emphasis on the first concept, the ostentation of the patina from ancient times on the bare matter runs the risks of aestheticising the past, the latter one potentially generates old "brand new" monuments.
How far should the project intervene in existing contexts without resulting in embellishment? Expanding on the two notions of authenticity and reproducibility, the way the project unfolds may emphasise specific periods over others.

Is that power of perpetuating pre-existing narratives or prioritising a specific time frame a dimension of the "power of the project" worth further investigation? Also, should the project always conform to praising the oldest vestiges?

The project between short and long term

The project is a deferred and inter-temporal procedural practice driven by textual and relational dynamics. It unfolds in the present, integrating concepts and contextual data from the past, focusing on the future.
With this premise in mind, "Ardeth" raises the following questions: how can the project reconcile the short time of intuition with the lengthy process duration required to complete the work?
Can the future be incorporated into the project, planning the entire life cycle of a work or a landscape to arrange architectural modifications over time? Could we consider, within the ecological realm of construction, the idea of designing ruins, as depicted in Joseph Gandy's images of Sir John Soane's Bank of England? Alternatively, must we acknowledge that the "life of forms," as described by Focillon, is inherently unpredictable in the long term, akin to any living organism?
Furthermore, fashion stands in contrast to architecture's inclination for longevity. Simmel indeed defined *fashion* as antithetical to teleology. How does fashion influence architectural styles, museum displays, and the preservation of history? How is duration manifested in temporary installations or projects geared towards temporary uses?
The concept of cyclical time has frequently been integrated into architecture. Examples include sundials, the rotating volumes inside the Tatlin Tower, the rotating studios in Sacripanti's project for the expansion of the Italian Parliament, and the circular movement of Villa Girasole by Angelo Invernizzi near Verona. Are these simply uncommon experiments, or can these projects still function as devices capable of representing time?

Thinking about the future through the project

The entire epistemology of the Modern Movement reflects a deep-rooted belief in the "magnificent and progressive destiny" of humanity, with the Corbusian *main ouverte* is the powerful symbol of the optimism of modern architecture, serving as a powerful symbol of the optimism of modern architecture. In contrast, contemporary architects operate in an era of rapid scientific and technological advances. Paradoxically, they seem somewhat uncertain about progress, if not openly hostile to it.
To describe this condition, Bauman coined the term "Retrotopia:" forced to confront a future that seems out of reach, the Angel of History is driven by the wind toward the past, which becomes an obsession.
In light of this, "Ardeth" raises the question: how is the idea of the future manifested in architectural and landscape design during this challenging time?
In short, can there still be room for the avant-garde project in our weak time? In other words, how can we think about progress in architecture

beyond the obvious implementation of component and material technology? Is it possible, for example, to overcome the idea of architecture as a static form through adaptability?
Adaptability concerns flexibility of use and the concept, codified by Jullien, of "availability" to changes. Adaptability introduces the fourth dimension of time into architecture, in addition to the three spatial coordinates. Adaptability, then, brings new possibilities for responding to users' needs, such as temporary occupants and non-conventional uses. In the project, will this require assuming a "specific neutrality" posture, as suggested by Atelier Kempe Till in the *Manifesto for New Collective Housing*?

Nel dominio delle scienze dure il tempo appare orientato verso il futuro e correlato all'entropia e al disordine dei sistemi; nelle scienze umane prevale invece l'idea di un tempo soggettivo, descritto da Bergson in termini di cicli ricorsivi percepibili attraverso l'esperienza senziente. Sono, entrambi, paradigmi che condannano l'uomo a soggiacere alle leggi del tempo, destinato a perdersi nella dispersione entropica, da un lato, o nella ripetizione spersonalizzante, dall'altro.
Come le scienze dure, anche il mito ci ricorda che il tempo divora la vita. Ma ci indica anche una possibile via di fuga: Crono, infatti, mangia la sua prole, ma il figlio più giovane, Zeus, si salva grazie a uno stratagemma "progettato" dalla madre Rea, che sostituisce ai bambini delle pietre. L'immagine del padre che sopprime la generazione successiva viene poi cancellata dal mito del futuro che emerge dal passato, quando tutti i figli vengono infine rigurgitati, grazie a un altro dei trucchi ideato da Zeus. Per questa via, il mito ci suggerisce che l'intelletto (lo stratagemma) e le opere intellettuali (le pietre) possono trascendere il tempo. Se dunque gli esseri umani non possono resistere all'estrema transitorietà della loro natura, possono però sopportare la minore transitorietà delle loro "costruzioni" nel corso del tempo.
Nata dunque per durare nel futuro, tanto fisicamente quanto nella memoria collettiva, l'architettura appare impegnata, per sua stessa natura, in uno sforzo (titanico, appunto) di sopravvivenza. Purtuttavia, in un'epoca ancorata a miti di perenne giovinezza, possiamo anche concederle il diritto all'oblio? O meglio, il diritto alla mutazione, al decadimento, fino all'apparizione della rovina, espressione di un passato reso eterno, che Augé definisce "tempo puro".
A partire da queste premesse, questo numero di "Ardeth" ambisce a riflettere sulle profonde implicazioni che la nozione di tempo produce sull'architettura, sospesa tra la tensione all'immortalità da un lato e, dall'altro, la sua reale corruttibilità.
Questa call intende dunque esplorare le differenti posture critiche che assume il progetto (di architettura, di restauro, di paesaggio) quando in-

teragisce nel presente sulle cose che ci provengono dal passato o quando aspira a confrontarsi con il tempo futuro.
A tal fine, questo numero tematico proporrà tre blocchi di questioni: il primo riguarderà l'ambiguo confine tra tempo storico e tempo presente; il secondo guarderà al progetto come pratica inter-temporale, in bilico tra breve e lunga durata; il terzo guarderà infine al modo in cui, attraverso il progetto di architettura, pensiamo al futuro.

Il progetto tra tempo storico e tempo presente
Il museo è un'istituzione, ma è anche il luogo architettonico deputato all'istituzionalizzazione del tempo. In architettura le dimore storiche, o "case-museo", combinando l'involucro materiale con il soggetto rappresentato, fanno coincidere contenitore e contenuto. Salendo di scala, anche le città antiche, sovente, propongono sé stesse come gigantesche "case-museo". Per questa via, si trasformano in luoghi di "messa in mostra" del patrimonio, materiale e immateriale. Ma deve esistere un divario temporale significativo perché un'opera, un luogo, o un paesaggio, siano accreditati come beni patrimoniali?
Il caso di Villa Savoye, divenuta monumento nazionale quando il suo architetto era ancora in vita, ci ricorda che non di rado il tempo presente ha la forza di imporsi nella coscienza collettiva.
È dunque possibile una nozione estesa di patrimonio che consideri il presente come risorsa "memorabile"? Di certo non possiamo dimenticare come i valori contemporanei, espressi nell'attualità, abbiano difficoltà ad imporsi alla pari dei valori di antichità. Il riconoscimento del presente come tempo storico concerne pertanto la questione del giudizio di valore, codificata da Alois Riegl all'inizio del secolo scorso. Esistono tuttavia differenze significative, sulle quali "Ardeth" invita a interrogarsi, tra culture legate all'idea di "autenticità" della materia e culture legate all'idea di "riproducibilità". Se, ponendo l'accento sul primo concetto, l'ostentazione della patina della nuda pietra rischia di estetizzare il passato, nel secondo caso avremo però monumenti antichi "nuovi di zecca".
Fino a che punto potrà dunque spingersi il progetto, quando interviene sul preesistente, per non divenire cosmesi? Dovrà raccontare tutti i layer temporali o potrà enfatizzare determinati periodi rispetto ad altri?
La capacità di perpetuare tutte le narrazioni preesistenti o di privilegiarne solo alcune è una dimensione del "potere del progetto" che merita di essere approfondita? E si potrà non considerare preferibile, fra le altre, la narrazione più lontana nel tempo?

Il progetto tra breve e lunga durata
Il progetto è una pratica processuale differita e inter-temporale, animata da dinamiche testuali e relazionali, che si svolge nel presente, incorpora nozioni e dati contestuali prodotti nel passato, ma è rivolta al futuro.
A partire da questo assunto, "Ardeth" solleva le seguenti questioni: come

può, il progetto, porre in equilibrio la breve durata dell'intuizione e la lunga durata del processo che porterà all'opera realizzata?
È possibile incorporare il futuro nel progetto, pianificando le modificazioni di un'architettura nel tempo, programmando il ciclo di vita di un'opera o di un paesaggio? Portando all'estremo questo ragionamento, che ha a che fare con la sfera ecologica del costruire, potremmo addirittura riconsiderare, come nelle raffigurazioni di Joseph Gandy della Bank of England di sir John Soane, di progettare lo stato di rovina? O bisognerà accettare che la "vita delle forme", come descritta da Focillon, nel lungo periodo ricadrà nel regno dell'imprevedibile, com'è per qualsiasi organismo vivente?
Su un altro piano, anche le mode confliggono con la naturale tensione dell'architettura ad ambire alla lunga durata. Simmel le definì, infatti, come costrutti estranei a ogni forma di teleologia. In che modo esse producono un impatto sui linguaggi architettonici, sulla museografia e sul modo di presentare la memoria del passato? E ancora, in che modo il tema della durata viene inteso nell'opera di architettura allestitiva, per sua natura caduca, o nei progetti che prevedono usi temporanei?
Bisogna infine ricordare che la rappresentazione del tempo ciclico è stata spesso incorporata nell'architettura: ne sono esempio gli orologi solari, o la rotazione dei volumi all'interno della torre Tatlin, o gli studioli rotanti nel progetto di ampliamento della Camera dei Deputati di Sacripanti, o ancora il movimento circolare della Villa Girasole di Angelo Invernizzi, in provincia di Verona.
Si tratta di sperimentazioni bizzarre, figlie di un'altra epoca, o può ancora oggi, il progetto, farsi congegno e strumento di rappresentazione del tempo?

Pensare il futuro attraverso il progetto
L'intera epistemologia del Movimento Moderno esprime una radicata fede nelle "magnifiche sorti e progressive", di cui è *summa* la *main ouverte* corbusiana, simbolo potente dell'ottimismo dell'architettura moderna. All'opposto, gli architetti contemporanei operano in un'epoca dominata da rapidissimi avanzamenti scientifici e tecnologici, ma paradossalmente poco confidente nel progresso, se non apertamente ostile ad esso.
Per descrivere tale condizione Bauman ha coniato la definizione di "Retrotopia": costretto a guardare un futuro che non può raggiungere, l'angelo della Storia è sospinto dal vento verso un passato dal quale è ossessionato.
La questione che "Ardeth" pone è, quindi: come si incarna l'idea di futuro, in questo presente problematico, nel progetto di architettura e di paesaggio?
Può, in sintesi, esistere ancora uno spazio per il progetto di avanguardia, in un tempo debole come questo che viviamo? In altre parole, come possiamo concepire il progresso in architettura, al di là dell'ovvia implemen-

tazione della tecnologia dei componenti e dei materiali? È, per esempio, possibile superare l'idea di architettura come forma statica, attraverso la riflessione sull'adattabilità?
L'adattabilità non ha a che fare solo con la flessibilità d'uso, ma anche con una nozione che Jullien definisce "disponibilità" al cambiamento. Oltre alle tre coordinate spaziali, l'adattabilità introduce nell'architettura la quarta coordinata temporale e include nuove possibilità per soddisfare le mutevoli esigenze degli utenti (occupanti temporanei, nuclei familiari atipici, usi non convenzionali ecc.). Si tratterà forse di assumere, nel progetto, una postura di "neutralità specifica", come Atelier Kempe Till sostiene nel *Manifesto for new collective housing*?

Submission guidelines
http://www.ardeth.eu/wp-content/uploads/2023/10/submission-guidelines_Oct-2023.pdf

About the guest editors
Pavel Kuznetsov (1971), museologist and curator, since 2022 lecturer on Soviet avant-garde in Accademia di Architettura (Mendrisio, Switzerland). Deputy director of Schusev State Museum of Architecture, Moscow (2010-2022), director of the State Melnikovs Museum (2014-2022). Author of the book *The Melnikov House: Icon of the Avant-Garde, Family Home*, Architecture Museum (Berlin, 2017, 2021). Curator of the exhibitions: *Melnikov / Le Corbusier: rencontre à la villa Savoye* (2017, France), *Melnikoff* (2022, Moscow), *Melnikov: Architect of the Impossible* (2023, Mendrisio).

Manuela Raitano (1968), associate professor at DiAP, Department of Architecture and Project, Sapienza University of Rome, since 2015 is professor in the Master Degree in Architecture (Conservation) and since 2012 is member of the board of Ph.D. in Architecture and Construction. Among others, she published the books *Dentro e fuori la crisi. Percorsi di architettura italiana del secondo Novecento* (2012, Librìa) and *La città storica un tempo era nuova* (2020, Letteraventidue); she also edited, with P. Posocco, a book entitled *La seconda vita degli edifici* (2016, Quodlibet).


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Call

deadline / scadenza
November 25, 2024 / 25 novembre 2024

Ardeth #15

FRAGILITY. Building in a Broken World

FRAGILITÀ. Costruire in un mondo guasto

Stine Dalager Nielsen, Mette Ramsgaard Thomsen
Theme Editors / Curatrici

"It is about the feeling of holding something immensely valuable in your hands while also being in the grips of something bigger. To be powerful and vulnerable at the same time…"

Klougart, 2021: 125

In a time where global crises are rapidly multiplying, fragility emerges as a pervasive, planetary condition. It rattles our perception of continuity and development as we realise that what we previously considered an existential given is gradually crumbling beneath our feet. Yet, fragility also conveys a sense of hope. As argued by theorist Steven Jackson, our "Broken World" might inspire renewed involvement and commitment to what we have left and urge a re-conception of our social-, environmental- and material dependencies (Jackson, 2014; 2023). This ecological mindset contradicts the linear *take-make-waste* approaches deeply ingrained in societal conduct and design thinking. It moves beyond the norms of circular thinking, and promotes cyclic actions of repair, care and adaptation, directing our attention to the guardi-

anship of materials, the preservation of value and the significance of the individuals undertaking these repairs.

This "Ardeth" issue on *Fragility* explores what it means to build and live in a broken world. It asks:

How does the conceptualisation of fragility as a terrain for a new building ecology challenge existing models of design and production? And what are the new frameworks that can ideate future practices by which to engage and uphold this unstable disposition?

The concept of fragility expands on Jackson's broken world thinking (Jackson, 2014; 2023) into a notion of broken world *building;* a positive catalyst of socio-cultural practices and renewed sensitivities in building that develop from responding to planetary boundaries in a creative and formative manner. Fragility identifies building as a verb. By foregrounding building as action, it emphasises the practices of making and draws in its social-, ecological-, material- and technological agencies. Building takes place in time, as it continually re-configures in response to change through measures of repair, care and adaptation. Here, building becomes an evolving practice of continual construction with the ability to suggest radically new starting points for architectural imagination and rupture its foundational ideals of permanence and durability. Fragility enables us to think of resources not as finitely extracted but as mindfully reused and cared for in their temporary nesting places of built assemblies, until they are, once more, circulated in new flows or designs. The cascading of materials (the practices of refitting, reusing, repairing, and recycling materials) is here pre-empted as integrated design strategies for the future preservation and recirculation of buildings as material assemblages. Strategies that enable materials to outlive their buildings as precious and significant resources. As such, fragility unfolds building as an interconnected entity. Revealing its heterogeneous construct of social, environmental and material dependencies, it calls for an intensified and careful engagement between humans and building to respectfully hone and honour this complexity as a valuable asset of our built environment. It asks: What are the evolving correlations between building and inhabitant, maker and repairer, what are the interrelations between specialists and laymen and how can these scale up to engage larger entities of the social, material and environmental ties that shape these relations? What is arrived at is an ethical proposition for a building ecology that exceeds existing circular thinking by fostering renewed attention to building's dependencies, its temporal nature, its practices and its material flows. An ecology wherein fragility and impermanence are formative premises by which we operate. Here, care, repair and adaptation are key practices for addressing the fragility of our broken livelihoods and for anticipating strategies for future scenarios of living. Strategies that have the power to embody a persistent "staying with the trouble" (Haraway, 2016: 4) while prompting new arts of living on a damaged planet. Building ecology upends our understanding of building as an endpoint, by suggesting a cyclic framework for the evocation of nested life spans that can be intensively engaged to form a new discourse in architecture.

This “Ardeth” issue on *Fragility* seeks contributions which address the following key questions:

- Design dependencies:
  If architecture is traditionally cast in the image of the permanent and durable, how can new discourse, informed by ideas of fragility and broken world thinking, frame impermanence as a new starting point for architectural production? How can new principles of limited life-spans, cycles and reuse challenge the foundations of architectural thinking? How does a renewed awareness of architecture’s fragile social-, environmental- and material dependencies recast architectural practice as a building ecology?
- Material Value:
  Can fragility become a new way of conceptualising circularity? Care and repair are key principles of the circular design framework conceptualised through processes of material cascading (the practices of refitting, reusing, repairing, and recycling materials). However, current industrial building practice cast these reparatory actions as consequences of failure. How can the conceptualisation of fragility allow us to understand care and repair as constructive middle-points fundamentally integrated with design? What are the new values that reparatory action can impose on resource and resourcing as both noun and verb?
- Material Practice:
  Fragility is already embedded into building practice. If mainly unseen and devalued repair, care and adaptation are mainly performed outside the pretext of design and by actors removed from the initial process of fabrication. How can we learn from existing processes of care and repair through the specifics of social- and cultural practices, surveying, building pathology and remediation, and how can these be translated into languages of design and processes of fabrication? How can giving significance to fragility challenge the ordering of our practices to foreground reparatory action as a design principle?

Format
With this call for papers of “Ardeth” #15, we invite practitioners, philosophers, social scientists, craftspeople, architects, residents, and others to contribute their perspectives for laying the foundations of this emerging discourse. By framing ideas of fragility and impermanence as novel dependencies for architectural production, we ask how we can imagine building as an expanded process of continual construction. With this interdisciplinary approach, we aim to conceive and initiate a new discourse for the built environment that assigns broader social and ecological responsibilities to architecture.

Submission guidelines:
http://www.ardeth.eu/wp-content/uploads/2023/10/submission-guidelines_Oct-2023.pdf

"Si tratta della sensazione di tenere tra le mani qualcosa di immensamente prezioso e, allo stesso tempo, di essere nelle mani di qualcosa di più grande. Essere allo stesso tempo potenti e vulnerabili..."

Klougart, 2021: 125

In un'epoca in cui le crisi globali si moltiplicano senza sosta, la fragilità si manifesta come condizione diffusa a livello planetario. Quando ci rendiamo conto che ciò che consideravamo una base esistenziale incrollabile si sta gradualmente sgretolando sotto i nostri piedi, la nostra percezione di continuità e sviluppo vacilla. Eppure la fragilità trasmette anche un senso di speranza. Come sostiene il teorico Steven Jackson, il nostro Mondo Distrutto (*Broken World)* potrebbe ispirare un rinnovato coinvolgimento e l'impegno verso ciò che ci rimane, sollecitando un ripensamento delle nostre dipendenze sociali, ambientali e materiali (Jackson, 2014; 2023). Questa mentalità ecologica contraddice gli approcci lineari del "prendi-usa-getta" profondamente radicati nella condotta della società e nel pensiero progettuale. Si tratta di un approccio che supera le norme del pensiero circolare e promuove azioni cicliche di riparazione, cura e adattamento, richiamando la nostra attenzione alla tutela dei materiali, alla conservazione del valore e all'importanza degli individui che effettuano queste riparazioni.
Il numero di "Ardeth" dedicato alla *Fragilità* esplora cosa significa costruire e vivere in un mondo guasto. La domanda centrale è la seguente: la concettualizzazione della fragilità come terreno fertile per una nuova ecologia del costruire come mette in discussione i modelli esistenti di progettazione e produzione? E quali sono i nuovi quadri di riferimento per ideare pratiche future con cui impegnarsi a sostenere questa disposizione instabile?
Il nostro concetto di fragilità elabora il *pensiero* di un mondo guasto introdotto da Jackson (Jackson, 2014; 2023) per adattarlo alla nozione di *costruzione* in un mondo guastato; un catalizzatore positivo di pratiche socio-culturali e di rinnovate sensibilità nell'edilizia che si sviluppano rispondendo ai limiti del pianeta in modo creativo e formativo.
La *fragilità* identifica il costruire come verbo. Mettendo in primo piano la costruzione come azione, enfatizza le pratiche del fare e richiama le sue agentività sociali, ecologiche, materiali e tecnologiche. Il costruire ha luogo nel tempo, poiché si riconfigura continuamente in risposta al cambiamento attraverso misure di riparazione, cura e adattamento. In questo contesto, costruire diventa una pratica in divenire continuo, capace di suggerire punti di partenza radicalmente nuovi per l'immaginazione architettonica e di superarne gli ideali fondativi di permanenza e durabilità.
La fragilità ci permette di concepire le risorse non come qualcosa di limitato che si estrae dalla terra, ma come qualcosa da riutilizzare con cura in "assemblaggi costruiti" che costituiscono per tali risorse un rifugio temporaneo, fino a quando non saranno nuovamente messe in circolo tramite nuovi flussi o progetti. L'utilizzo a cascata di materiali

(le pratiche di riadattamento, riutilizzo, riparazione e riciclaggio dei materiali) è qui prevista come strategia di progettazione integrata per la futura conservazione e ricircolazione delle costruzioni come assemblaggi di materiali. Si tratta di concepire strategie per cui i materiali, in quanto risorse preziose e importanti, possono sopravvivere alle costruzioni di cui sono parte.
La fragilità per sua natura rivela la costruzione come entità interconnessa. Svelandone il costrutto eterogeneo di dipendenze sociali, ambientali e materiali, esige un impegno maggiore e più attento tra gli esseri umani e il costruire, così da perfezionare e onorare questa complessità come bene prezioso del nostro ambiente costruito. La fragilità ci chiede: quali sono le correlazioni in divenire tra l'edificio e chi abita, chi costruisce e chi ripara? Quali sono le interrelazioni tra gli specialisti e i non addetti ai lavori? E come possono aumentare per mobilitare entità più grandi tra i legami sociali, materiali e ambientali che danno forma a queste relazioni?
Il risultato è una proposta etica per un'ecologia del costruire che superi l'attuale pensiero circolare, promuovendo una rinnovata attenzione alle dipendenze del costruire, alla sua natura temporale, alle sue pratiche e ai suoi flussi materiali. Un'ecologia in cui la fragilità e l'impermanenza sono le premesse formative con cui operiamo. In questo contesto, la cura, la riparazione e l'adattamento sono pratiche chiave per affrontare la fragilità delle nostre condizioni di vita e per anticipare le strategie per scenari futuri. Strategie che hanno il potere di dare corpo a un persistente "coesistere con i problemi", citando il volume di Haraway (2016), stimolando al contempo nuove arti di vivere su un pianeta danneggiato.
L'ecologia del costruire stravolge la nostra concezione della costruzione come punto di arrivo, suggerendo un quadro ciclico che evoca cicli di vita concentrici che possono essere utilizzati per formare un nuovo paradigma in architettura.
Il numero di "Ardeth" dedicato alla *Fragilità* sollecita contributi che affrontino le seguenti questioni chiave:

Dipendenze progettuali:

- Se l'architettura è tradizionalmente proiettata nell'immagine del permanente e del durevole, come può un nuovo paradigma, caratterizzato dalle idee di fragilità e di pensiero del mondo distrutto, inquadrare l'impermanenza come un nuovo punto di partenza per la produzione architettonica? In che modo i nuovi principi di durata limitata, ciclo e riutilizzo possono scuotere le fondamenta del pensiero architettonico? In che modo una rinnovata consapevolezza delle fragili dipendenze sociali, ambientali e materiali dell'architettura rifonda la pratica architettonica come un'ecologia del costruire?
- Valore materiale:
  La fragilità può diventare un nuovo modo di concepire la circolarità? La cura e la riparazione sono principi chiave del quadro di progettazione circolare concettualizzato attraverso processi a ca-

scata (le pratiche di riallestimento, riutilizzo, riparazione e riciclo dei materiali). Tuttavia, l'attuale pratica edilizia industriale vede queste azioni di riparazione come conseguenze di un fallimento. In che modo la concettualizzazione della fragilità può permetterci di vedere la cura e la riparazione come punti intermedi costruttivi fondamentalmente integrati con la progettazione? Quali sono i nuovi valori che l'azione riparatrice può imporre alle risorse e al loro utilizzo?

- Pratica materiale:
  La fragilità è già incorporata nella pratica edilizia. Se la riparazione, la cura e l'adattamento rimangono per lo piú invisibili e svalutati, vengono eseguiti al di fuori del pretesto della progettazione e da attori estranei al processo iniziale di fabbricazione. Come possiamo imparare dai processi di cura e riparazione esistenti attraverso le specificità delle pratiche sociali e culturali, del rilevamento, della patologia edilizia e del risanamento? E come possono tradursi questi processi in linguaggi di progettazione e processi di fabbricazione? In che modo dare significato alla fragilità può mettere in discussione l'ordine delle nostre pratiche per portare in primo piano l'azione riparatrice come principio progettuale?

Formato
Con questa call #15, "Ardeth" invita professionisti, filosofi, scienziati sociali, artigiani, architetti, residenti e altri a offrire la propria prospettiva per contribuire a gettare le basi di questo paradigma emergente della fragilità. Inquadrando le idee di fragilità e impermanenza come nuove cornici per la produzione architettonica, ci chiediamo come possiamo immaginare l'edilizia come un processo esteso di costruzione continua.

Linee guida per l'invio dei contributi
http://www.ardeth.eu/wp-content/uploads/2023/10/submission-guidelines_Oct-2023.pdf

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About the guest editors and this call

Fragility – Building in a Broken World constitutes the reflective partner of the international symposium "Broken World Building" arranged in May 2024 by professor, Mette Ramsgaard Thomsen and postdoc, Stine Dalager Nielsen of CITA, The Royal Danish Academy in Copenhagen. The symposium asked how architecture can reorient its practices from a focus on end-points and building completion - to a more ecological perception of building as a continuum. A critical stepping stone for unfolding how material circularity in the built environment not only relies on the durability of matter but also on how we approach this matter over time. A perspective that significantly adds to prevailing circular thinking by highlighting the importance of material practices in the discussion of lifespan and life cycles.

This "Ardeth" open call brings these discussions into a wider forum of participants and contributors and adds to the initial outcomes of the symposium by reflecting on how broken world building as a notion of fragility might help to instate a theoretical positioning of building ecology. Together, the "Ardeth" *Fragility* issue and the "Broken World Building" symposium form a conceptual keystone within a larger study into bio-based material practice in architecture undertaken at the Centre for Information Technology and Architecture (CITA). The European Research Council (ERC) project "Eco-Metabolistic Architecture" where we ask how bio-based materials situate new practices, new technologies and new representations for an architecture of limited durability described by the heterogeneous, the behavioural and the temporal.

We are eagerly awaiting your contributions to this exciting and relevant discussion.

A proposito dei curatori ospiti e di questa call for papers

Fragilità - Costruire in un mondo guasto costituisce la controparte riflessiva del simposio internazionale "Broken World Building" organizzato nel maggio 2024 dalla professoressa Mette Ramsgaard Thomsen e dalla ricercatrice Stine Dalager Nielsen del CITA, Centro per l'informatica e l'architettura dell'Accademia Reale Danese di Copenhagen. Il simposio si è focalizzato su come l'architettura possa riorientare le sue pratiche da un'attenzione alla fine e al completamento della costruzione a una nozione più ecologica del costruire come continuum. Si tratta di un invito fondamentale per capire come la circolarità dei materiali nell'ambiente costruito non si basi solo sulla durabilità della materia, ma anche sul modo in cui ci approcciamo a questa materia nel tempo. Una prospettiva che comporta aggiunte significative al pensiero circolare prevalente, evidenziando l'importanza delle pratiche materiali nella discussione sulla durata e sui cicli di vita.

L'invito aperto a contribuire a questo numero di "Ardeth" vuole portare queste discussioni in un forum più ampio di partecipanti e contributi rispetto ai risultati iniziali del simposio, riflettendo su come la nozione di fragilità possa contribuire, partendo dall'idea di costruire in un mondo guasto, a creare un posizionamento teorico per l'ecologia del costruire. Insieme, il numero di "Ardeth" *Fragilità* e il simposio "Broken World Building" costituiscono una chiave di volta concettuale all'interno di un più ampio studio sulla pratica dei materiali di origine biologica in architettura intrapreso dal CITA, Centro per l'informatica e l'architettura. Si tratta dell progetto del Consiglio Europeo della Ricerca (ERC) "Eco-Metabolistic Architecture", in cui ci chiediamo come i materiali di origine biologica possano stabilire nuove pratiche, nuove tecnologie e nuove rappresentazioni per un'architettura dalla durata limitata, caratterizzata dall'eterogeneo, dal comportamentale e dal temporale. Rimaniamo in attesa dei vostri contributi a questa discussione appassionante e di grande attualità.