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Mela, Marilena

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FROM GIS TO MARBLE CRAFTS: MUNDANE REPRESENTATIONS OF RENEWABLE ENERGY LANDSCAPES AND THEIR ROLES TOWARDS JUST TRANSITIONS

MARILENA MELA

Marilena Mela is a PhD candidate and lecturer at Vrije Universiteit Amsterdam. She studied architecture in Athens and Florence and worked as an architect in Spain and Greece, before joining the EU-funded project Heriland, a network of doctoral research that explores the relationships of cultural heritage to spatial planning. Her research interests range from critical heritage, place identity, and landscape adaptation, to grassroots activism, spatial planning cultures, and global networks. Her PhD project looks at the spatial complexities of the energy transition and is informed by fieldwork in islands around Europe, including the Cyclades in Greece, the Wadden Islands in the Netherlands, Shetland in Scotland, and the Aeolian islands in Italy. At VU Amsterdam, she teaches heritage and landscape related courses at a BA and MA level. She is also involved with participatory projects in Greece, aiming to the activation of local knowledge as a means to reclaim the largely abandoned Greek countryside.

ABSTRACT

This essay discusses the roles of spatial representations of renewable energy in shaping attitudes and action around the production of space amid the socio-environmental crisis. Central is the dispute around the production of renewable energy spaces. Renewable energy infrastructures such as wind farms and solar parks are important tools for the urgent transition of our societies to cleaner models of energy; at the same time, the territorial expansion of renewables usually happens within the existing neoliberal frameworks of spatial production, often reproducing inequalities and excluding human and non-human actors from their local landscapes. Architecture and architects can critically contribute to this dispute by employing their visualizing skills. Forefront architectural research already visually investigates matters of sustainability, spatial justice, and local rights; however, its engagement with real-life complexities of the energy transition remains limited. Greater affective power lies with the everyday spatial imagery that already forms part of renewable energy planning. Architectural materials, such as masterplans, construction drawings, diagrams, and models usually constitute formal requirements within the planning process. In some cases, the insufficiencies of the planning system account for the emergence of opposition movements, which spontaneously employ sketches, caricatures, landscape photography, and graphics as means of protest. An analysis of visual materials from my research in Scotland, the Netherlands, and Greece, and a focused case study of a wind-power conflict in the Aegean islands, shows how agencies of spatial representations vary greatly depending on sociopolitical contexts and planning cultures. “Mundane” imagery created both within the formal planning process and in opposition to it interacts with existing systems and ultimately affects the shaping of the landscape.

PRODUCTION OF RENEWABLE ENERGY SPACES

Sites of renewable energy production, such as wind farms and solar parks, are now ubiquitous presences on the landscape and will become more so in the coming years. For many, they fulfill humankind’s long overdue need to stop depleting the finite resources of the earth. But no matter how intangible sun and wind might appear, their transformation into usable energy is not placeless. Capturing devices, electricity grids, conversion, and storage stations have their materiality—as do the landscapes that receive them. To (simplistically) quote Henri Lefebvre,

When we evoke ‘energy’, we must immediately note that energy has to be deployed within a space. When we evoke ‘space’, we must immediately indicate: what occupies that space and how it does so: the deployment of energy in relation to ‘points’ and within a time frame. When we evoke ‘time’, we must immediately say what it is that moves or changes therein.¹

Lefebvre employs “energy” in a much wider sense; however, the passage is effective in reminding that these sites are both agents to and reflections of the globalized production of space. In the era of what Neil Brenner and Christian Schmid describe as planetary urbanization, the infrastructural spaces of energy production cannot be absent from architectural and urban research.² Theorist Keller Easterling has contributed to our knowledge of such spaces by exploring their relationships to flows of capital, and their potential for resistance-building.³ In the wide area of environmental humanities, anthropologist Anna Lowenhaupt Tsing and her colleagues look at the unintended consequences of industrial infrastructure that become interwoven with the biotechnological assemblage of place.⁴

Although academic attention on infrastructural spaces has risen, renewable energy projects remain a somewhat awkward subject for socio-spatial research. A potential reason is that, while they promise to build a less exploitative relationship between humans and earth, this promise is not necessarily embedded within a wider shift in the dominant economic principle of expansion and growth. Media theorist

Jussi Parikka reminds us that the geopolitics of the hunt for energy, as an aspect of contemporary digital capitalism, remains dependent on the relationships with the earth.⁵ The energy transition has been essentially conceptualized as a program of state subsidies to energy companies; in other words, it is largely left up to the neoliberal market to regulate and implement this global project.⁶ A report by TNI (Transnational Institute) and TUED (Trade Union for Energy Democracy) argues that this path is not sustainable: while the percentage of energy produced by renewable sources has risen, the overall energy needs and production have also risen, perpetuating the dependence on fossil fuels.⁷ At a local level, privately led planning processes at times fail to take into account environmental and cultural characteristics. The right to the landscape of traditionally marginalized actors, such as rural or indigenous communities, or non-human life, is often disregarded.⁸ The research of anthropologists Nicola Argenti and Richard Knight in Greece shows that locals often see renewable energy projects as parts of neo-extractivist agendas.⁹ Building on their research in Mexico, anthropologists Cymene Howe and Dominic Boyer argue that sustainable energy projects “have the potential to imitate the political and institutional logics of coal, oil, and gas.”¹⁰

Alternatively, they continue, such projects “might pursue different trajectories altogether.” The energy transition can be perceived exactly as an opportunity to rethink and redesign dominant political and social institutions. The ubiquity of wind and sun, and their shorter supply chain, “favor local political sovereignty and authority, because they destabilize the trans-local infrastructures and necessities of grid-based modernity.”¹¹ A truly sustainable transition would feature the prioritizing of marginalized communities, attention to matters of social, spatial, and energy justice, and a claim for an overall shift in the modern narrative of growth and development.¹²

USES AND AGENCIES OF THE (ARCHITECTURAL) IMAGE

Such a shift, however, also requires alternative models of spatial production and governance. The notions of *landscape* and *territory* are useful to this pursuit.

For Antoine Picon, *territory* in its original conception saw space as a passive set of resources to be managed. *Landscape*, as developed in relation to painting, implied a similar detachment between human and space, and emphasized the aesthetic appreciation of the environment.¹³ Cultural geographer Kenneth Olwig gives a different explanation of the term: *landscape* (the German *Landschaft*, appropriated by the Dutch) relates to a system of spatial governance from the inside, by communities who “know their things.”¹⁴ With the emergence of the environmental humanities, the *landscape* became an appropriate term to describe the ever-evolving assemblage of relationships between human and non-human actors.¹⁵

These different definitions reflect the roles of spatial disciplines, such as architecture and landscape architecture. The collective publication *The Feral Atlas* discusses the historic role architecture played in colonization and industrialization through the implementation of grand designs. Architect Feifei Zhou argues that architects addressing climate change should instead focus less on “large-scale infrastructure requiring scientific interventions to improve performance and efficiency,” and more on alternative spatial analyses of the Anthropocene.

Architects offer a particular set of skills of noticing, representing, and analyzing, especially in relation to the built environment and the structures humans have observed, designed, or occupied over time.¹⁶

In other words, the agency of architects might lie not only in designing territories but also in visualizing landscapes, in ways that allow to spatialize new imaginaries for space and place. Forefront architectural research and practice already work in this direction. In the 17th International Venice Architecture Biennale, curated by Hashim Sarkis and themed “How will we live together?”, concepts of environmental, social, and political justice featured in powerful visualizations. Exhibits explored global financial flows, big-scale landscape transformations, and new models for inclusion and participation. The Polish contribution, titled *Trouble in Paradise*, specifically engaged with the future of rural landscapes, proposing to seek solutions to mitigate the effects of

migration, marginalization, and problematic planning by investigating the relevance of concepts of the commons.¹⁷ The central installation, *Panorama of the Polish Countryside*, consisted of a printed collage which, hanging like a curtain that covered the entire perimeter and height of the exhibition pavilion, aimed to assimilate the experience of standing amid this post-productive Polish countryside—now featuring utility poles and arrays of wind turbines (Figures 1 & 2).



Figures 1 & 2: Panorama of the Polish Countryside created by Jan Domicz, Michał Sierakowski, Paweł Starzec, PROLOG +1. Exhibit in the Polish pavilion at the 17th International Venice Architecture Biennale, curated under the title *Trouble in Paradise* by collective PROLOG+1. One out of few exhibits engaging with the everyday territorial complexities of the energy transition. More information in the publication Wojciech Mazan, ed., *Trouble in Paradise* (Warsaw: Zacheta — National Gallery of Art, 2020). Image source: author.

Architectural research has, in some cases, engaged with the complexities of the energy transition. However, it is perhaps more substantial to look beyond forefront architectural projects, which remain relatively detached from society and oriented toward

specific expert audiences, and turn instead towards the somewhat mundane spatial representations created around renewable energy projects. Drawings, maps, diagrams, sketches, photographs, and other visualizations already participate in the production of these spaces in various ways. Such materials are generated by engineers, landscape architects, planners, photographers, or simply contesting actors.¹⁸ Their analysis shifts the focus from the intentions of the designers to the unintended consequences of spatial representations. The images circulate widely in the contemporary mediascape and, as cultural theorist E. Ann Kaplan describes, “construct what people know as reality.”¹⁹ Images become a tool for governing the territory, a way of seeing the landscape, and a means for its actors to establish common claims.

ARCHITECTURAL DRAWINGS IN RENEWABLE ENERGY PLANNING

As in all engineering projects, drawings are important tools in planning for renewable energy projects. The planning process for wind farms and solar parks is relatively standardized in the context of European countries, although it presents important variations per place, project, and planning system. The case of the much-contested Viking windfarm in the windy Shetland islands in the north of Scotland presents a rich example of the various uses of formally required plans and drawings. The wind farm started as a joint project of the islands’ council and an energy company, and the first Environmental Impact Assessment for a 150-turbine installation was prepared in 2009. The company described the process as a “design iteration” that aimed to the fulfillment of two sets of criteria: legal and technical on the one hand, and environmental on the other one.²⁰ To this aim, multiple studies were drafted and related, among others, to landscape impact, ornithology, or roads and traffic. These were accompanied by maps of designated areas, layout plans, rendered views, and construction details (Figure 3). These materials were produced by many different consulting firms, none of which held a specific design orientation. Instead, with a focus on assessment, real estate, or planning policies, the goal of their services was for the project to achieve planning consent after consultation by statutory

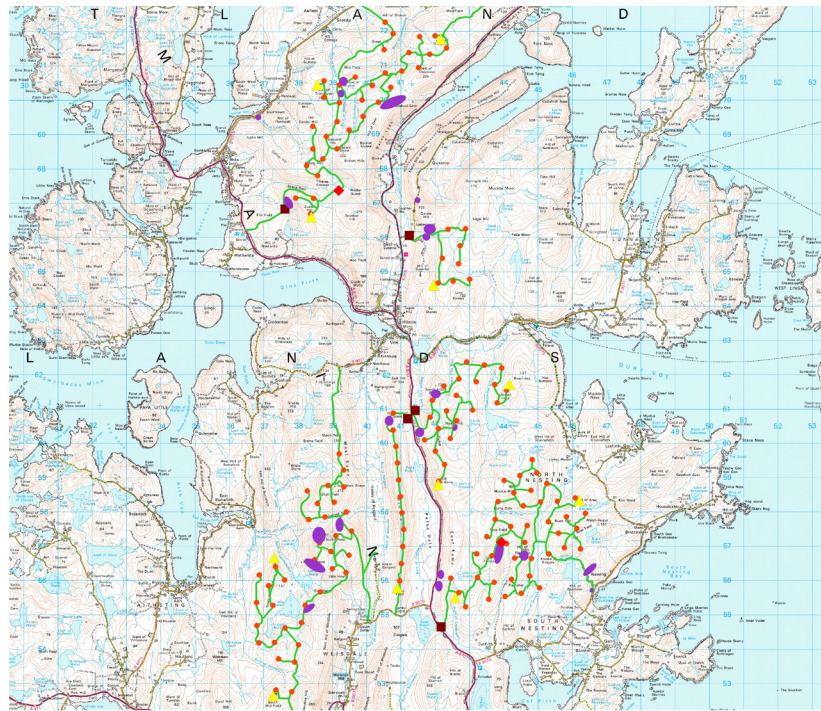


Figure 3: Maps and drawings related to the design of the Viking wind farm in the Shetland Islands. Above: Site layout of the project prepared by BMT Cordah as finalized in 2009. [Source: Viking Energy Archive, Environmental Impact Assessment 2009, Appendix Figures, in www.viking-energy.co.uk.] Bottom Right: Photomontage of the future wind farm in the landscape. [Source: Ash design and assessment- Viking Wind Farm, in www.ashdesignassessment.com/]

authorities. The project was also presented to the neighboring communities in the form of drawings, an interactive 3D representation, and a physical model in scale 1:30000.²¹ A period of statutory objections led to the modification of the layout, and eventually, planning consent was granted for a lightened wind-farm of 103 wind turbines.²²

The project has since been described as divisive for the local community.²³ According to opponents, objections regarding the impact of the wind farm on the island landscape had barely any effect on the result. Overall, design materials were prepared primarily in response to formal requirements, or as essential threads in bureaucratic entanglements, rather than as tools in a creative design process. While the

multiple documents and images are easily accessible on the company's website, the lack of a readable masterplan makes it difficult for the non-expert to decipher the logic behind the project; the fragmented nature of images, their production by a wide range of specialists, and the heavy dependence on invisible boundary lines might have contributed to the detachment of the project from the lived island landscape. These materials make it clear that the project (as is the case with most renewable energy projects) was not conceived as part of an integrated design vision for place, but was run instead as a subject-less, bureaucratic process, defined by operational and financial factors. The island council has since drafted maps of territorial guidance for renewables, perhaps in an attempt to minimize future disputes.²⁴

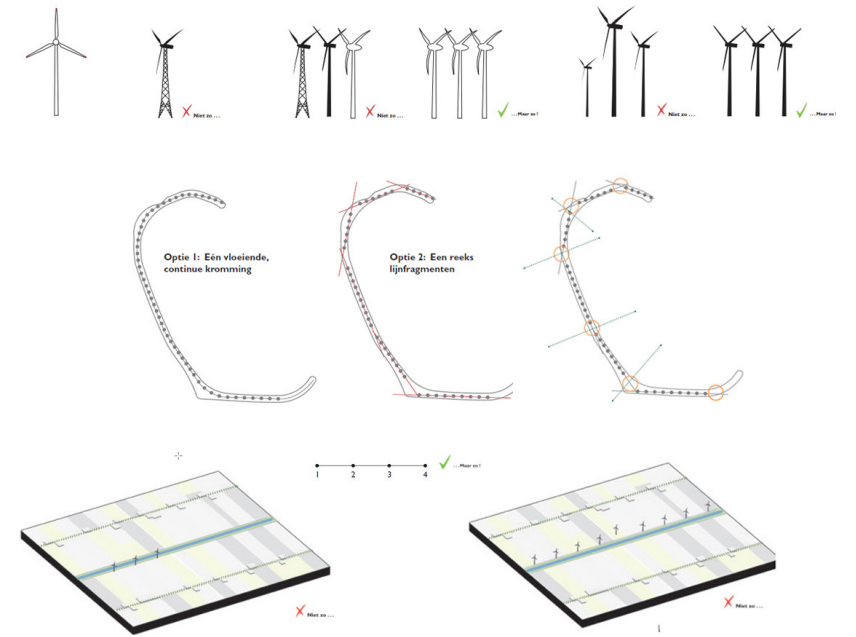


Figure 4: Visual extracts from the report prepared by H+N+S architects for the Wieringermeer polder. The diagrams illustrate guidelines for good practices in the spatial configuration of wind turbines. [Source: H+N+S Landschapsarchitecten, "Beeldkwaliteitsplan Windenergie Wieringermeer," Amersfoort, Oktober 2014]

In other cases, designers have been invited to create spatial visions for the integration of landscapes with renewable energy devices. Some examples come from the Netherlands, a country described by Andrea Faludi as having "a soft spot for planning,"²⁵ where local and regional governments have often collaborated with landscape architects to define guiding principles for wind and sun power infrastructures. In 2011, landscape architecture studio H+N+S prepared a structural vision for wind energy in the Wieringermeer polder.²⁶ The vision responded to a need for upscaling the already existing wind power generation and a realization that the policy of fragmented assessments of individual windfarms would end up harming the spatial cohesion of the landscape. The project was commissioned by a partnership of wind farm owners and energy companies and was supported by the municipality and the province. The design approach, as one of the project managers describes, is based on a series of clear line arrangements that add a "recognizable new layer in the cultural landscape" and create the opportunity "to better reflect the essence of the polder."²⁷ The design team prepared an "image quality plan" (Beeldkwaliteitsplan or BKP) that comprises extensive visualizations of good and bad practices for the spatial configuration of wind turbines, and visually

examines scenarios for their siting in relation to existing urban patterns in many different scales; the plan was afterwards used to assess individual planning applications (Figure 4). Several architectural visual tools are present in the report: sketches, top-view plans, cross-sections, diagrams, axonometries, and collages. A follow-up article on the website of the Center for Monuments and Archaeology of North Holland argues that, despite the drastic upscaling, the employment of design work has led to an improvement of the visual qualities of the landscape.²⁸

As is evident in this and other renewable energy projects in the Netherlands, design principles are generally employed early in renewable-energy planning. Urban designers and landscape architects engage with energy on many scales: they produce research projects referring to the energy transition in the entire European territory,²⁹ or design interventions for the integration of small projects in sensitive dunescapes.³⁰ In general, while conflicts around renewables are ever-present in the Dutch territory, the accessibility and ubiquity of design strategies and materials seem to be playing an important role in consensus building, perhaps in contrast with the reception of similar projects in many other places.



Figures 5 & 6: Photographs of the island Agios Georgios, close to Sounio, in Attica, Greece, where a wind-power project was realized in 2016. Above: The island before the implementation of the project, captured by Thanasis Christodoulou, and published with an article protesting the project. (Source: tetartopress.gr) Below: The project published on the website of the energy company. (Source: www.terna-energy.com). Representations of the island as landscape and as territory.

GREY SPATIAL REPRESENTATIONS IN THE AEGEAN ISLANDS

A different set of examples come from Greece, where recent years saw a rise in contestations around top-down renewable energy projects. These projects employ the drawings that are formally required for assessment and construction, although in many cases it is fairly hard for citizens to gain access to these materials. At the same time, an abundance of sketches, photographs, advertisements, caricatures, artworks, and other grey spatial representations have emerged as byproducts of conflicts. These images, created by promoters of renewable energy, such as energy companies, or protesters against it, such as local groups, appeal to the moral values of the viewer. Green fields, with almost picturesque

wind turbines on the one hand and wide obtrusive roads dug in formerly pristine landscapes on the other, attempt to convince the audience about their version of common good. Companies address the responsibility of the consumer to support sustainable forms of energy, and protesting groups aim to mobilize communities against the destruction of the landscape. The meaning of places and technological objects change depending on the staging, reception, and interpretation of the image (Figures 5 & 6).³¹

A closer look at some of these images allows an understanding of the formation of place out of a combination of physical and discursive forces. In his set of collages *Desecrations*, architect Kostas Manolidis reproduces familiar scenes of small harbors, hilly islets, sun-warmed rocks, and Doric order

architectural remnants (Figures 7 & 8). These are, unmistakably, scenes from the Aegean archipelago as portrayed by 19th century travelers, only different: dense forests of giant wind turbines have sprung all over the islandscape. In Manolidis' description we read:

Rapidly growing numbers of absurdly large wind turbines are forced onto landscapes of rural Greece, irreparably ruining intact natural scenery and historical sites. These collages are trying to bring out this blight by inserting the giant machines into the idealizing gaze of antiquated landscape representations.³²



Figures 7 & 8: Two collages included in the series *Desecrations* of architect Kostas Manolidis, overlaying forests of wind turbines over popular antiquated views of the Aegean islands. (Source: kostasmanolidis.wixsite.com/works/desecrations)

Indeed, in the case of the Aegean islands, these and many other images add a new layer to a widely represented space. Since the end of the 19th century, the circulation of images of blue seas, white terraced settlements, and rocky hills gradually attributed a mythical status to the previously 'undiscovered' islands of the Cyclades and the Dodecanese complex. Architects of the modern movement—among them Sigfried Giedeon and Le Corbusier—contributed with sketches, photographs, and manifestos, projecting the unique equilibrium of form and function in island habitats.³³ In 1965, photographs of Santorini were featured in the exhibition *Architecture Without Architects* at New York's Museum of Modern Art, curated by Bernard Rudofsky.³⁴ Gradually, as these islands were rendered into mass-tourism destinations, the production of representations multiplied and indirectly affected the future shaping of the physical landscape. In parallel, big emigration waves after 1960 gradually converted the islands into peripheries within the national territory. In this spatial and discursive context, recent projects for extended wind farm developments, led by energy companies, aspire to capitalize on the abundance of wind and unbuilt space. The projects are being fiercely contested by local communities, environmental groups, heritage experts, and other people attached to the Aegean landscape, who put forward themes of landscape rights and stress the lack of a coherent policy for spatial energy planning. Artists, architects, craftspeople, photographers, and writers have participated in the mobilization against wind farm developments with the production of images or artefacts. A good example is the project *Le vent et les immortelles*, which employs artistic representations as urban activism through a wide-reaching poster-campaign (Figure 9). In urban and rural areas, such representations circulate in social media, are distributed as printed leaflets, or are hung in walls, aspiring to act as reminders of what is to be lost and as invitations to action.

These affective roles of the image can perhaps be better understood in a local context. On the Cycladic island of Tinos, the anti-wind movement is linked to a wide circulation, both in situ and online, of photographs, graphics, artworks, and documentaries. The photographs of architect Ioanna Papastathopoulou



Figure 9: One collage from the *Desecrations* series and other posters on a city wall, inviting action and solidarity; the image was later circulated on social media. Part of the project *Le vent et les immortelles*. Photo credit: Ianna Andréadis

and photographer Rita Filipousi attempt to convey the threat that the terraced landscape with small churches faces by the installation of wind turbines (Figure 10). These photographs, revealing, as Walter Benjamin describes it, “hidden details of familiar objects” are captured as one last documentation of a soon-to-be-altered environment.³⁵ But their role goes beyond a mere commemoration; they also testify to the embodied nature of protesters’ action. As Papastathopoulou comments (in personal communication), these photographs were taken during the “shifts” that protesters’ groups held on the site of an unwanted wind farm, in their attempt to stop the transfer of the machine parts. Images were directly posted on social media, making claims to local rights and attracting support from sympathizing groups.

At the same time, the anti-wind action in Tinos went beyond the digital sphere and undertook material dimensions, activating links to local practice. Sculptor

Lefteris Naftis carved the anti-wind claims in marble; his sculpted plaques portray turbines, disoriented birds, and two policemen symbolizing state repression of the anti-wind movement (Figures 11 & 12). Tinos has been a historic artistic center of marble craft since the 17th century and preserves this character through the continued existence of a sculpting school and the omnipresence of elegant marble objects in all public spaces. The artworks of Naftis do not function only as visual representations. It can be assumed that for islanders they assume a highly symbolic function, playfully weaving together practices of land, heritage, and craft. They render the anti-wind struggle into a lasting legacy, among other episodes that have been constitutive to the identity of place.

The collages, photographs, and sculpted artworks illuminate, and perhaps affect, the links between landscapes, communities, and globalized spatial change. They create associations between the discursive past and the planned future of the archipelago. Through their reproductions and their wide circulation in digital or printed forms, images become entangled with embodied manifestations and multidisciplinary research and are employed towards the attraction of attention and solidarity. In terms of spatial planning, these spontaneous visualizations of collective claims become a means in the multilevel resistance of protesters against an institutional process that initially excluded them. Members of the opposition movement can hardly be characterized as NIMBYs—a term commonly used to describe local opposition to generally beneficial projects.³⁶ As a close look at visual materials shows, windfarm opposition is instead often linked to acts of care and place-protection. At the same time, through the coalitions of protesters with other environmental groups, this opposition performs a wider critique of profit-based environmental destruction, disguised under the cloak of sustainability.

FROM REPRESENTATION TO ACTION (?)

In the age of its digital reproducibility, the image often escapes the intentions of its creator and exerts its own agency in socio-spatial assemblages. As Doreen Massey might have put it, renewable energy

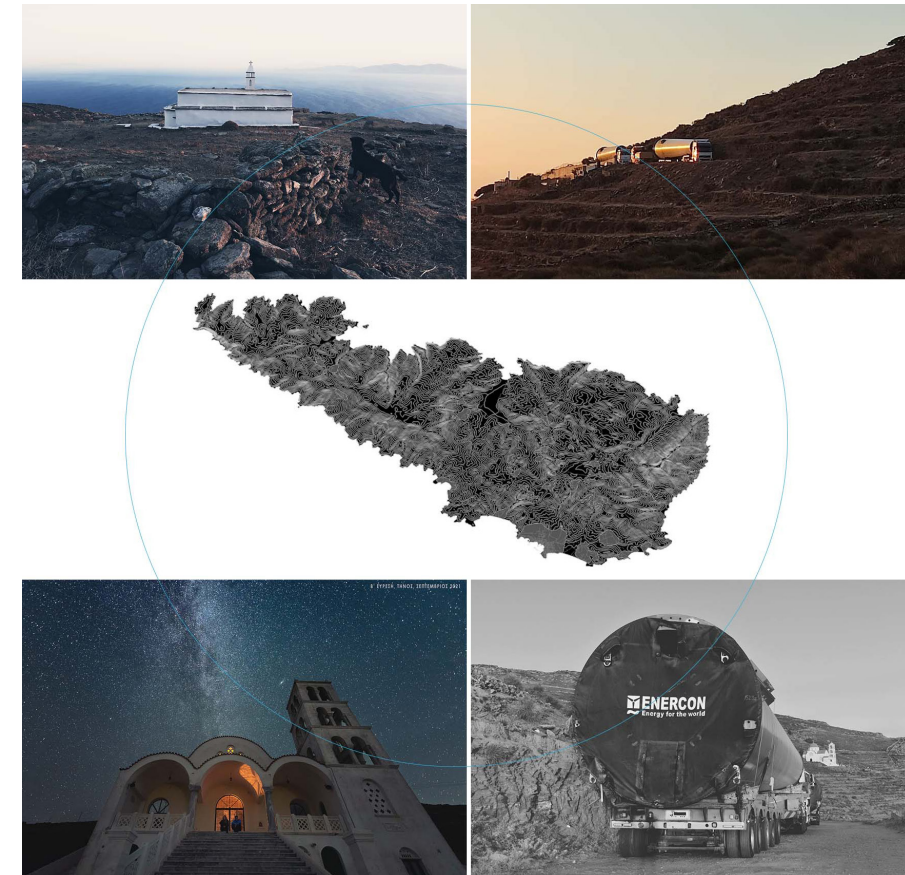


Figure 10: Three photographs by architect Ioanna Papastathopoulou (up right, bottom left, bottom right) and one by photographer Rita Filipousi (up left) picturing the site of future wind farm development on the island of Tinos, and the arrival of trucks carrying parts of wind turbines. The emphasis is on the landscape as a unique assemblage of human and geological agencies, and on this new event as a disruption to its balance. The photographs are reproduced with the permission of the photographers and overlaid over a map of the island. Edited by the author.

apparatuses and their representations participate in the constellations of social relationships that constitute place.³⁷ Representations are not external to the process of spatial production; to paraphrase the definition of *affect* by Ali Rahim, they have the capacity “to instigate new outcomes and behaviors in users.”³⁸ This is particularly evident in a process as wide and sudden as the territorial expansion of renewable energy infrastructures. The power of the examined images lies in their ability to engage individuals and communities in the complexities of achieving a just transition.

I have examined two types of “everyday” spatial representations: drawings that participate in formal planning, and images spontaneously created in the margins of it. The differences in the density and function of each category testify to the planning culture and the sociopolitical situation of the different

countries. However, we should not be quick to deem the seamless incorporation of design in the planning process a success, and the use of the image as resistance to it a failure. In a sense, the second category is also a successful mechanism of correction: by drawing attention to the malfunctions of the process, it invites countervailing action. The inefficacies of the current model of the energy transition are exposed, and concerned communities realize their identification with landscapes and invent practices to defend them(selves). These actions can be perceived as islands of what Anna Tsing describes as patchy hope, one that comes in contrast to trust in “technocratic geoengineering fixes.” She writes:

Hope in the Anthropocene (...) tends to take the shape of a hopeful politics of technological transcendence, the zombie version of modernist hope. Transhumanism, “green capitalism,”



Figures 11 & 12: The anti-wind movement as captured in marble by Tinian sculptor Lefteris Naftis. The artefact activates links between tradition, craft, place, and planned futures.

the Singularity University in Silicon Valley, and the ecomodernist movement are all versions of this revived modernist hope for capitalism and humanity to reinvent itself in a “greener” and “better” form in the face of crisis and disruption.³⁹

A truly sustainable future cannot be produced out of quick fixes and innovative ideas. Instead, the sustainability of everything—as defined by anthropologist Tim Ingold—is based on the quest for new forms of citizenship and democracy.⁴⁰ Architectural work can have different agencies in this project.⁴¹ Architects who wish to contribute to this sustainability of everything can analyze spatial dynamics; they can imagine new prototypes; and they can work with communities to ensure any transition is improving their livelihood. When the system does not include them, they must assume their roles as spatial intellectuals, nevertheless, by joining communities that are already acting within patches of hope in their rightful claims.⁴² ■

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6. Among others, anthropologists Cymene Howe and Dominic Boyer argue that it is still unclear how the goals of the energy transition will be achieved, given the proliferation of the neoliberal economy in state-led policies. In: Cymene Howe and Dominic Boyer, “Aeolian Extractivism and Community Wind in Southern Mexico,” *Public Culture* 28, no. 2 79 (May 2016): 217, <https://doi.org/10.1215/08992363-3427427>.
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11. The quote comes from Hermann Scheer, *The Solar Economy: Renewable Energy for a Sustainable Global Future*, Repr (London: Earthscan, 2009):89, cited in Howe and Boyer, “Aeolian Extractivism and Community Wind in Southern Mexico,” 235.
12. A very convincing argument in favor of alternative trajectories that destabilize narratives of development can be found in Doreen Massey, *For Space* (SAGE Publications, 2005).

13. Antoine Picon, “What Has Happened to Territory?,” *Architectural Design* 80, no. 3 (May 2010): 94–99.
14. See Kenneth R Olwig, “Recovering the Substantive Nature of Landscape,” *Annals of the Association of American Geographers* 86, no. 4 (1996): 630–53, and Kenneth R. Olwig, “Heidegger, Latour and the Reification of Things: The Inversion and Spatial Enclosure of the Substantive Landscape of Things – the Lake District Case.” *Geografiska Annaler. Series B, Human Geography* 95, no. 3 (2013): 251–73.
15. This definition aligns with the work of Anna Lowenhaupt Tsing. She writes, “...landscapes more generally are products of *unintentional design*, that is, the overlapping world-making activities of many agents, human and not human.” In Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton and Oxford: Princeton University Press, 2015): 152.
16. Tsing et al., *Feral Atlas*.
17. Wojciech Mazan (ed.), *Trouble in Paradise*. (Warsaw: Zacheta — National Gallery of Art, 2020).
18. In addition, the analysis of such data fulfills the urge of Margaret Crawford to engage with the realm of construction, which has been long overlooked by architects and claimed by neighboring disciplines of engineering. In: Margaret Crawford, “Can Architects Be Socially Responsible?,” in *Out of Site: A Social Criticism of Architecture*, ed. Diane Ghirardo (Seattle: Bay Press, 1991), 27–45.
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