

LANDSCAPE AND ENERGY

Research by Design: a spatiotemporal episteme in designing the transition

I INTRODUCTION

Architecture is a highly multifaceted field, one which deals with a multiplicity of disciplines, themes and issues. This is one principle reason why the architectural profession lies at the heart of one of the most significant paradigm shifts our generation will inaugurate: the energy transition.

Speculatively, such a radical schism from our fossil-fueled way of life will have momentous spatial implications on our urban, peri-urban and rural environments. This warrants the need for extensive planning and spatial design input¹; it is imperative that architectural practice collaborates with other crucial disciplines to critically engage in this transformation, ensuring the amelioration of our landscapes. Roughly half of the North Sea region's energy demands are expected to be generated from large, offshore windfarms² by 2050. Thus, how and where will the other half of energy demands be generated? By backcasting³, one can speculate that dense urban areas have limited spatial capacity to accommodate renewable energy technologies (RETs) in mass. This begs the following research questions: *What new terrestrial spatial order will arise in the wake of the energy transition in low density areas, particularly in peri-urban and rural areas?*; *How will the introduction of decentralisation impact the energy infrastructure itself and what social opportunities may arise from this?*

With this in mind, what role can architects and the knowledge systems we employ play in this transition? How can we advance our discipline, by acknowledging its inherent potentials and limitations, to ensure it bares agency in this mammoth challenge? Without a doubt, understanding the capacity of different research methodologies and implementing them effectively is at the crux of this; architectural research is the nidus of responsive design, innovation and advancement in practice and academia⁴. If architecture's ontological agency is to evolve alongside the transition, then so must its episteme and supporting heuristic techniques. As such, it is essential to undertake the right kind of research in response to clear hypotheses, questions or concerns. This is because different methodologies bare different thought processes – different methods of doing and producing generate different ways of understanding.

*"Ideas about spatiality are moving away from physical objects and forms towards the variety of territorial, political and psychological social processes that flow through space. The interrelationships amongst things in space, as well as the effects that are produced through such dynamic interactions, are becoming of greater significance for intervening in urban landscapes than the solely compositional arrangement of objects and surfaces."*⁵

Within the scope of the *Transitional Territories* Graduation Studio, my design thesis will deal with spatiotemporal energy transition (through decentralisation) in the North Sea region. The project must respond to the ever-fluctuating relationships between society, (geo)politics and natural processes. This stems from the studio's ontological understanding of cities and urban landscapes as complex systems⁶, which are rooted in a temporal dimension. Rather than seeing architecture as the building of object-space entities, it is being interpreted as an enabler of processes and infrastructures within a complex system: a space-time discipline. This is buttressed by David Harvey, who insists that the primary challenge for designers has transcended spatial determinism. Architectural practice should involve itself with the unlocking, enabling and remoulding of urbanisation forces and interactions, which depend on the physical constructions that house them, in time and space.⁷ The most interesting conflation between the course and my studio project's development, thus far, has been the

resonance with the *On Heuristics, Research and Design* lecture; it highlighted that the complexity of 'wicked problems' (such as the energy transition) challenges architecture's epistemological status quo as a problem-solving discipline⁸. Once we value architectural design as 'a cognitive process', the malleability of 'design as thinking' becomes a tool that eases interaction with such complex topics. This is especially true when the project has not been tackled using a multidisciplinary approach. When dealing with extensive issues that exist within complex systems and ecologies, knowledge production benefits from multidisciplinary input because it encourages dialectical thinking⁹.

II RESEARCH-METHODOLOGICAL DISCUSSION

Transitional Territories is a research studio with an over-arching methodological framework: 'research by design' through scenario building. A form of 'theory-led' research, Ray Lucas explains that it is "critique, analysis [and] dialectically oriented"¹⁰. According to Dirk Sijmons, "this type of research has evolved in recent decades as a useful tool for research into the future, because it has turned out to be capable of bringing together the worlds of science (facts, forecasts) and politics (involvement, choices) by means of design and imaginations."¹¹ Lastly, it is a method that mirrors Jorje Mejía's belief that analytical research should be carried out throughout a design project, challenging the widely believed assumption that research is undertaken prior to a design, in act of corroboration¹². To ensure agency within the complex systems of today's cities, the studio's methodological framework incorporates five design scales: territory; infrastructure, landscape; ground; and body. The main heuristic method that I have been using (and will continue to use) to tie these scales together is that of mapping (each scale is of course fed by different systems of knowledge, which are in turn generated through different heuristic techniques within themselves).

Research began at the territorial and infrastructural scales, with the production of a group Atlas. Four interdisciplinary groups (biotopes, climate, flows and geomorphology) extrapolated and projected data concerning transitions in the North Sea using cartographic techniques. Maps, generated through state-of-the-art GIS software and drawing techniques, were used to illustrate the information, draw connections and emphasize issues or forces present in the region. Indeed, "the function of mapping is less to mirror reality than to engender the re-shaping of the worlds in which people live."¹³ These maps provided a knowledge-base for the next exercise: scenario building through collaging. Even though the process of scenario building is arbitrary, its strength lies in its ability to tie many different viewpoints together into a coherent projection. This is echoed by Peter Andreas Sattrup, who states that "it is the model-building capacity of architecture understood as *gedanken-experimente*, the creation of ideas, narratives and physical reality that makes it scientific."¹⁴ Beyond this, Lucas states that dialectical thinking generated through multidisciplinary practice is a highly robust approach to theoretical exploration, since it forces minds to consider multiple positions¹⁵. By drawing from different disciplines of thought, one becomes able to see the same topic through a completely different lens¹⁶. Lastly, I found that writing has been an indispensable tool to build up a robust scenario narrative. Indeed, writing is a cognitive process where one records, processes, edits, clarifies and curates their thoughts. This exercise propelled me to identify the gap in knowledge that I wanted my thesis to contribute to: the quality of the energy transition's terrestrial impact.

Building upon this as a cognitive footprint, my thesis motives include the building of three clean energy scenarios, which will consider different centralization/decentralization schemes. By mapping a chosen portion of an electricity network in Scotland, I shall endeavor to identify key physical properties of the energy infrastructure that have architectural potential: design criteria become evident, alongside issues of scale, concentration/diffusion and embeddedness/isolation. The study will become systemized by selecting the most promising scenario and then identifying its potentials and constraints in relation to the 'receiving' landscape; site-specificity is key to highlighting useful criteria. The road trip around Scotland was an important research tool in this regard, since it provided me with an impression of the landscape factors I should consider; methods including photography, sketching and informal

interviews with locals were essential. By creating a family of object 'types' that are inherent for network functionality, I will endeavor to establish a design syntax that considers both the existing context's topographical qualities and infrastructure's physicality. Through this, I aim to develop a system of knowledge that, while being site-specific, is an adaptable 'methodology-led'¹⁷ research approach that can be reapplied to different contexts. One of these 'types' will then be chosen as my thesis project's architectural intervention (the ground and body scale). The potential symbiosis between the infrastructure's functionality, the urban fabric's morphology and a shift in the culture of people's daily will be explored; a hybridisation into a new architecture arises by breaking pre-established 'limits' within the urban condition to create new social opportunities. By interviewing people that manage community-owned decentralized RETs, an emic research approach¹⁸ will be introduced. Charles Jencks emphasizes that theoretical research must be undertaken with contextual investigation¹⁹.

III RESEARCH-METHODOLOGICAL REFLECTION

*"As both analogue and abstraction, then, the surface of the map functions like [...] a staging ground or a theatre of operations upon which the mapper collects, combines, connects, marks, masks, relates and generally explores."*²⁰

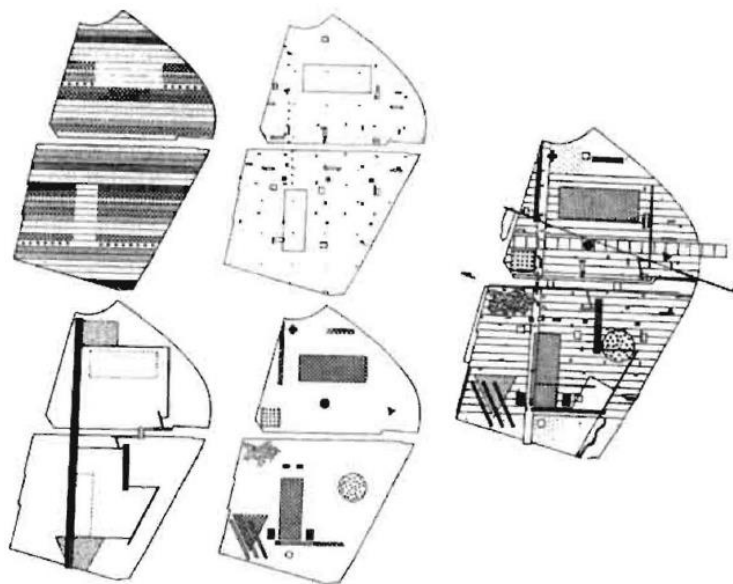
Since mapping is the primary heuristic tool that will be used throughout the five design scales, it will be the focus on the following section. It is important to clarify that the act of drawing what already exists may be more accurately referred to as tracing. Mapping also includes "various hidden forces that underlie the workings of a given place"²¹, creating an eidetic and fictitious illustration from facts and empirical observations. As explained by Corner, the reasons for this agency are two-fold: the first and more objective characteristic is the analogous impression maps bare of the earth's surfaces; the second, which is where maps' speculative, "strategic, constitutive and inventive"²² agency emanates from, is their unavoidable *abstractness*. As the human mind translates what it sees into lines and shades, it subconsciously and systematically selects, omits, isolates and codes information²³. As a result, the art of cartography is "doubly projective: it both captures the projected elements off the ground and projects back a variety of effects through use."²⁴ Cartography is a research method which, when recognized as an analytical tool and used shrewdly, can reveal both the quantitative and qualitative dimensions of a territory, landscape or place.

In his essay *The Agency of Mapping*, Corner provides examples of 'analogous-abstract' maps that highlight the: analogous relationship between maps and reality; the fluctuating nature of time-space relations; and, lastly, the equal importance of "mapping actions (techniques), mapping effects (consequences) and maps themselves."²⁵ Further-to-this, the operational system of maps is made clear through *fields*²⁶, *extracts*²⁷ and *plottings*²⁸. Within each stage of the process, the cartographer must make a number of design decisions "with the construing and constructing of the map alternating between processes of accumulation, disassembly and reassembly."²⁹ This strongly resonates with the *On Types and Typologies* lecture; like typologies, maps are cultural constructs and once you become aware that they are such, a liberation and expansion of thought follows.

Within the scope of scenario building, which encourages temporally-responsive design in the architectural and urban design disciplines, the 'analogous-abstract' nature of mapping sets the stage for the conception of future realities. In simpler terms, by actively illustrating a site in a new fashion, unforeseen responses or outcomes may materialise. This is because their 'analogous-abstract' planes allow for the reordering of a myriad of condition strata. With this in mind, Corner highlights and cautions against the cultural interruption of maps that has developed throughout the last century; they are often regarded as neutral "indisputable mirrors of reality"³⁰ that are a measured representation of an unchanging and accurate environment. Indeed, maps are often produced as analytical surveys of pre-existing site conditions in a design project, which are then

used as a backdrop of a design's proposed plan. Regarding the studio's emphasis on architecture as a spatiotemporal discipline, it is imperative that the efficacy of mapping is achieved by challenging this cartographic latency. The dominance of tracing that overshadows the exploratory creativeness and resourcefulness of mapping is being challenged and, ultimately, subverted. Mapping is research in itself and not a set foundation from which it begins; "the various cartographic procedures of selection, schematization and synthesis make the map already a project in the making"³¹ in itself.

Corner identifies four thematic mapping techniques, including: *drift*; *layering*; *game-board*; and *rhizome*.³² While all four techniques are useful for my project, I will elaborate on the one (given the scope of the essay) that I feel may be most helpful. *Layering* provides a helpful systematic precedent, an emanant example of which is Rem Koolhaas' 1983 Parc de la Villette proposal³³ (see *figure 1* below). By breaking down the park's programmatic needs and logistical concerns into a series of projected strata, each layer was then able to be treated separately and had its own embedded rationale and system. The "mosaic-like field of multiple orders"³⁴ means that the reader can, either, read a single layer by understanding the mapping's rationale, or can interrupt a new event structure through layer hybridisation. What is significant about this latter point is that the map suddenly becomes performative rather than illustrative. Furthermore, "unlike a traditional site plan, the layered field remains open to any number of interpretations, uses and transformations in time."³⁵ This is an exceptionally useful technique for my thesis project, as its requirement to be spatiotemporally responsive is critical.



Rem Koolhaas/Office for Metropolitan Architecture, *Layer Diagrams for the Parc de la Villette*, 1983.

IV POSITIONING

At this point, it is of import to highlight that the project development thus far has been strongly rooted in the territorial and infrastructural scales (the design process in the landscape, ground and body scales have only just begun). With this in mind, I found the *On Heuristics and Research Methods* lecture to be highly compelling thus far, since it illuminated the traditional epistemological way architecture is practiced. Once I understood this, I appreciated how it needed to evolve in response to the energy transition: a 'wicked problem'. To borrow Sijmon's words: "the energy transition is not your average subject; it actually alters the foundation of the power system."³⁶ I fully support the notion of the architectural practice's development into a spatiotemporal and multidisciplinary discipline to ensure

its efficacy. The importance of cross-disciplinary cooperation is paramount and the need for a re-establishment of the understanding of design and landscape arises.

With regard to my position on the validity of mapping as a heuristic approach within the 'research by design' methodology, I believe it successfully addresses the two aforementioned criteria. Moreover, research through mapping "enables the designer to *construct* an argument, to embed it within the dominant practices of a rational culture, and ultimately to turn those practices towards more productive and collective ends."³⁷ As such, I will continue to use it as a research by design tool in my thesis. Building upon Corner's theoretical discussions, I believe that its conflation with contemporary, state-of-the-art mapping technologies is essential to our successful intervention within landscapes, because interventions must be site-sensitive and responsive. Christophe Girod, for example, is pushing the boundaries of representation and mapping with the use of 3D point cloud³⁸, thereby providing pragmatic precedent for designers to truly measure and reveal essential elements of landscapes. These technologies can be highly useful in creating urban environments that are responsive to change – that are spatiotemporal - since they provide more accurate modelling, which provides a clearer understanding of our geomorphological realities.

*"Through rendering visible multiple and sometimes disparate field conditions, mapping allows for an understanding of terrain as only the surface expression of a complex and dynamic imbroglio of social and natural processes. In visualizing these interrelationships and interactions, mapping itself participates in any future unfoldings. Thus, given the increased complexity and contentiousness that surrounds landscape and urbanism today, creative advances in mapping promise designers and planners greater efficacy in intervening in spatial and social processes. Avoiding the failure of universalist approaches toward master-planning and the imposition of state-controlled schemes, the unfolding agency of mapping may allow designers and planners not only to see certain possibilities in the complexity and contradiction of what already exists but also to actualize that potential."*³⁹

In my mind, the above quote successfully summarises the issues urban environments are facing with the upcoming energy transition. Moreover, it provides a heuristic solution. If mapping is an "active agent of cultural intervention"⁴⁰ and, as Sijmon's highlights, reality and culture are so inherently linked to the way we produce energy⁴¹, then it follows that mapping is an indispensable connective tool for our future. By using mapping as an enabler, rather than a tool of occupation, it bares capacity to respond to changes and alterations in time. I believe the strength of mapping in the forthcoming paradigm shift is that it affects geographies' actualization, rather than simply presenting them.

As such, the idea behind the thesis project is not to exert a heterogeneous and global plan in landscape, resulting in the sprawl of generic and identity-less landscapes. Rather, designers should look to the site-specific conditions of a place, its natural and cultural 'talents', and unlock those potentials. Moreover, site-specificity does not only encompass ecological or topographical factors; the successful integration of decentralized RETs in communities also requires analysis of the socio-cultural milieu, economic factors and historical remnants. All forces, including social movements, historical remnants and technical schemes, should be graphically represented on different layers and adjusted depending on scale. Therefore, within a praxeological perspective mapping seems like a powerful research tool. Through this, the notion of designing for the working of things rather than the objects themselves is buttressed. Urbanisation itself cannot, and should not, be fully designed. It is too complex. However, the processes that are required to make our built environments function can be through architectural agency; how infrastructures interact and interdepend in space and time may be the nidus of a new architectural ontology.

NOTES

¹ Dirk Sijmons, *Landscape and Energy – Designing Transition* (Rotterdam: NAI Publishers, 2014).

² IABR, “2050 – An Energetic Odyssey: the video”, accessed December 24, 2018, https://iabr.nl/en/film/2050_webvideo.

³ “Backcasting is the approach to describe a desired (sustainable) future state, based on primary human needs and constraints at the time, and translate this situation back to action needed now.”

Jón Kristinnsson, *Integrated Sustainable Design* (Delft: Delftdigitalpress, 2012), 31.

⁴ Jorge Mejía, “Methods of Architectural Exploration, Evaluation, and Discovery”, (lecture, TU Delft, Delft, September 13 2018).

⁵ James Corner, “The Agency of Mapping: Speculation, Critique and Invention” in *Mappings (Critical Views)*, eds. Denis Cosgrove (London: Reaktion Books Ltd, 1999), 227.

⁶ A complex system is formed by a myriad of nested systems, sub-systems and components and the complex interdependence and exchange between these.

⁷ David Harvey, *Justice, Nature, and the Geography of Difference* (Oxford: Blackwell Publishers Ltd, 1996), 419.

⁸ Mejía, “Methods of Architectural Exploration, Evaluation, and Discovery”.

⁹ Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing Ltd, 2016), 14.

¹⁰ Lucas, *Research Methods for Architecture*, 13.

¹¹ Sijmons, *Landscape and Energy – Designing Transition*, 19.

¹² Mejía, “Methods of Architectural Exploration, Evaluation, and Discovery”.

¹³ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 213.

¹⁴ Sattrup, *Architectural Research Paradigms: an overview and a research example*, 3.

¹⁵ Lucas, *Research Methods for Architecture*, 14.

¹⁶ Peter Andreas Sattrup, *Architectural Research Paradigms: an overview and a research example* (Kongens Lyngby: Technical University of Denmark, 2012), 12.

¹⁷ Lucas, *Research Methods for Architecture*, 13.

¹⁸ Lucas, *Research Methods for Architecture*.

¹⁹ Charles Jencks, *Architecture 2000 and Beyond: Success in the Art of Prediction* (Chichester: Wiley Academy, 2000).

²⁰ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 215.

²¹ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 214.

²² Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 215.

²³ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 215.

²⁴ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 215.

²⁵ Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 221.

²⁶ “The field is the continuous surface, the flat-bed, the paper or the table itself, schematically the analogical equivalent to the actual ground, albeit flat and scaled. The field is also the graphic *system* within which the extracts will later be organized. The system includes the frame, orientation, coordinates, scale, units of measure and the graphic projection (oblique, zenithal, isometric, anamorphic, folded, etc.).”

Corner, “The Agency of Mapping: Speculation, Critique and Invention”, 229.

²⁷ “Extracts are the things that are then observed within a given *milieu* and drawn onto the graphic field. We call them extracts because they are always selected, isolated and pulled-out from their original seamlessness with other things [...]. They include objects but also other informational data: quantities, velocities, forces, trajectories.”

Corner, "The Agency of Mapping: Speculation, Critique and Invention", 230.

²⁸ "Plotting entails the 'drawing out' of new and latent relationships that can be seen amongst the various extracts within the field." Spatial plotting is the act that links extracts together into a field, the realisation of one of the infinite unlocked relationships or latent structures depending on the cartographers agenda.

Corner, "The Agency of Mapping: Speculation, Critique and Invention", 230.

²⁹ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 231.

³⁰ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 215.

³¹ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 216.

³² Corner, "The Agency of Mapping: Speculation, Critique and Invention", 231.

³³ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 235.

³⁴ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 235.

³⁵ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 236.

³⁶ Sijmons, *Landscape and Energy – Designing Transition*, 308.

³⁷ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 251.

³⁸ Christopher Girot, and Ilmar Hurkkens, *Field Instruments of Design*, (Zurich: Institute for Landscape Architecture, 2015).

³⁹ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 214.

⁴⁰ Corner, "The Agency of Mapping: Speculation, Critique and Invention", 217.

⁴¹ Sijmons, *Landscape and Energy – Designing Transition*.

BIBLIOGRAPHY

Corner, James. "The Agency of Mapping: Speculation, Critique and Invention". In *Mappings (Critical Views)*, eds. Denis Cosgrove, 213-252. London: Reaktion Books Ltd, 1999).

Girof, Christopher, and Hurkxkens, Ilmar. *Field Instruments of Design*. Zurich: Institute for Landscape Architecture, 2015.

Harvey, David. *Justice, Nature, and the Geography of Difference*. Oxford: Blackwell Publishers Ltd, 1996.

IABR. "2050 – An Energetic Odyssey: the video". Accessed December 24, 2018. https://iabr.nl/en/film/2050_webvideo.

Jencks, Charles. *Architecture 2000 and Beyond: Success in the Art of Prediction*. Chichester: Wiley Academy, 2000.

Lucas, Ray. *Research Methods for Architecture*. London: Laurence King Publishing Ltd, 2016.

Mejía, Jorge. "Methods of Architectural Exploration, Evaluation, and Discovery". Lecture presented at TU Delft, Delft, September 13 2018.

Sattrup, Peter Andreas. *Architectural Research Paradigms: an overview and a research example*. Kongens Lyngby: Technical University of Denmark, 2012.

Sijmons, Dirk. *Landscape and Energy – Designing Transition*. Rotterdam: NAI Publishers, 2014.