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Energy landscapes in a crowded world: A first typology of origins and expressions

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ABSTRACT

One of the main drivers of landscape transformation has been our demand for energy. We refer to the results of such transformations as “energy landscapes”. This paper examines the definition of energy landscapes within a conceptual framework, proposes a classification of energy landscapes, and describes the key characteristics of energy landscapes that help to define an over-arching typology of origins and expressions. Our purpose is to inform scholarly discourse and practice with regard to energy policies, decision-making processes, legal frameworks and environmental designs. We exam the existing literature, provide a critical perspective using imagery from the USA and Europe, and combine the disciplinary perspectives of geography and landscape architecture. We propose three main characteristics that contribute to the development of a typology: (1) *Substantive qualification*: General types of energy landscapes distinguished by dominating energy source; (2) *Spatial qualification*: The appearance of energy landscapes, ranging from distinct spatial entities to less recognizable subsystems of the larger environment; and (3) *Temporal qualification*: The degree of permanence of energy landscape ranging from relatively dynamic to permanent. Addressing these and a growing number of associated questions will promote more thoughtful protection of the landscapes we inherit while paying closer attention to the relationships between ourselves and the landscapes that surround us.

1. Introduction

Imagine living in a time before internet, mobile phones, televisions, radios, books, town criers, or sophisticated language. Everything you needed to know – or could know – would come from reading the landscapes that surrounded you. It would be a relational experience; you would learn the give and take of the landscape. Using all your senses all the time, you would be acutely alert for any changes in appearance, process, opportunities, and threats. Vision would be indispensable, but you would also feel the earth under your feet, taste flavors the landscape offered, smell odors wafting over the landscape, and hear – perhaps with some trepidation – the jabberings of wild animals that were sharing the landscape with you.¹ Over time, you would sharpen your skills at reading landscapes, become attentive to the stories they had to tell, and be constantly alert for any hint or clue they might provide that would prove valuable to your personal safety and well-being.

Looking back, we see that relationships between society and

landscapes have evolved. For most of our time on planet Earth, we worried about the dangers landscapes embodied. By the beginning of the 20th century, however, we were beginning to reverse course. Instead of fearing landscapes, we had started embracing them, including untamed ones, for their values, including aesthetic qualities they held, such as solitude. Henry David Thoreau best expressed this redirection when he declared: “In wildness is the preservation of the world” [1]. Eventually we completed the readjustment in our relationship to landscapes from one of fear to one of appreciation. We came to consider many of them “jewels” that needed our protection and merited our safe keeping. We began realizing that as we strived to save landscapes, we were striving to save ourselves.

Thoreau counseled us to resist taking landscapes for granted, to avoid fastening ourselves to the false promise of landscape permanence that often springs from our relatively short human lifespan. Notwithstanding his advice and despite the agreed value of landscapes – in appearance as well as function – we seem seldom able to leave them undisturbed. Living with more than 7 billion neighbors underscores the strain of consistently supporting landscape

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¹ Paraphrased and amended from thoughts by Anne Whiston Spirn. The language of landscape, Yale University Press, 1998.

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sovereignty, independence and longevity. Instead, we continue meddling, regularly manipulating landscape shapes, purpose, manner and intensity, creating what geographers often refer to as “cultural landscapes”, that is, the natural environment as influenced by human agency. Often the creation of these cultural landscapes results from commissioning energy resources to sustain human life. In recent years, many observers have started referring to the visible results of the unending and insatiable human quest for Nature’s most fundamental resource. We call these ‘energy landscapes’.

Over the centuries, energy landscapes have assumed many forms, but for most of that time the alterations and even damage that they produced were seldom linked directly to the growth of energy demand. We were poor at making the linkages between our need for energy and the landscape consequences that resulted. These costs were usually given the innocuous label of ‘collateral damage’. They were seen as unavoidable environmental costs that, in earlier less-crowded times, would simply be left behind as we carved up virgin territory.

Many energy landscapes accumulated in remote regions, far from population centers and probing skepticism. They were out of sight and out of mind, and one did not recognize the common thread of their origin or the possible measures that could help to mitigate the consequences of their presence. Today, with an increasing ubiquity, there is rising interest in focusing attention on them as a unified topic. Energy landscapes are co-constructions of space and society that come into existence through a series of material and social relations. They have been accumulating to such a degree in recent years that they no longer can elude our recognition and concern [2].

Now that we have become alerted to the signatures of energy landscapes, we tend to spot them everywhere, in an exquisite variety of forms. We see them as scars left from mining, patchworks of drilling pads, cleared routes for pipelines and canals, harbors for large tankers, oil refineries, gas compression plants, generating stations, transmission lines, waste tips, fields of derelict equipment, arrays of solar panels, abandoned towns, and the exoskeletal forests of spinning turbines churning electricity from the wind.

The appearance, location, and recognition of energy landscapes incites wide swings of perceptions, reactions and policies, even when created by a single technology. For example, while some people may loathe wind turbines, others may consider the very same machines an attention-grabbing backdrop for their marital vows, such as has occurred in Palm Springs, California. Some people decry the wholesale destruction produced by mountain-top removal, while others see the resulting scars as visible evidence of valuable jobs and vital economic development.

In sum, the breadth of reactions to energy landscapes tends to place curves and bumps in the path to a sustainable future. The goal of this paper is to help straighten and smooth that path by developing a suitably reflective typology of energy landscape origins and expression as an introduction to a newly-recognized research domain.

We begin in Section 2 by laying a foundation for the proposed typology by summarizing the rising recognition of energy landscapes in the literature. The theoretical basis for the typological study of energy landscapes is laid out in Section 3. Section 4 advances the conceptual framework for the typology. These sections are followed by a discussion and conclusions. We combine the disciplinary perspectives of geography and landscape architecture to emphasize past and existing energy landscapes as well as the planning and designing of future energy landscapes. To illustrate the critical perspectives that are important to any understanding of energy landscapes, we incorporate a generous sampling of images from the United States and several countries in Europe, where such landscapes have been receiving the most scholarly attention.

2. The growing awareness of energy landscapes

Energy landscapes are found in myriad forms and locations, some expected and some exceptional. While one may expect to encounter them in such coal-rich places as the Cumberland Plateau in Kentucky, the Ruhr region in Germany, or the Midlands of England, they are starting to proliferate elsewhere as well. These may be places of scenic or historic value, along unspoiled ridgelines, astride busy highways, or even in the shallow waters off cherished beaches. Their growing profusion has been attracting increasing public attention, although this newfound awareness rarely partners with insight into how to make them smaller, less noticeable, or more acceptable.

It will become increasingly difficult – if not impossible – to meet global energy needs without creating new energy landscapes. Such landscape shifts may be a difficult reality to accept, especially wherever people would prefer that landscapes remain unchanged indefinitely. The increasing abundance of energy landscapes gives testimony to the fact that landscape permanence, a common human wish, is a myth leading to enduring disappointment. The advice of Thomas Wolfe – you can’t go home again – never rang truer [3].

Many difficulties can surface as societies work to meet energy demands while simultaneously trying to limit the landscape effects that energy developments produce. A principal challenge is adjusting to the fact that the landscape impacts from energy developments differ spatially, by resource and geography, by public perception, and by conditions of life such as poverty, cultural constraints, and levels of opportunity. In Europe the creation of energy landscapes that we encounter today is part of a centuries-old progression. Germans can experience the spatial consequences of energy development by visiting the regions of Essen, Cologne, and Leipzig. In the Czech Republic, egregious examples of energy landscapes include the area surrounding the city of Most (Fig. 1) [4]. It has been in places such as these that the public has learned about environmental and financial costs that accompany energy development, how the scale and disruption of landscapes limit options for future use, and how difficult is the remediation that society might desire. Moreover, in densely populated Europe, energy landscapes are in view of millions of people. They cannot be avoided.

It is not uncommon for people in energy-rich areas to become habituated to energy landscapes from mining and related extractive activities. Either they are not bothered them, they consider it counterproductive to complain, or they accept them as a ‘necessary evil’ that trail the creation of jobs. Ironically, the flat trajectory of opposition to many traditional energy landscapes took a sharp upward turn with the growth of renewable resources such as wind power. This reaction was especially noticeable in California, the Netherlands, the UK and other places as early as the 1980s, where wind turbines were characterized as spinning, glinting, bird-chopping, noisy impositions on the land. They were in plain and obvious view, they could not be relocated or camouflaged, and many people detested them. It was a conflict of geographical incompatibility that owed its intensity to the site-specific nature of wind power itself [5]. In the UK, with a population density 8 times that of the United States, it immediately became difficult to find sites for wind turbines that were not in someone’s field of view. The problem arose in California as well, albeit with different underpinnings. There the problem stemmed from the fact that two of the earliest sites for large-scale wind installations were co-located athwart the right-of-way of major highways heading toward the large metropolitan regions of San Francisco and Los Angeles. These energy landscapes became a fact of daily life for those who commuted along these roads. They could not be ignored.

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