Energy Research & Social Science 30 (2017) 53–60

Contents lists available at ScienceDirect

Energy Research & Social Science

journal homepage: www.elsevier.com/locate/erss

Original research article

From wire evil to power line poetics: The ethics and aesthetics of renewable transmission

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ARTICLE INFO

Keywords:
Aesthetics
Overhead transmission lines
Public perceptions
Electricity rhetoric

ABSTRACT

Building upon a selective history of so-called "wire evil," and more recent social science research regarding public perceptions of electric infrastructure, this article explores renewable transmission lines as sites of tension between landscape aesthetics and environmental ethics. It reports the results of an ethnographic study performed at a utility-owned arboretum in Omaha, Nebraska and suggests a "power line poetics" may help balance the aesthetic experience of electric infrastructures and the ethics of renewable energy development.

Prologue

I pass the thicket, enter the grove, and pause beside an Eastern cottonwood, Nebraska's state tree. This entire strip of suburban forest, which is wedged next to the interstate, echoes with the sounds of passing traffic. Amidst this white noise, I run my fingers over the rough bark and consider the roots beneath my feet. The roots, and their spread, are like ancient precursors to the electrical infrastructure overhead. The other, metallic network is visible on the woodland's edge—aluminum and steel-reinforced cables hang between 45-foot tall wooden utility poles (which were once Douglas firs, a species also harvested for Christmas trees). The network also shines on the clearing's western rise—quarter-inch lines locked to accordion insulators and attached to an 180-foot lattice steel tower. Like this cottonwood's roots—its longest fingers dug forty, fifty feet below the earth's surface, its elbows ranging outwards, some of them exposed on the banks of a nearby ditch—the power lines that weave through the surrounding landscape are often dismissed. To see this tree for its root system is analogous to seeing the electricity we generate and consume for the overhead lines in our environment. To see the forest (as grid) for the trees (as power lines) is to appreciate the lines as a series of material artifacts, structures with a technological function and a social meaning.

The roots underground and lines overhead are necessary links in their respective systems, yet "tree" and "electricity" often attract warmer visions and more magnanimous associations. The thick branches stemming from this cottonwood's trunk rise seven stories tall and reign over the bur oak, hackberry, and maple at their shoulders. As autumn progresses, visitors' eyes will be drawn to the cottonwood's thousands of waxy, silver and green leaves as they turn yellow and then drop to the forest floor. Next spring, the cottonwood may grow even taller and broader. Growth will depend upon the gnarly root system that tunnels for sustenance in this soft, loamy soil.

Similarly, the local electric system, a node of which radiates from the substation attached to the lattice steel tower on the hill, almost instantaneously transfer electrons to millions of lights and machines. The lines I can see and hear emitting a constant hum, pulse power through the city, help to charge my smart phone, and make sure the laptop upon which I will transcribe my field notes does not go dark. As the season changes and the days get shorter, the electricity in these lines will help to heat my family's home. Those grey, metallic threads are arbiters of convenience and also critical conduits: without electric power, many electricity-dependent citizens like me could not survive the winter. Of course, the analogy only follows so far. Both root systems and wire systems extend from tree trunks and wooden arms, yet unlike the organic shoots that burrow beneath this living specimen, the engineered, metallic threads overhead must hide in plain sight, and when such structures fail to hide, when the lines on the horizon do poke into attention, they are often loathed as blight.

1. Introduction

Across North America and Europe, increased renewable energy production has made wind turbines and solar panels more familiar parts of the visible landscape; increased sustainable consumption has brought humans into closer contact with electric vehicles and energy-efficient appliances. Compared to the tall, sleek white wind turbines or the nimble electric vehicles with names like Leaf, Tesla, Bolt, and Volt, the transmission lines that link various forms of production and

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http://dx.doi.org/10.1016/j.erss.2017.05.040
Received 31 October 2016; Received in revised form 15 May 2017; Accepted 31 May 2017
Available online 04 July 2017

consumption are often seen as static and banal. Social scientists and energy policy scholars have conducted significant research regarding public perceptions and various siting procedures, pylon designs, and community engagements [1–11]. This research shows both the function and perception of electric infrastructure is shaped by technical, financial, environmental, and cultural forces, such as aesthetics. In short, where and how individuals see power lines is both an outcome, and influence, of the work they do in distant places and immediately visible landscapes.

This article contributes to existing research by placing the perception of power lines within the constellation of "energy, ethics, and ethnography" formed by this special issue. Clearly, the lines transmit energy, and energy in the anthropocence has ethical consequences. At first blush, the ethical dilemma posed by power lines pits the need to build more transmissions lines (to deliver more renewable energy, reduce CO2 emissions, and slow climate change) against the desire to protect the environment from the unsightly, dangerous blight caused by sweeping wires and looming pylons. However, a simple "pro" or "anti" power lines stance does not effectively translate to a clear ethical position. Many ethical strains are enmeshed in public engagements with electric infrastructure, including century-old critiques of "wire evil."

Detangling the wires' apparent wickedness from positive electric rhetoric contributes to the anthropological interest in electricity, which "as commonly understood, is always already social" ([12] p. 532). It is also part of the recent, interdisciplinary turn to infrastructure, which anthropologists have been encouraged to analyze "as concrete semiotic and aesthetic vehicles oriented to addressees" ([13][13] p. 329). Here, I challenge the assumption that these "aesthetic vehicles" are inactive eyesores. I argue that power lines are actors and that they convey a certain agency. The lines, and the values attached to them, create place as well as intersect landscape. The purpose of such an argument is to reorient energy discourse and to expand the influence of aesthetic experience in discussions of environmental ethics. What meanings *could* electric infrastructure transmit to viewers? How might direct, physical engagement with improve its perceived fit in an environment? Answering such questions through ethnographic research reinforces the significance of experiencing electricity and/in landscape.

High-voltage overhead transmission lines (HVOTLs) are filled with tension and demand compromise. Transmission lines—which are also called power lines, and sometimes "power-lines" include all of the wires, cables, guys, cross arms, poles, pylons, towers, insulators, conductors, switches, transformers, and other materials required for transmissions 69kv or greater. Public concerns about the lines tend to coalesce around their real or potential impact on property value, safety, land use, human health, wildlife, ecosystem, and aesthetics [14–16]. While these and other factors, such as the siting process and forms of public engagement, have been subjected to numerous empirical studies, aesthetic impact remains difficult to value and parse.

On the one hand, it is hard to design visually pleasing poles and pylons. The lede of a 1982 *New York Times* editorial, "There's no way to beautify a power-line pylon," predicts the ambiguous conclusion of a recent review of industry efforts to change materials, shapes, and insulator configurations: "improving public perception through design has ultimately led to unrealistic expectations" ([17] p. 38). On the other hand, it is difficult, if not impossible to predict how, why, and for how long an individual or a group may oppose the aesthetic impact of a particular power line. In 1996, the International Electric Transmission Perception Project concluded that "aesthetics emerged as a major issue of concern," but the results of existing research made it, "difficult to draw specific findings or conclusions" [15]. It seems that both industry and the public agrees—the lines are, at best, not pleasing, and, at worse, egregious monstrosities.

In a recent news article on possible health impacts of power lines, a Columbia University Professor of Environmental Health Sciences claimed: "I probably would not be terribly worried [about lines' health effects] other than the fact that they're terribly ugly" [18]. Such assurances may dispel persistent fears about the carcinogenetic effects of electromagnetic fields; however, assuming the lines are safe but "terribly ugly," "eyesores," or "blight" can signal a troubling ethical intervention. If the lines are universally ugly or inherently blight, then complaining about their aesthetic impact seems frivolous and even unethical, especially in relation to other environmental quandaries (e.g. sweeping deforestation, exploitative labor practices used to extract precious metals and fossil fuels, superpowers' lukewarm efforts to reduce global warming). In addition, if we assume *all* lines are ugly and they must blight *some* areas then opponents may be labeled as NIMBY (Not in my back yard) and morally blameworthy.

Philosophers have challenged the idea that Nimbyism is inherently immoral or egotistical [19], [20]. Social science researchers studying perceptions of transmission lines have also worked to debunk NIMBY stereotypes, showing that even those who do not live nearby lines often oppose them based on aesthetic, political, or environmental beliefs [4,21,22]. Utilities and transmission planners may improve stakeholder engagement by accepting that, rather than hackneyed NIMBY responses, resistance to a power line in a particular place is "neither irrational nor necessarily unethical" ([23] p. 118). Of course, the negative perceptions can appear irrational, especially as the perceived burdens of lines in the landscape are psychologically disconnected from the benefits derived, both by the individual who enjoys electricity in her or his home, and by the community making a transition to more renewables.

The problems posed by overhead electric transmission lines are not new, but putting the lines underground costs 6–20 times more than overhead [24]. Gaining public acceptance for renewable, overhead transmission lines is increasingly important. In 2015, the U.S. electric power industry produced 1.925 million metric tons of carbon dioxide, or 38% of all energy-related emissions. Of these, 1.364 million metric tons, or 71%, were linked to coal [25]. Without interconnected regional, national, and international grids, the renewable revolution may have to wait for advancements in local energy storage. For instance, efficient, house-sized batteries might store wind and solar energy generated in times of surplus and, when the wind stops or night falls, the stored energy could meet local demands. Alternatives to futuristic storage technology may already exist.

A recent computer model built by Alex MacDonald and colleagues at the National Oceanic Atmospheric Administration shows that a nationwide network of high-voltage direct current (HVDC) lines could meet U.S. energy demands by point-to-point transmission from giant wind farms and solar fields in the rural areas to the more populated (and energy hungry) areas of continent. The researchers conclude that such a sustainable, large-scale electric network could reduce carbon emissions by 80% from 1990 levels [26]. Such massive systems would have significant international and even global benefits but, as one energy expert explained, "The problem is not rooted in technology, but rather in the way that the U.S. power system is organized legally, politically, economically, and culturally" [27].

A culture of public resistance to overhead transmission lines has manifest in different forms and with varying intensities. Whether or not a community decides to accept a power line may not be their most pressing ethical or environmental dilemma, but, just as a fallen tree branch or a pesky squirrel can short a transmission line and lead to widespread blackouts, particularly negative perceptions of power lines can have sweeping effects.

2. Wire evil and electric rhetoric

As electric power systems proliferated through North America and Europe, the overwhelming advantages wrought by broad and nearly instantaneous communication and power networks drove far deeper into our social landscape than some of electrification's more contentious, albeit well-documented, effects on politics, communication, commerce, and culture [28–32]. In popular discourse, electrification