

ENERGY JUSTICE IN GLOBAL PERSPECTIVE

Reading California's Power Grid: A Metonymic Methodology

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As climate change intensifies, the global imperative to minimize carbon emissions and move beyond oil deepens. Many visions for the future of energy imagine increased electrification as a solution to the transition away from fossil fuels that does not require major cultural change. In this imaginary, electricity acts as a bridge between the fossil-fueled twentieth century and technologically driven green energy futures. Not only does the vision of a green electrified future fail to address the unjust cultural and political power relations that surround energy systems, it also ignores the already disastrous impacts climate change has had on the US power grid. Examining the environmental entanglements of and the cultural imaginaries that shape electrification is necessary to imagining and enacting more just and transformative energy futures that do not use electrification as a means of prolonging the current extractive, colonial, and capitalist cultural approaches to energy.

This essay takes as its starting point the tension between visions of green electric futures and the material reality of the grid. Focusing on California's electricity grid, this essay analyzes electricity's complicated web of power relations by triangulating three case studies that apply a metonymic methodology for close reading the region's power grid. PG&E's smart meter upgrades are the focus of the first case study. The second case study examines California's recent electricity equipment-sparked superfires. Finally, the essay concludes with a third case study focused on PG&E's public safety power shutoffs, the utility's safety response intended to prevent additional fires. Ultimately, the three case studies, when juxtaposed, provide very different perspectives on the dominant narratives surrounding electrification. When triangulated, the case studies show how the imaginary of easily accessed limitless electricity, which fuels visions of increased electrification as a solution to climate change, relies on both an abstraction of the power grid and the continuation of unjust colonial practices.

Introduction

As climate change intensifies, the global imperative to minimize carbon emissions and move beyond oil deepens. Many visions for the future of energy imagine increased electrification as a solution to the transition away from fossil fuels that does not require major cultural change.¹ An April

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¹ This article draws on research and writing from my dissertation, "The Leaky Grid: Black and Native Electrified Imaginaries" (Gerson 2022).

13, 2022 joint letter from a group of 178 business leaders, environmental and health non-profits, government municipalities, and consumer protection, civil rights, environmental justice, and affordable housing advocates sent to US President Joseph Biden urging him to “support economy-wide electrification as a critical decarbonization tool” is an example of this vision (Rewiring America 2022). In the letter, increased electrification is presented as “necessary to ensure a safe and thriving climate future” while also offering a variety of economic benefits, including “cost savings for American families,” “good-paying American jobs,” and “avoided greenhouse gas pollution” (Rewiring America 2022).² In this imaginary, electricity acts as a bridge between the fossil-fueled twentieth century and technologically driven green energy futures.

Yet, as the Petrocultures Research Group explains, attempting an energy transition that does not seek to transform the social practices and relations surrounding energy systems, and instead merely swaps one energy source for another, retains “existing socio-economic inequalities—indeed, requires them” (Petrocultures Research Group 2016, 33). In other words, climate change, a result of colonialism,³ extractive capitalism, and environmental injustice, is not solely an emissions issue. The Center for Interdisciplinary Environmental Justice (CIEJ) explains that “it is dangerous to reduce climate change to an ‘emissions’ issue and to leave intact the extractive and oppressive processes that caused climate change in the first place” (CIEJ 2019). The center identifies these processes as the “co-constitutive systems of oppression: white supremacy, settler-colonialism, heteropatriarchy, capitalism, the nation-state, and land and water dispossession” (CIEJ 2019).

The joint letter urging “economy-wide electrification” conveys the ways in which electricity is contemporarily viewed as an environmentally friendly, technologically progressive solution to climate change that does not require radical (and necessary) cultural, political, environmental, and economic change. As Akhil Gupta argues, “The problem of sustainable futures requires a complete recalibration of energy use with social and political life” (Gupta 2015, 564). The electric car is an example of the shortcomings of building energy futures around increased electrification as a solution to fossil fuels. Electric cars are shaped by developmental logics that imagine social progress results from technological innovation. In practice, electric cars perpetuate petrocultural imaginaries of limitless individual access to transportation and energy for the global elite. They do not provide the radical cultural shift necessary to address the underlying hierarchies of power and social practices that created climate change. Even in states like California, with high

2 You can read the letter in full here: https://assets.ctfassets.net/v4qx5q5o44nj/1N44vFK1qLjZEI8c2AFB3V/39919e049dd3f82c7a3f608162418964/Climate_Provisions_Sign_on_Letter.04.13.22.pdf.

3 Potawatomi scholar Kyle Powys Whyte demonstrates how climate change is intensified colonialism in “Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene” (2017).

renewable generation, switching to electric vehicles will reduce carbon emissions by only approximately 5 percent (CIEJ, n.d.). Instead, electric car battery production continues colonial systems of resource extraction and Indigenous displacement.⁴ Examining the environmental entanglements of and the cultural imaginaries that shape electrification is necessary for imagining and enacting more just and transformative energy futures that do not use electrification as a means of prolonging the current extractive, colonial, and capitalist cultural approaches to energy.⁵

Not only does a greenwashed electrified future fail to dismantle the unjust cultural and imperial power relations that surround energy systems, it also ignores the already disastrous impacts climate change has had on the power grid. Globally, and across the United States, electric utilities and regulators have failed to prepare the power grid for the impacts of climate change, including increased storms and intense heat and drought. Consider, for instance, Hurricane Maria, which took Puerto Rico's power grid offline in 2017; the triplicate winter storms that caused Texas's major power crisis in February 2021; and the Pacific West's electricity equipment-sparked fires. This essay takes as its starting point the tension between visions of green electric futures and the material reality of the grid. In it, I analyze electricity's complicated web of power relations by advancing a metonymic method of reading for infrastructure.

I propose that the rhetorical trope of metonymy provides a framework for analyzing the power grid. A rhetorical trope is a device that makes meaning at the conceptual level through substitution (Sajé 2009; Matus 1988). A familiar example is the metaphor, which produces new meaning through comparison and similarity (Matus 1988, 307).⁶ Metaphor, according to Roman Jakobson, relies on similarity, and metonymy on contiguity. Metonymy also works through substitution but is the substitution of a part for the whole (or a whole for the part),⁷ the substitution of a name,⁸ or the substitution

4 Emma Jayne, of CIEJ, explains, "In a future where we've replaced gasoline-powered vehicles with electric ones and power plants with giant batteries, we have FAILED to combat climate change, and our efforts have displaced thousands of Indigenous people from their homelands" (Jayne 2021).

5 Karen Barad defines entanglement as "not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence" (2007 ix). Nicole Starosielski's essay "Pipeline Entanglements of Fibre-Optic Cables" provides an illustrative example of infrastructural entanglement (2016).

6 For example, in order to produce knowledge about the co-constitutive relationship between the State of California and PG&E, the *San Francisco Chronicle* relies on metaphor: "The fabled histories of California and Pacific Gas and Electric Co. have been so inextricably linked that the venerable power company is to the Golden State what General Motors is to Michigan" (Doyle 2001). In this metaphor, comparison and similarity produce conceptual knowledge about California and corporate utility PG&E, centering on the ways the privatization of resources, capitalist industry, and corporate power are inherent to colonial projects of statehood.

7 Synecdoche is the specific rhetorical trope where a part is substituted for a whole, or a whole is substituted for a part. Following in the footsteps of many literary scholars, I have subsumed it under the umbrella of metonymy (Matus 1988, 325; Sajé 2009, 47).

8 Think here of the way corporate brand names come to stand in for the objects they produce, such as Xerox for copier and Kleenex for tissue. Unpacking the cultural ideologies inherent in these metonyms draws attention to corporate power and capitalist modes of production.

of something interrelated or closely associated (Sajé 2009; Matus 1988).⁹ Rhetorically, the metonym structures how people communicate and produce knowledge about electricity. In the English language, electricity is often spoken about through metonym. For example, colloquial terms for electricity such as “power,” “lights,” and “current” are all metonyms that produce knowledge about electricity through substitution. Current is in a part/whole relationship to electricity; lights reference the energetic work that electricity accomplishes and thus is in close association; and power is contiguous with electrical energy. The concept of metonymy draws attention to contiguity and relationality, providing a methodology for making the sprawling system of the power grid and its complex cultural, political, and ecological interrelationships legible.

Through a metonymic methodology, specific critical encounters with electricity infrastructure produce knowledge about the ongoing interactions between climate change and electricity infrastructure, and the distance between the current power grid and smart grid fantasies. Focusing on California's largest investor-owned utility (IOU), Pacific Gas & Electric (PG&E)—whose service territory stretches from the Pacific (west) to the Sierra Nevada (east), and from Bakersfield (south) to Eureka (north)—I triangulate three case studies that apply a metonymic methodology for close reading the region's power grid. PG&E's smart meter upgrades are the focus of the first case study. Metonymically, the smart meters stand in for the whole of the grid and participate in technologically developmental smart grid imaginaries. The second case study examines California's recent electricity equipment-sparked superfires. The electrical sparks igniting these blazes metonymically facilitate an examination of the power grid's interrelationship with California's changing climate, while also opening an analysis of the way the grid spatially contours California environments. Finally, I conclude with a third case study focused on PG&E's public safety power shutoffs (PSPSs), the utility's safety response to preventing additional fires. The PSPSs stand in direct contrast to Western modernity's fiction of instant access to limitless energy, and to its imaginary of increasingly electrified futures.

The PSPSs weave the first two case studies together, showing how they are interconnected, while also highlighting the distance between progressive technological imaginaries of a future smart grid (which smart meters enable) and the unsustainability of limitless energy (which the fires lay bare). The three case studies provide very different perspectives on the dominant narratives surrounding electrification. When triangulated, they show how the

⁹ For example, Bob Johnson opens his entry on “Embodiment” in *Fueling Culture 101* with a metonym. He proposes that hot yoga, in all of its luxurious excess, is an embodied and tactile metonym for modernity's carbon-fueled culture (2017, 124). For Johnson, hot yoga, made possible only by the burning of coal, petroleum, and petroleum products, substitutes for all of modernity's “pleasures of combusted carbon” (Johnson 2017, 124).



Figure 1: An electricity tower in PG&E's service territory, just outside San Luis Obispo, California.

The photo shows the impossibility of visualizing electrical infrastructure within a single frame. The tower looms, too large to fit in the photograph, and the transmission lines exceed capture by the photo's frame, alluding to the larger interconnected grid system the tower is part of. Photograph by Sage Gerson. The photograph is reproduced with permission of the photographer.

imaginary of increased electrification as a solution to climate change relies on both an abstraction of the power grid and the continuation of unjust colonial social practices. In this essay, I recognize that California is a single site in a larger global geography where similar tensions and interactions are also at play. In my focus on California, I hope to connect the region with other sites like Texas and Puerto Rico, where the fantasy of limitless electricity has also been interrupted by changing climates and continued colonial power relations.

A Metonymic Methodology

Analyzing infrastructure means addressing issues of scale. The sprawl, scope, and scale of the power grid complicates its local visibility—the entire system of the grid remaining out of view. As Lisa Parks has written, “an infrastructure is difficult to visualize in its entirety within a single frame” (2015, 356). There is no vantage point from which a California electricity user can see the entirety of the region's electrical grid as it stretches across state lines and through tinder-dry backcountry to deliver electricity. Too high of an aerial view renders the electricity infrastructure invisible, too earthbound and the system recedes, a specific local infrastructural segment filling one's vision. In other words, the power grid requires a methodology of limitation, one that resists a God's-eye view, forcing partial perspective.

Scholars often define infrastructures by their perceived invisibility, claiming that breakdown and failure are needed to produce infrastructural visibility (Parks and Starosielski 2015; Graham 2010; Star 1999). While infrastructure breakdown is often spectacular (oil blowouts, bursting dams, failing bridges), this formulation reinscribes reductive binaries between visible/invisible and success/failure. When operating without failure, electricity infrastructure is not invisible to communities who live in close proximity to toxic coal-fired power plants, or to those who install solar panels on their homes and businesses. The formulation of visible and invisible is about a kind of attention—what is known about something, and who notices—that is inherently shaped by positionality, spatiality, and structures of power. To see or be seen is not necessarily the same as to know or be known.

Writing about partial perspective and situated knowledges, Donna Haraway theorizes that “seeing everything from nowhere” (1988, 581), or the “god trick” of “infinite vision is an illusion” (1988, 587). The god trick of objective vision, she cautions, has been mistaken “for creativity and knowledge, omniscience even” (Haraway 1988, 587). Haraway writes that “the knowing self is partial in all its guises, never finished, whole, simply there and original; it is always constructed and stitched together imperfectly, and therefore able to join with another” (1988, 586). Haraway provides a framework for thinking through how knowledge is produced from specific situated perspectives, and how an approach that acknowledges limitation is not the same as reduction or foreclosure, instead creating the possibility for interconnections. Adopting such an approach enables an account of California's electricity infrastructure that exceeds a dichotomous classification as invisible or visible, successful or actively failing. My approach to studying infrastructure, informed by Haraway, works across media and material forms and is interpretive and analytical. I adapt a close reading approach commonly used in literary studies to scrutinize specific infrastructural segments, details, interrelations, and attributes in order to produce meaning about the system—much the same way literary scholars who practice text-based close reading focus on specific details in order to produce knowledge about a text.

Parks outlines a method of critical encounter for studying infrastructure in which she tries “to develop a critical methodology for analyzing the significance of specific infrastructural sites and objects in relation to surrounding environmental, socio-economic, and geopolitical conditions ... These observations and mediations are intended to foster infrastructural intelligibility into discrete parts and framing them as objects of curiosity, investigation, and/or concern” (Parks 2015, 355–56). Metonymy provides a methodology for thinking alongside Parks's work to foster intelligibility by drawing attention to discrete parts of infrastructure as objects of investigation and concern.

A metonymic approach provides the thread for stitching together different critical encounters with the power grid—enabling an analysis focused on infrastructural interrelationships, spatiality, contexts, and part-whole relationships. Natasha Sajé theorizes that “Metonymy shows us how we (are taught to) see the world through the things we connect and represent. Analyzing metonymy involves understanding part-whole relationships, contexts, and categories” (2009, 48).¹⁰ Jill Matus writes that metonymy was reclaimed by feminist literary scholars (1988, 306) because it is “concerned with context,” “bound up with temporality,” “spatial, physical” (1988, 311), and, powerfully, as “positionality made figurative” (1988, 312). Matus’s linking of metonymy and positionality connects a metonymic method of reading infrastructure directly to Haraway’s situated knowledges and partial perspectives. Furthermore, in its focus on the contiguous, spatial, and physical, metonymy draws attention to the grid’s interactions with environments, geographies, and landscapes.

Matus asserts that “A sensitivity to metonymy in reading texts not only necessitates an attention to context, positionality, and interrelationships but also advances the decoding of cultural perspectives and ideologies, since the things we choose to connect and represent in terms of each other tell us about the way we see the world” (1988, 323). Analyzing California’s power grid through the concept of metonymy helps bring attention to the colonial, economic, and political forces shaping its interrelationships with ecologies and human power structures. Through a metonymic methodology of partial perspective, analyses of specific aspects of and encounters with electrical infrastructure are able to produce knowledge about the power grid despite the fact that its scale exceeds a single frame.

My work expands on Jennifer Lieberman’s theorizing about “the ongoing role that metonymy plays in our representations and conceptualizations of electrical systems” (2017, 15). While Lieberman analyzes the reductive role that metonymy plays in cultural constructions of electricity, as it can make invisible the human labor and complex sociotechnical systems that make electrification possible, I take up metonymy as a framework that draws attention to the grid’s spatiality, historical context, and interconnections. The metonym operates on multiple levels—rhetorical, visual, spatial, and material—throughout this essay. Different aspects of how metonymy works inform the focus of each of the following case studies. The first substitutes electricity meters for the whole of the grid, utilizing the way metonymy is

¹⁰ It is worth noting that Jacques Lacan conceives of metonymy as substituting signifiers from within the same signifying chain, whereas a metaphor substitutes a signifier from a different signifying chain. For Lacan, this means that metonymy never arrives at a signified and instead always defers, unlike metaphor, which borrows a signified from another signifying chain. This leads Lacan to claim that metonymy is “the signifier of desire” due to its perpetual displacement (Lacan, quoted in Matus 1988, 306). Because of this, Lacan conceives of metaphor as creating a vertical signifying relationship, while metonymy’s relationship is horizontal. Metonymy’s horizontality seems well suited to infrastructure’s horizontal sprawl and the desire for endless energy it supports. The powerlines in [figure 1](#) visualize the horizontal sprawl of infrastructure as they stretch to the edges of the photograph. The way the transmission lines exceed the frame of the photo evokes an endless horizontal crisscross of electrical wires, sprawling across, and beyond, California.

structured by part-whole relationships. The second and third case studies draw on metonymy's emphasis on interrelationships, spatiality, and context by substituting events closely related for the power grid to show that energy solutions to climate change must be about more than merely emissions.

Part-Whole Relationships: Electricity Metering

Electricity meters are in a part-whole relationship with the larger power grid. They are the interface through which customer electricity use is mediated—where electricity companies come into direct contact with individual users, and where users interface with the larger infrastructural system of the power grid. Being an energy consumer emphasizes knowledge and familiarity with certain aspects of electricity use—namely, what Mette Kragh-Furbo and Gordon Walker describe as “the energetic work that it performs,” such as “the intended movement of an electric fan ... electricity itself is not directly perceivable in its presence, movement or amount” (Kragh-Furbo and Walker 2018). Lieberman observes that “when the word electricity evokes the components that users see and control—the light you turned on, the power whirring through your devices—it functions as a metonym” (2017, 214). In other words, energy systems are designed to highlight individuals' everyday encounters with energy. This is facilitated, in part, by interfaces, such as light switches, fuse boxes, and electricity meters, designed to specifically mediate user interactions. Often, as is the case with the meter, these interfaces position energy as commodity and user as consumer. These interfaces provide familiar touchpoints because, in practice, they make the work electricity performs perceptible.

In 2006 the California Public Utilities Commission (CPUC) first approved the installation and use of smart meters. Smart meters gather real-time data and relay it to utilities to facilitate intelligent management with the goal of increasing efficiency. California's smart meter upgrades act as a material metonym for future smart grid aspirations. The replacement of electromagnetic (or analog) electricity meters with digital (or smart) meters provides an entry point into the cultural values that are built into California's grid, including technodevelopmental imaginaries of smart grid futures and the quantification/datafication of everyday lives and environments.

Both analog and digital meters measure and record customer usage data. Electrical usage is measured in kilowatt hours (kWh). Analog meters measure electricity mechanically, recording usage on a set of dials on the meter's face. The analog meter uses two conductor coils to create magnetic fields. One coil interacts with the electrical current and the other with the voltage passing through the meter. The magnetic fields created by the coils turn a disc inside the meter that rotates as current is drawn from the grid (US Department of Energy, n.d.). To collect the meter's data, its dials must be read on-site monthly by a utility employee (known as a meter reader). The analog meter cannot be read remotely.

Digital, or smart, meters enable two-way networked communication between a customer's residence and utility (PG&E, n.d.). PG&E's digital electricity meters record commercial customers' usage data every fifteen minutes and residential customers' usage data every hour (PG&E, n.d.). Smart meters use both cellular mesh networks and radio frequencies to convey residential customer usage to the utility approximately every four hours. In other words, instead of one residential customer data point a month collected by a utility employee, utilities now collect 720 data points per month digitally. Kragh-Furbo and Walker conceive of smart metering as a "data-making activity" (Kragh-Furbo and Walker 2018, 1). As Shannon Mattern has demonstrated, datafication is simultaneously mediation (Mattern 2017 ix). Smart meters mediate the environment as data, energy as resource, and user as consumer. The data that meters produce makes it possible for PG&E to provide online user accounts that allow customers to monitor energy use and savings. Through federal government programs, the data also has the potential (through a customer opt-in system) to travel beyond PG&E to third parties (Data.gov 2012). The US government sees the consumption and use of utility customer data as a "growing market" that they hope to "jumpstart" (Data.gov 2012). Thus, smart metering is an example of assetization—turning data into a commodity to create new markets.

Meters are part of how the power grid mediates electricity access and use, determining the experience of electrification. In this way, electricity meters facilitate global flows of capital by enforcing privatization of energy resources, monitoring and tracking energy resource use, and making utility profit possible. Electricity meters hail users as consumers, tracking and disciplining them as such. Antina Von Schnitzler explains that "as they measure, meters translate and render the physical world legible in numerical terms through mechanical dials or, more recently, LED screens. Measurement here is performative; it is a material-semiotic practice that produces realities, rather than merely representing them" (2017). Von Schnitzler observes that meters, as semiotic objects, accomplish things besides measuring electricity. She explains that the meter "can assign responsibilities and produce obligations" (Von Schnitzler 2017). Smart meters reassign responsibility for the environmental impacts of electricity from the utility producer and distributor to individual users. Couched in environmental terms, the type of environmentalism that smart meters bring about is one steeped in capitalist logics of demand and response, consumption, and control.

While smart meters facilitate a relationship with the environment through their mediation, the relationship they bring into being is one based on the illusion of human control and dominance over environments—constructing the environment as always already eminently knowable and manageable. Lieberman contends that "The entire sociotechnical apparatus that we colloquially and metonymically refer to as *electricity* allows us to write for ourselves the fantasy of an orderly world—a world that responds to the

buttons we press” (2017, 214). Smart meters produce a form of environmentalism based not on taking direct action, community organizing, or reimagining cultural relationships to the environment, but instead on individuals responding to digital data points that monitor and reconstruct their energy use. Smart meters’ datafication and mediation produce the illusion of control over environments, energy users, and energy systems.

Smart meters are “sensing” technologies that make electricity metering “programmable.” I use both “sensing” and “programmable” here in direct reference to Jennifer Gabrys’s work. As Gabrys (2016) outlines, sensors are intended to enable enhanced responsiveness through the real-time monitoring and collection of data. The data is then processed and is supposed to “trigger responses that may be human- or machine-based ... often oriented toward making systems and processes more efficient or ‘balanced.’ The real-time ‘intelligence’ provided by sensors is meant to translate into smart systems that continually enable corrective actions” (2016, 8). The goal of using such sensing technologies is to ensure quick and efficient management of environments as well as infrastructures (Gabrys 2016, 8). This kind of efficiency is designed not to radically transform an energy system, but instead to maximize it. While the increased energy efficiency, load shifting, and integrated renewable generation smart meters enable are environmentally significant, smart meters also further the twentieth-century imaginary of limitless access to energy fueled by technological progress.

Proponents like the CPUC, PG&E, and environmental organizations assert that digital metering enables smart decision-making, cost control (PG&E, n.d.), and optimization (CPUC, n.d.). For supporters, smart meters make possible new, data-driven, and efficient relationships between humans and energy systems. These supporters present smart meters as a win-win for utilities and customers, both financially and environmentally, and as the first advancement of a smart grid—which they envision as central to US energy futures.

PG&E conceives of the smart meter as the “cornerstone of the smart grid, that will modernize the electrical system to be stronger, smarter and more efficient” (PG&E, n.d.). Smart meters, as the cornerstone of the smart grid, are presented as not only driving a “new green technology industry in California” but also improving electricity delivery “reliability” through increased resiliency “in the face of outages and other problems” (PG&E, n.d.). The belief in a technologically progressive future is on full display on PG&E’s website, where it is written that “There is no one single idea or technology that will get us to the Smart Grid in one fell swoop. Rather, it’s a series of small steps and incremental advancements. It may seem like a lot, but in a decade, we’ll all be shocked at how far we’ve come. The actions we take now are in preparation for technologies and developments we haven’t

yet fathomed” (PG&E, n.d.). There is little substance in PG&E’s statement beyond an abstract narrative commitment to linear developmental progress driven by technological innovation.

Spatiality, Relationality: Electricity Equipment—Sparked Fires

Just over a decade ago, PG&E was touted as one of the most progressive utilities in the United States (Roberts 2007). However, in recent years, it has become known more for its equipment-caused fires and bankruptcy than its progressive approach. Between 2014 and 2017, PG&E equipment sparked more than 1,500 California fires (McFall-Johnson 2019), and since 2015, PG&E-ignited fires have caused more than one hundred deaths (Worth, Pinchin, and Sullivan 2020). Since the 1980s, more than one-seventh of California has burned (“KCET Tending the Wild,” n.d.). Approximately 40 percent of the region’s “worst blazes” have been caused by electricity equipment (Worth, Pinchin, and Sullivan 2020).¹¹ Images of California’s superblazes and smoke-choked skies have come to stand in as spectacular visual metonyms for the destruction promised by accelerating climate change—igniting the apocalyptic imaginaries of those living in and beyond the region. California’s combustible landscape, exacerbated by human-caused drought and heat—and by the state’s infrastructure systems, including its many miles of high-tension powerlines and century-old transmission towers (Blunt and Gold 2019; Brekke 2019)¹²—come together in a perfect firestorm of colonial making. PG&E’s electricity equipment–sparked superfires provide openings into the physical and historical contexts of California’s grid, and the way that the grid contours the region’s environments. Examining the fires ignited by PG&E’s equipment draws attention to the power grid’s interrelationships with California’s changing climate, settler colonial land management practices, and the carceral state. Employing a metonymic approach emphasizes the grid’s spatial distribution. Considering the spatial distribution of California’s power grid reveals the incongruity of representing the region’s fires as wild and the electricity grid as either separate from nature or as a passive infrastructural system that benignly sits atop the landscape.

Mike Eliason’s photograph in [figure 2](#), makes a visual argument about the causal relationship between the state’s power grid and recent superfires. The photograph, which continues to be published alongside news articles about ongoing electricity equipment–sparked fires, acts as a visual metonym. Despite accompanying news reports about fires ignited by PG&E equipment, Eliason’s photograph does not depict a fire sparked by PG&E. Instead, it

11 CAL FIRE ranks California’s top twenty largest (by acre), deadliest, and most destructive fires. According to these rankings, four of the top twenty largest fires and four of the top twenty deadliest fires were sparked by electricity equipment (CAL FIRE 2020). In turn, nine of the top twenty most destructive fires were caused by electricity equipment (CalFire 2020).

12 Breaking investigative reporting found that PG&E was aware that hundreds of miles of high-voltage lines needed repairs for years before they sparked the deadliest fire in California history in 2018 (Blunt and Gold 2019; Brekke 2019).



Figure 2: The Thomas Fire as it burns through Montecito, California, on December 17, 2017.

It would take firefighters more than a month to fully contain the fire. The photograph opens the article about the fires caused by PG&E electricity equipment, “Part 1: PG&E Gets Burned for California Wildfires,” *Forbes*, February 7, 2019. Photograph by Mike Eliason/Santa Barbara County Fire Department. Photograph reproduced with permission of the photographer.

depicts the 2017 Thomas Fire, blazing through Montecito, California, south of PG&E’s service territory. When we unpack this metonymic substitution, it is clear why Eliason’s photograph is used to illustrate California’s electricity-sparked fires: it visualizes the spectacular environmental violence of electricity equipment–caused fires. In it, the transmission towers threaten, backed by flames that are as tall as they are. The towers stand out in stark relief against the fire’s red glow and wreath of gold smoke. The linearity of the electrical equipment works to foreground the infrastructure system, while the organic shapes of the flames, smoke, tree, and hills recede to the background. The powerlines connecting the towers—the fire-starting culprits—are difficult to see, disappearing into the blaze and smoky haze and making the towers appear falsely discrete, camouflaging their interconnection.

Eliason’s photograph, like all spectacularized images of environmental violence that circulate in the aftermath of disaster, is entangled with cultural ways of seeing, experiencing, and being in the environment. Laguna Pueblo author Leslie Marmon Silko unpacks how the English-language concept of landscape “assumes the viewer is somehow outside or separate from the territory he or she surveys” (1996, 265–66). “Viewers,” Silko instructs, “are as much a part of the landscape as the boulders they stand on. There is no high mesa edge or mountain peak where one can stand and not immediately be part of all that surrounds” (1996, 265–66). Silko’s critique of Western cultural environmental perspectives and the Euro-American nature/culture binary illuminates how landscape-style images of environmental disaster are

often shared separately from the histories, environments, and relationships they are part of—frequently offering viewers spectacular but decontextualized images with little or no instructions for interpretation. Landscape-style images of environmental disasters work to sever viewers from their embeddedness within the environments the images depict and are viewed within. As a window into California's fires, the frame of Eliason's photo hides the fire's impact on human communities, conceals the human labor of fighting the fire, and masks the human photographer who captured the image. The only clues of human presence in the midst of the fiery destruction are the transmission towers, which act as a kind of visual metonym for human society. Linking the human and electricity technology works to define what it means to be human through the lens of Western developmental modernity and paints the region's relationship to fire as one of totalizing destruction.

To account for the nearly half of California's "worst blazes" sparked by electricity equipment, it is necessary to turn to the spatiality of California's grid infrastructure, the terrain, and the history of electrification in the state. California's contemporary use of high-voltage electricity transmission lines as a major component of its grid plays a crucial role in its electricity equipment-caused fires (Blunt and Gold 2019; Brekke 2019). According to historical accounts, California's use of high-voltage lines can be traced back to fuel type (based on resource availability in the state) and the location of resources (the Sierra Nevada) in relation to the location of the state's coastal population centers (Wright 1903). California has never had easy access to coal. Instead, the region was an early adopter of hydroelectric power generation (Wright 1903; Building California 1998; and PG&E Currents 2017). The sources of California's nineteenth and early twentieth-century hydropower were hundreds of miles from its cities, leading to its long-distance, dispersed grid configuration. To minimize power loss from out-of-state and other remote generation sites (Hoover Dam, for example), high-tension transmission lines were developed and installed to transport electricity across California's landscape (Building California 1998, 103).

PG&E's hydroelectric system, which today provides nearly four million households with electricity, is still made up of early gold rush-era water transportation technology (PG&E Currents 2017). The same flume technologies that enabled gold rush hydraulic mining innovations and made it possible for miners to move massive amounts of water and reshape mountains continue to transport water on behalf of PG&E's hydroelectric system (Building California 1998, 103; PG&E Currents 2017; Wright 1903). This use of flume technologies is an extractive and colonial example of infrastructural "remediation" wherein a new infrastructure system does not displace an older one but instead builds upon and transforms it (Bolter and Grusin 1999). Through infrastructural remediation, the colonial ecologies and systemic extraction of mining continue to shape the region's relationship

with water. The region's history of hydraulic mining provides context for the spatial configuration of PG&E's hydroelectric system and is also necessary to unpacking the interrelationships the grid enables and (violently) disrupts.

Popular histories of PG&E tout the utility's ties to the gold rush—such as a popular media account published in the *San Francisco Chronicle* that trumpets that “Tracing its corporate ancestry back to the California Gold Rush, the utility officially became PG&E in 1905” (Doyle 2001). PG&E also celebrates its continued use of early gold rush-era water transportation systems in its corporate-sponsored film *Gold, Water and Power, PG&E on the Stanislaus River*. What these corporate histories erase in their triumphal narratives of developmental progress and electrified modernity include the extreme environmental degradation caused by hydraulic mining practices and the colonial genocide of Native Californian peoples wrought by the gold rush (Risling Baldy 2019; Miranda 2012). Cutcha Risling Baldy, of Hupa, Yurok, and Karuk descent, writes that “the Gold Rush (beginning in 1849) not only brought in thousands of people hoping to find gold, it also included the attempted genocide of California Indian people” (2019). Ohlone/Costanoan Esselen and Chumash scholar and poet Deborah Miranda also recounts how California's goldfields were “the middle of one of the bloodiest genocides ever documented, one approved and funded by the United States government” (45). Miranda and Risling Baldy's accounts of California gold rush history lay bare the colonial violence surrounding PG&E's celebrated flume infrastructure and highlight what both PG&E's and the *San Francisco Chronicle*'s corporate histories fail to acknowledge: the history of the region that is now known as California includes triplicate and ongoing colonial regimes—first the Spanish, then the Mexican, and, into the present, the US. These colonial regimes contour environments, impacting relations with lands, waters, and more-than-human life.

This essay is indebted to Indigenous studies, Native epistemologies, and the diverse environmental knowledges they produce. Crucial to examining electrical energy's place in the US technological and developmental imaginary, and to reimagining energy otherwise, is drawing attention to how Western conceptions of energy are culturally constructed, while also highlighting transformational alternative approaches. To this end, it is important to highlight that the Euro-American conception of energy as quantifiable, commodified, extractible, and privatized is culturally specific (and it is this cultural construction of energy that energy humanists tend to focus on in their scholarship) and, in a US context, requires ongoing colonialism to maintain. Native North American scholars and writers have pointed out that Indigenous conceptions of energy are incommensurate with Western extractive commodification, instead conceiving of energy as a force that animates all beings (Harjo 2019; Diaz 2020). For example, Laura Harjo, Mvskoke scholar of Indigenous futurity, explains that “A Mvskoke way of being in the world is animated by energy in all things ... there is spiritual

energy in all elements ... our time existing in material form is animated by a transfer of energy among beings, an important grounding concept for understanding the realm of community” (2019, 55). Harjo’s conception of energy, focused on community self-determination and animacy, brings into being a very different cultural relationship to the concept of energy, human relationality, and the more-than-human world.

California’s power grid is shaped by, and materializes, human power relations. It is not a technological system that exists in isolation, but as this essay’s attention to relationality highlights, is part of a larger material, cultural, environmental, and political constellation. As the electricity-sparked fires demonstrate, part of this constellation is the power grid’s interrelationship to the long, fraught history of settler land management practices of burn suppression. Beginning with Spanish conquest and continuing through the 1970s with CAL FIRE and US Forest Service policies, fire suppression and the limiting and banning of controlled burning became standard settler land management practices. In the early 1900s, the US Forest Service encouraged fire suppression to maximize the number of trees per acre, and so all fire was viewed as threatening to valuable timber resources (*Tending the Wild* 2016). Fire suppression, born out of a commodification of the land and desire to maximize profit through resource extraction, produces colonial ecologies while also culturally constructing what is perceived to be natural. Before the genocide of the gold rush, it is estimated that 4.5 million acres burned annually throughout Indigenous California (Kerlin 2020). Suppressing fire is one of the ways that colonialism in California fuels and sustains itself.

Yet other relationships to fire exist. The multimedia series *Tending the Wild*, produced with the guidance of Chumash weaver Timara Lota Link, shines light on the traditional ecological knowledge (TEK) of Indigenous people across what is now known as California. The series showcases how Native Californians have “actively shaped and tended the land for millennia,” emphasizing how Native people and TEK are, and have been, necessary to living in balance with nature. The first episode of *Tending the Wild*, “Cultural Burning,” opens with the aftermath of an intentional burn at the Kaweah Oaks Preserve in Tulare County, California. As the camera slowly pans across the burn site, Ron W. Goode, tribal chairman of the North Fork Mono Tribe, says, “You have to know how to work with fire” (*Tending the Wild* 2016). For tens of thousands of years, Native Californians carefully conducted cultural burns to “increase[e] fruit and seed production, caus[e] new growth that was better suited for making baskets, and reduc[e] the fuel load that could be burned by naturally occurring wildfires” (*Tending the Wild* 2016).

Cultural burning maintains Indigenous rights, responsibilities, and well-being (Long, Lake, and Goode 2021). Fire is one of the ways Native Californians have a relationship to the land, caring for it and the diverse more-than-

human beings who also call it home. Throughout the documentary episode, Goode articulates a relationship with the land that is co-constitutive, natural/cultural, reciprocal, and connected. As the climate changes, it is imperative that the region build with fire, not against it. California's infrastructure currently makes the region more fire prone. The frequency of California's fires demonstrates the ways infrastructure-caused environmental violence is systemic and not discrete. Fire in California is not a one-off spectacular event but is instead part of the region's past, present, and future.

The word "wildfire," which both CAL FIRE and PG&E use to describe California's fires (CAL FIRE 2020; PG&E, n.d.), obscures the history of civilizational projects of capitalist development and colonial settlement in California. The term "wildfire" operates within colonial time, in that it conjures the romanticized image of a sweeping fire burning through the undeveloped forests of the Sierra Nevada and the chaparral-covered hills of the Central Coast—not the gritty smoke of the 2018 Northern California Camp Fire (to date, California's deadliest fire) as it destroyed more than fourteen thousand structures and resulted in the death of at least eighty-four people (Worth, Pinchin, and Sullivan 2020). More than half of California's most destructive "wildfires" were caused either by electricity equipment or arson (CAL FIRE 2021)—not exactly ignited in an uninhabited natural environment as the word "wildfire" implies. The *Oxford English Dictionary* (OED) defines "wild" as "living in a state of nature"; when referring to a place or region, "uncultivated or uninhabited; hence, waste, desert, desolate"; and when referring to a person, "uncivilized, savage; uncultured, rude; also, not accepting, or resisting, the constituted government" (1989). More specifically, a wildfire implies "'natural, not artificially produced', or 'out of doors, not domestic'" (*Oxford English Dictionary* 1989). As the definitions show, the word "wild" reinforces hierarchical colonial dichotomies between nature and culture, civilized and savage, that not only reinscribe colonial power and construct a particular version of linear history toward civilizational progress, but also fail to address the complexity and entanglements of California's current fires. The conception of wild regions as uninhabited evokes a violent imaginary of human erasure, akin to the one perpetuated by colonists to justify the violent settlement of the American West. This kind of erasure performs a dehumanizing violence.

The incongruity of the definition of "wildfire" and its use to describe California's increasing fires, regardless of how they are started, not only fails to acknowledge human impact but, more specifically, fails to address precisely who and what is responsible for this impact. Describing California's fires as "wild" accomplishes parallel rhetorical erasures as describing the flooding, levee breaks, lack of assistance or emergency response, and increased violent policing that followed Hurricane Katrina as "a natural disaster." Both

descriptions enforce a false dichotomy between human society and nature and, in so doing, make invisible the structural racism and colonial matrix of power fueling the twenty-first century's spectacular environmental violence.

In response to this spectacular environmental and infrastructural violence, the state of California deploys the labor of incarcerated people to “buffer” the property and people it deems matter from the threat of its fires.¹³ California's incarcerated firefighting force starkly highlights the ways environmental violence lays bare human hierarchies that forcibly organize people into populations deemed to matter and those that do not.¹⁴ In the case of California fires, this hierarchy is enforced by the prison-industrial complex and the carceral state, and falls along racial lines. Black, Native, and Latinx Californians face disproportionate rates of incarceration compared to White Californians (Prison Policy Initiative, n.d.).

California has had an incarcerated firefighting program since 1945 (Hess 2018). At its onset, the program was designed to replace firefighters who had been drafted in World War II (Hess 2018). The program continues throughout California, with as many as 3,700 incarcerated men and women—and, until 2020, this program also included minors—making up one-third of California's firefighting force (Neklason 2017). Incarcerated firefighters are paid less than \$5.50 per day, plus an additional \$1 an hour when actively fighting fires (Goodkind 2019). Incarcerated firefighters absorb the sparks from electricity infrastructure with their bodies and labor. David Pellow, in *What Is Critical Environmental Justice?*, evidences the ways that the US prison-industrial complex contributes to a myriad of environmental injustices (2018, 66). Pellow defines prisons as “legally sanctioned sites of enslavement through the incapacitation of human beings and through widespread forced labor” (2018, 87). California's system of incarcerated firefighters makes explicit the ways that all infrastructural systems, including the electric grid, depend on human labor to remain operational. It also highlights the ways that colonial fire management practices and the region's fire-prone power grid are entangled with multiple states of unfreedom.

Context and Substitution: Public Safety Power Shutoffs

On October 9, 2019, in an effort not to spark additional fires, PG&E shut down power across thirty-five counties, impacting approximately 729,000 electricity customers (CPUC 2019). Then, again, between October 23, 2019, and November 1, 2019, PG&E cut off power across thirty-eight counties,

¹³ I use “buffer” here to reference Katherine Yusoff's book *A Billion Black Anthropocenes or None*, which details how “the proximity of black and brown bodies to harm ... is predicated on the presumed absorbent qualities of black and brown bodies to take up the body burdens of exposure to toxicities and to buffer the violence of the earth” (Yusoff 2018 xii).

¹⁴ The state has a long history of buffering the environmental violences caused by its energy systems with the absorbent labors of incarcerated people. For example, incarcerated laborers were brought to Santa Barbara from San Louis Obispo, Santa Clara, and San Diego to perform the toxic task of cleaning up Santa Barbara's beaches after the oil spill (LeMenager 2014, 60–61).

impacting approximately 975,000 electricity customers, many of whom remained without electricity for almost a week (CPUC 2019). These two public safety power shutoffs (PSPSs) became the largest planned outages in California history (CPUC 2019). The shutoffs expose the distance between California's current power grid and utilities' smart grid aspirations, and highlight how the reliance on linear narratives of technological progress allow governments and utilities to continuously defer their commitment to solving systemic problems in the present. The PSPSs are a desperate attempt to mitigate catastrophic environmental impacts, showcasing how unprepared the US power grid is to adapt to increasingly extreme weather and climactic events.

According to PG&E's website, PSPSs are a response to "High temperatures, extreme dryness and record-high winds," which create "conditions in our state where any spark at the wrong time and place can lead to a major wildfire" (PG&E, n.d.). In the interest of public safety, "If severe weather threatens a portion of the electric system, it may be necessary for PG&E to turn off electricity ... This is known as a Public Safety Power Shutoff (PSPS)" (PG&E, n.d.). Documentation from the CPUC shows that the PSPS in early October, 2019 was executed poorly, constituting "a risk to public safety" that "resulted in significant disruption to the public" (CPUC 2019). Among PG&E's failures: Its website was down and unavailable for most of the PSPS event, meaning customers and government agencies could not access information about the outage (CPUC 2019). PG&E did not notify 23,000 customers (of a total 729,000 customers) that the outage would occur, including 500 medical baseline customers—PG&E's program for residential customers who depend on power for certain medical and independent living needs (CPUC 2019). PG&E did not coordinate with local governments or Native nations prior to or during the outage (CPUC 2019). And, finally, PG&E did not have a plan prior to the outage about how the PSPS would impact other infrastructure throughout its service territory (such as hospitals or data centers), and did not identify where backup power would be necessary (CPUC 2019). The PSPSs show utility prioritization of profits over people and environments; the material, environmental, and social limits of the fantasy of easy access to limitless energy; and the failure to radically, safely, and justly reimagine energy systems in the face of a changing climate. Instead, the PSPSs perpetuate structural injustices such as ableism and the undermining of Native nations' sovereignty and self-determination.

One solution to grid vulnerabilities to temperature, dryness, and winds is to bury, or underground, electricity transmission equipment. However, PG&E asserts that burying lines on a large scale is prohibitively expensive. It estimates that it costs approximately \$3 million to underground a mile of transmission lines in California (PG&E Currents 2017). Though asserting the high cost of undergrounding transmission infrastructure, PG&E spent \$2.2 billion on its smart meter upgrade program (Woodall 2009). The billions

of dollars PG&E has spent on smart meters is an example of the tensions between California's imagined future smart grid and the current state of its grid system. It displays, in stark relief, the distance between the CPUC's, utilities', and state's rhetorical commitments to a smart grid "that will modernize the electrical system to be stronger, smarter and more efficient" (PG&E, n.d.) and the (in some places) century-old transmission towers that comprise California's electricity grid (Blunt and Gold 2019). The illusion of control over energy use, environments, and consumers that smart meters promise requires the grid to operate as normal. When thousands of electricity users spend days without power with little to no notice, medical baseline customers are encouraged to purchase their own life-preserving backup power supplies, and electricity equipment regularly sparks fires, a carbon-free, safe, responsive, limitless, and secure smart grid seems like a fantasy.

PG&E has proposed a slate of grid upgrades, including an identified fifty-three thousand necessary "corrective actions," that they predict will take about a decade to complete (Brekke 2019; Worth, Pinchin, and Sullivan 2020). However, documentation shows that PG&E has resisted many of these same upgrades over the last ten years (Worth, Pinchin, and Sullivan 2020).¹⁵ Mark Ferron, a CPUC commissioner from 2011 to 2014, commented that "On a scale from one to 10, where 10 is really obstructive and zero is completely cooperative, I would have put PG&E at a nine" (Worth, Pinchin, and Sullivan 2020). This means some of the damage, death, and destruction of the previous fifteen years was avoidable had PG&E taken safety advocates seriously and prioritized people and environments over profits.

While electricity users wait years for PG&E to upgrade their infrastructure, to ease the burden these PSPS events cause, PG&E recommends that folks (including vulnerable medical baseline customers) purchase backup power sources and be ready with disaster preparedness plans (PG&E, n.d.). These recommendations place the responsibility of both electrification and safety on the individual—a thoroughly neoliberal and inadequate response to systemic issues. Promising future development reinforces an understanding of history where systemic problems of the present are deferred, to be solved in a technologically progressive future. Meanwhile, Californians are left to find their own solutions on an individual level—which, in practice, means these solutions will be unequal, unevenly falling along lines of access (which is shaped by class, ability, location, ownership, race, etc.). The PSPSs are significant. They show the power that energy corporations (as legal

¹⁵ For example, according to Katie Worth, Karen Pinchin, and Lucie Sullivan, reporting for PBS, "the company fought a proposal that it report every fire its equipment caused, describing the measure as an 'unnecessary cost' of time and resources in a 2010 filing. The following year, responding to another proposal, its attorneys wrote that 'PG&E does not agree that it is necessary to require a formal plan specific to fire prevention.' And for years, the Northern California company argued to regulators that it shouldn't be held to the same standards as its Southern California counterparts, saying wind-driven fire risk in its territory was significantly lower than in Southern California" (2020).

monopolies) and infrastructure systems have over everyday lives and environments, while also uncovering the distance between California's smart grid aspirations and its infrastructural reality.

The smart grid is at the heart of linear narratives of technological progress, fueling fantasies of an electrified energy transition that swaps one type of energy for another without radically reimagining social relations or practices that shape current configurations of extractive, capitalist, and colonial energy systems. However, what the PSPs indicate is that these linear narratives, in part, create a present rife with unaddressed systemic problems, problems that can be deferred to the future only with great cost to lives, cultures, and environments.

Conclusion

As PG&E smart grid aspirations show, electricity remains at the heart of US conceptions of progress. In her work, Lieberman details how electrification became wrapped up in notions of progress and ultimately became “a common metonym for modernity” in the nineteenth and early twentieth centuries (2017, 5). Increased electrification as the path toward green energy futures continues to link modernity, progress, and electricity. It also conjures energy futures where limitless individual access to energy remains an integral part of the future of modernity. My focus on situated knowledges and partial perspectives is, in part, an attempt to model what an approach of limitation, in the face of the fiction of limitlessness, makes possible. I understand a methodological focus on limitation to be an intervention into the colonial capitalist emphasis on limitlessness and growth. Limitlessness requires abstraction, decontextualization, and deterritorialization. In opposition to this, an analysis of energy systems that embraces limitations works to reconnect energy to place-based, critical, and historically contextualized knowledge formations.

Approaching energy systems in terms of their interrelationships, spatiality, and context provides a way forward for envisioning alternative energy imaginaries. Prioritizing relationality highlights the social and environmental relationships the grid facilitates and those it forecloses, which, in turn, opens up the possibility of reimagining energy systems based on equity and accessibility that prioritize people and environments over profit. As Gupta attests, “we thus have to reimagine electricity use in the future that does not simply seek to extend the patterns of the present. Bringing more people to the grid so that they can consume more electricity is neither feasible nor desirable” (2015, 564). Climate change requires the reimagining of energy systems. This reimagining is not just an emissions issue, a plug-and-play energy swap, but is an opportunity to envision more just social relations and practices that do not rely on unfree labor or colonial remediation.

The three critical case studies examined here, when juxtaposed, provide very different views of the imagined smart grid future. These encounters raise concerns about the dominant imaginary of climate change as only an emissions issue, and of technological fixes that merely trade one energy source for another. Instead, they highlight the already ongoing impacts of climate change on the power grid in order to challenge uncomplicated visions of energy futures that rely on increased electrification as an oversimple solution to the fossil-fueled past and present.

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