

Anne Pasek, Cindy Kaiying Lin, Zane Griffin Talley Cooper, Jordan B. Kinder, **Digital Energetics**, Minneapolis: University of Minnesota Press, 2023, 152 pp., \$18.00 (paperback).

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Digital Energetics opens with the provocation: “Where is energy in media? And where are media in energy?” (p. 1). To critical scholars of technology, infrastructure, and the environment, this question likely reads as a challenging yet refreshing move away from the “material turn” that has been the focus of much scholarship of the past decade. Drawing from their intersecting expertise in media theory, environmental humanities, and science and technology studies, the book’s four authors experiment with what they term an “energy analytic,” which “frame[s] both an argument about the world and a method of study” (p. 2).

Energy enables the production and consumption of what media scholars would more readily define as “media”—television, social media, etc. But, as the authors argue, energy itself can also be understood as “media” in the sense that it is in the “middle” of technological systems (as electricity, as heat, as data). The energy analytic pushes the researcher to adopt the positionality of energy itself, which is “caught in the middle of” (p. 3)—*mediating*—complex sociotechnical arrangements of labor, material infrastructures, value systems, and environments. This is a methodological maneuver that promises novel analytic perspectives. An energy analytic asks whether our objects of study are truly discrete objects or are better understood as relational assemblages whose boundaries shift when traced through flows of energy (p. 6). In asking this question, the book revisits recent and classic debates across media and technology studies about materialism, determinism, and culture.

Anne Pasek’s opening chapter, “From Atoms to Electrons,” invokes technology researcher Nicholas Negroponte’s famous claim that digitization represents a shift “from atoms to bits” (p. 15). Pasek acknowledges the now-familiar materialist corrective—that digital media are far from immaterial—to emphasize how critical scholars have asserted the importance of studying the atom, even in the (supposed) age of the bit. She carefully sidesteps this argument to ask if “atoms and bits are the wrong foils to describe this shift” altogether (p. 17). Maybe the alternative, she asks, is to “reexamine the history of digital media as a partial shift from the atom to the electron?” (p. 17). She recounts how proponents of early computing technologies sought “dematerialization-through-efficiency”; the replacement of slow human labor with electronics which gained in speed and efficiency year over year. Through this reframing, Moore’s law and Koomey’s law¹ were engrained as dominant cultural narratives of exponential growth and ever-increasing



¹ Koomey’s law “holds that the energy efficiency of digital devices operating at peak performance will double every one and a half years . . .” (p. 27).

efficiency (pp. 26–27). But, as Pasek shows, there are limits to efficiency. The contemporary rise of cloud computing, for example, can be read as a response to the slowing rate of transistor miniaturization (p. 29). The chapter's most incisive contribution lies in its political-economic diagnosis of Big Tech's green ambitions. Despite the contemporary breakdown of Koomey's law, she observes, Big Tech has argued that the efficiency gains computing technologies have unlocked across other sectors are reason enough to maintain optimism about electrical efficiency as a climate solution (pp. 32–33). Yet this optimism is tempered by the sector's growing relationships with fossil capital (p. 34). The result is a portrait of an industry that is both flailing in the search for continued efficiency gains and nonetheless maintaining its facade as an environmental savior.

Zane Griffin Talley Cooper's chapter turns from electrons to entropy, tracing the "problem" of heat in proof-of-work blockchain systems. The chapter starts with his account of an explosion: a blown capacitor on a Bitcoin mining computer. Taking this explosion as an "entry point," this chapter offers a media archaeology of *heat* in computing, conceptualized as "that which escapes and that which is lost through the racks of digital media infrastructures" (pp. 44–45). Here, Cooper assigns a high level of agency to particles and energy within their sociomaterial networks, a provocation reminiscent of Bruno Latour's (1993) recognition of the vast agency of microbes or Timothy Mitchell's mosquito (Mitchell, 2002). Cooper excavates the conceptual migration of entropy as a concept from thermodynamics into Shannon's information theory. In doing so, he contrasts proof-of-work systems against assumptions that have long governed digital infrastructure: primarily, that heat is the ultimate figure of waste or loss, always to be prevented, if possible, in the name of efficiency. However, because "the block-chained data produced through proof-of-work are quite literally a record of consumption, exhaust, and irretrievable loss," proof-of-work systems assign value to this lost energy itself (p. 64). Cooper's archaeology offers an alternative to the vision of ever-increasing efficiency posited by the industry—a "system structured and defined by its profound leaking, a system producing internal certainties through the production and validation of external uncertainties" (p. 66).

Cindy Kaiying Lin's chapter departs from the rest both geographically and methodologically. Based on ethnographic fieldwork conducted alongside Indonesian state computer engineers, this chapter challenges the presumed universality of Silicon Valley's logics of energy and scale. Over the course of a year, Lin documented the engineers' efforts to build databases for satellite images that could support real-time wildfire detection (p. 73). Their efforts were constrained by the country's unreliable electrical and Internet infrastructures. These conditions were not well-supported by off-the-shelf big data solutions offered by tech companies such as Amazon. Lin shows how the same technologies underpinning big data infrastructures can be repurposed to support "small data" systems that are more responsive to unreliable energy infrastructures and labor arrangements. Efficiency, she argues, need not reinforce managerial hierarchy or foreign corporate cloud dependence. In this particular context, electrical and network constraints became sources of autonomy rather than of deficit. Lin's contribution is especially valuable for decentering Global North assumptions of technology and infrastructure design.

Jordan B. Kinder's chapter introduces a variation of the energy analytic—"platform energetics"—through an analysis of the political campaign platform NationBuilder. Linking extractive data practices to extractive energy regimes, Kinder reintegrates material considerations of land, territory, and environment into the hotly debated concept of "data colonialism." His modification to this concept is apt and badly needed: Data are not "the new oil" (p. 97). Rather,

Electricity, integral to the digital media systems that allowed data to be thought of as the new oil, remains predominantly produced by coal across the globe, an energetic relation between data and energy whose consequences will be increasingly if unevenly felt in the near and far future. (p. 97)

NationBuilder, he argues, simultaneously constructs imaginaries of technologically mediated democratic participation, while also constructing extensive material ties with extractive and environmentally destructive industries. This point is brought to bear by emphasizing the apolitical ambivalence that NationBuilder has monetized: Pro-environment activists and pro-oil campaigns alike use the platform to assert their values, and the platform thus lends legitimacy to both. By situating digital participation within the expansionary logics of extractive infrastructure, Kinder underscores the book's broader claim that digital systems actively shape energy regimes in addition to being powered by them.

Across these chapters, *Digital Energetics* advances two major conceptual contributions. First, it renews attention to the historically constituted specificity of media, extending and offering a new perspective to the long debate in the field (see Gitelman, 2006). Rather than treating the "digital" as deterministic or inconsequential, the authors track how specific infrastructures and technologies in specific contexts—circuits, proof-of-work systems, database architectures, and platforms, respectively—produce distinct sociotechnical formations and cultures. Second, the book bears a methodological offering. The energy analytic is more than a rematerialization of the digital (as many scholars have done over the past decade). Refreshingly, the energy analytic *follows* energy into its mediating role between labor and automation, waste and value, and product and politics.

If there is a limitation, it lies in the brevity inherent to the *In Search of Media* series format. While the book contains an excellent introduction that poses the book's main questions, it lacks a conclusion or epilogue to tie the chapters together. Yet this conciseness is also a strength, as the book is conceptually thick without being unwieldy or overly verbose. Future readers who are new to the *In Search of Media* series should anticipate this book to read like a series of conceptually close-knit but standalone vignettes of the interaction of energy, technology, media, and the environment.

At a moment when the climate crisis and the increasing political power in the computing and energy industries converge, the authors' insistence that we "follow energy into these arrangements" (p. 3) offers both a methodological and political imperative. *Digital Energetics* demonstrates a future direction for media studies that enables critical scholars to meet this moment. For scholars of digital media, environmental humanities, and political economy alike, this book provides a conceptual innovation that is urgently necessary.

References

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