

# **Land in Libraries**

Toward a Materialist Conception of Education

*Edited by*

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## Refusing Growth

### Cloud Technology, Climate Change, and the Future of Libraries and Archives

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#### Introduction

In contemporary library and archival work, our technological dependencies are immense and include everything from cataloging software, cloud storage, and task management platforms to credit card machines, scanners, and electronic communication systems. A core link between these tools and their connection to libraries, archives, and information work is “the Cloud.” Though invoked – almost poetically – as a singular, seamless piece of infrastructure, the Cloud is far from floating vapor. Marketing firms and technology corporations often employ the Cloud or cloud-based services as an environmentally conscious solution for the modern workplace; however, popular imaginings like this one mystify its true nature as well as its role in furthering climate change. The Cloud, instead, possesses deep ties to oil and gas extraction in addition to a profound physical and resource-heavy footprint. Moreover, as an armature of Big Tech – including as the largest source of Amazon’s increasing value (Markman, 2021), for instance – the Cloud is firmly embedded within the inner workings and assumed growth of the United States Military. These carbon-intensive entanglements are an ironic reality since cloud infrastructure also enables the advanced scientific modeling necessary to understand our increasingly unpredictable climate future (Edwards, 2017, pp. 36–37; Emanuel, 2019; Mattern, 2017).

Evidence of our shifting climate can be found through crushing heat waves and wildfires, alongside dying ocean life, in clear cut forests and empty water reserves, as well as anywhere that has been touched by intense hurricanes, flooding, mudslides, drought, low crop-yields, snowstorms, or freezing temperatures (Fountain, 2022; Irfan, 2021a; Leahy, 2021; Lewis et al., 2019). Carbon-driven climate change is not imminent; rather, climate change is both already present and accelerating rapidly (*United Nations*, 2021; Irfan & Leber, 2021b). Because of this uncertain environmental future, many industries – including libraries and archives – have now arrived at or are making their way towards a critical inflection point wherein massive adaptation and adjustment is required. So, for those of us using cloud technology in our day-to-day work – as is required by much of librarianship and archivy – where does our responsibility amidst these powerful entities, systemic issues, and stark futures lie?

In the following chapter, I engage with some of the ways that information and memory work actively contribute to climate change through our technological dependencies. To reveal these connections, I first diagram the materiality of the Cloud, reasserting its carbon and land-based footprint. I also directly address the connection between the Cloud and fossil fuels. I then examine recent literature and climate-related actions taken across libraries and archives, exploring the collective necessity for an ethos of both critical refusal and degrowth as tangible field-based responses to climate change. Lastly, I close this chapter by discussing potential paths forward, including scaling back our technological investments, restructuring how we work, as well as taking the maintenance and repair of our systems, spaces, and materials more seriously.

#### The Cloud

Despite possessing a name that evokes ephemerality, cloud technology, or “the Cloud,” is a highly material form of networked computing comprised of an immense chain of geographically-dispersed data centers – a “global archipelago of warehouses that collectively coordinate the world’s computing power” (*Very Like a Whale*, 2022, para. 6). Connected through seas of vinyl cables, these data centers each house server after server and are often kept cool through energy-intensive means like constant fan usage, air conditioning, and/or chilled water (Burrington, 2015; Carruth, 2014; Gonzalez Monserrate, 2022;

Johnson, 2019; Starosielski, 2015). Since the Cloud most often takes up space in unassuming or unmarked office complexes around the world (Burrington, 2016; Hogan, 2015a), our capacity to recognize it, and thus question it, is frequently mired. In *Prehistory of the Cloud*, media scholar Tung-Hui Hu (2015), asserts that, “the cloud has become so naturalized in everyday life that we tend to look right through, seeing it uncritically, if we see it at all” (p. 10). Though this status of quasi-invisibility is key to all facets of infrastructure – invisible until broken (Bowker et al., 2016) – the Cloud’s suggested ethereality is particularly key in how powerful American technology corporations<sup>1</sup> are able to hide away its overwhelming ecological impact (Taylor, 2019; Vonderau, 2019).

When examined on a deeper level, the physical footprint, environmental consequences, and geopolitical realities associated with the Cloud become difficult to ignore.<sup>2</sup> Political geographer Louise Amoore (2018) states that, “the whereabouts of ‘unseen computers’ is not unknown at all, but rather the Cloud is actualized in data centres, located in places with plentiful land, favourable tax rates, affordable energy, water for cooling, and proximity to the main trunks of the network” (p. 8). Every individual data center is a place-specific piece of infrastructure that can either gradually or rapidly influence its surroundings. Data centers exist in the middle of the desert, under the cover of ocean water, and buried in isolated snow and ice – though the information stored within their walls may originate thousands of miles away.<sup>3</sup> The more granular material components of the Cloud are no different. Planned obsolescence plagues the computers, magnetic tape, and drives that make the Cloud function, resulting in both unnecessary and somehow unavoidable excess. The rare earth minerals required for much of this technology are mined under harsh and hazardous conditions.<sup>4</sup>

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1 The specific “American technology corporations” I am referencing are Amazon, Google, and Microsoft – which I will refer to as “cloud corporations” for the remainder of this chapter.

2 For additional writing on the ecological, sociological, and material impact of the Cloud, see Gonzalez Monserrate, 2022; Pasek, 2019; Taffel, 2021.

3 Though beyond the scope of this chapter, data centers are built just about everywhere, including in wildfire and drought heavy regions in the United States like California, Utah, Oregon, and the deserts of Arizona. To keep these energy intensive machines cool, many data centers rely on access groundwater for evaporative cooling – the amounts of which companies like Google and Meta/Facebook fight to keep private. Both companies have identified this kind of information as a proprietary trade secret. See Hogan, 2015b; Parks, 2021; Solon, 2021.

4 For more on computing, cloud technology, waste, and mining for renewables, see Ensmenger, 2018; Liboiron, 2018; Riofrancos, 2019.

And, even if declared carbon-neutral, any data center will continue to consume non-renewable resources.<sup>5</sup> Quite literally, all aspects of the Cloud’s material footprint are marked by waste and toxicity.

Concerned with their public image, more and more cloud corporations appear to be moving away from “dirty” energy in favor of “clean” methods of power. Currently, Amazon, Google, and Microsoft – the three field leaders – are seeking renewable ways to power and maintain their data centers, some even constructing or investing in wind and solar farms (Ambrose, 2019; Gonzalez Monserrate, 2022). Writer Ingrid Burrington (2015) critiques this kind of greenwashing by arguing that, “while underwriting the cost of a wind farm is laudable, it only addresses one kind of environmental impact, focused on one particular set of metrics” (para. 15). Unsurprisingly, these three cloud corporations actively compete to be the “greenest” among them. Through their renewable energy investments as well as initiatives like internal recycling campaigns, cloud corporations appear to center climate action and distance themselves from the waning popularity of the fossil fuel industry (Amazon, n.d.; Google, n.d.; Microsoft, n.d.; Taylor, 2019; Zero Cool, 2019). However, these “environmentally-conscious” endeavors simply distract from the numerous cloud-based tech solutions that have evolved to make Big Oil more profitable.

In their 2020 report, *Oil in the Cloud*, Greenpeace examines how Amazon, Google, and Microsoft all have high-valued contracts with oil and gas conglomerates, thus cementing the Cloud’s role in furthering climate change. Citing industrial case studies, recent news articles, and corporate press releases, Greenpeace claims that many of these contracts “specifically aid in the exploration or production of oil” (Donaghy et al., 2020). For Big Oil, the Cloud is not just utilized to store data. Rather, this networked technology enables oil and gas conglomerates to obtain strategic information about new, exceedingly difficult to extract, and/or under-utilized oil wells through data-intensive machine learning processes, artificial intelligence, and predictive analytics (Munn, 2021, pp. 216–218). These tactics, which media studies scholar Luke Munn (2021) identifies as “petrotechnical violence” (pp. 218–221), ensure fossil fuel extraction for many decades to come. In their essay, “Oil is the New Data,” Microsoft engineer Zero Cool

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5 For a brief overview of carbon credits – the method through which most carbon neutrality is “earned” – see Buck, 2022; Elgin & Mider, 2020; Greenfield, 2021; Miller, 2021; Song, 2019.

(2019) captures the futility of these eco-initiatives by asking, “Why go through the effort of using clean energy to power your data centers when those same data centers are being used by companies like Chevron to produce more oil?” (para. 40). Acknowledging these conflicts of interest requires us to actually see the complex material, ecological, and political mechanizations that create and are reproduced through cloud technology.

For a further example, in late 2018, the United States Department of Defense released an unclassified Cloud Strategy report arguing the necessity and potential efficacy of committing to data-intensive, cloud-based warfare across the entire military. Some of the key arguments highlighted for militaristic cloud adoption were the potential to “enable exponential growth” (Department of Defense, 2018, p. 3) as well as utilize artificial intelligence and machine learning in support of warfighting.<sup>6</sup> The document claimed that “in the last two years, the world produced 90% of all existing data. This is a trend that has been going on for a decade, with no end in sight” (Department of Defense, 2018, p. 3). If we are to believe that cloud-based global data growth is both exponential and unending, then the latter statement promises the catastrophic end of life in two distinct ways: an increasingly “lethal, resilient, and innovative” (Department of Defense, 2018, p. 10) technocratic U.S. military and an accelerating climate crisis that endangers the lives and ecosystems of every being on the planet. Digital media and ecology scholar Sy Taffel (2021) succinctly captures and analyzes this dichotomy, stating that “the rhetoric of ongoing exponential increases in digital data is fundamentally incompatible with addressing Anthropogenic ecological crises; it forms a capitalist-colonialist fantasy that sustains the myth of perpetual economic growth without material limitations” (p. 2).

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6 Countless technology experts have written about how flawed our societal assumptions around AI and machine learning truly are. From predictive policing to automated warfare, contending with the flaws within these systems and the false premises under which they have been created is tantamount to building a more just world. Specifically related to warfare, Lucy Suchman offers that, “the promotion of automated data analysis under the rubric of artificial intelligence, and in the name of accuracy, can only serve to exacerbate military operations that are demonstrably discriminatory in their reliance on profiling, and indiscriminate in their failures to adhere to international laws of war” (Suchman, 2020). For more on the general topic of ethics and AI, look to the work of Ruha Benjamin and the Ida B. Wells Just Data Lab (Ida B. Wells Just Data Lab, 2021), Meredith Whitaker and the AI Now Institute (AI Now Institute, n.d.), as well as Timnit Gebru and the newly formed DAIR (Distributed Artificial Intelligence Research) Institute (The DAIR Institute, n.d.), to name a few.

Perpetual economic growth – like perpetual data growth, perpetual oil extraction, or perpetual military action – cannot survive on a dying planet, or even a flourishing one. For libraries, our interventions in these conversations may appear to be narrow but, when considered holistically and intentionally, I believe they will be deeply impactful and significant. In the following section, I look closely at existing work in libraries and archives concerned with climate change while cementing the importance for our field to embrace both critical refusal and degrowth as they relate to technological choices, the Cloud, and a livable planetary future.

### Not an End, a Beginning

*Technological advances, glorious structures, or excellent systems will be useless in a collapsing world. Libraries will be hit just as hard by the changes and crises affecting the planet and its inhabitants as any other institution and any other collective body or human group.*

– Civallo & Plaza, 2016, p. 34

As evidenced by recent peer-reviewed articles, conference presentations, professional development coursework, and organizational meetings, many timely climate change conversations have taken place across and within libraries, archives, and information work more broadly.<sup>7</sup> And yet, on a field-wide level, little is being done by our professional organizations, leaders, or administrators to take any form of definitive action in response to the active and expanding consequences of environmental collapse. Select workers have led vigorous efforts to consider the future of libraries and archives on a warming planet, encouraging adaptation and transformation (Edwards, 2017; Finn et

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7 These conversations have been present at the 2021 Digital Library Forum (DLF, 2021), in the Journal of Critical Library and Information Studies issue on Libraries and Archives in the Anthropocene (select articles from the issue are cited throughout this chapter), through professional groups like the Sustainability Roundtable (Sustainability Round Table, 2013) from the American Libraries Association (ALA) and the Climate Justice Interest Group of the California Library Association (California Library Association, n.d.), the Sustainable Libraries Initiative (Sustainable Libraries Initiative, n.d.), internationally across the Digital Preservation Coalition’s extensive work (Digital Preservation Coalition, 2014), and in a recent course offering from Eira Tansey at the 2022 California Rare Book School (CalRBS) on Archives and Climate Change (Tansey, 2022), to name a few.

al., 2020; Nowviskie, 2014; Pendergrass et al., 2019; Tansey, 2015; Winn, 2020). Others have questioned our individual carbon footprints as well as the footprints of what we study (Baillot et al., 2021). However, within the day-to-day operations of many libraries and archives, we workers are expected to align our practices with the status quo. Countless library and archival institutions engage in efforts to maintain normality despite the environmental and material extremes present in our own realities as well as the realities of our patrons (Sax, 2021). The 2021-2024 Strategic Plan for ALA's Sustainability Roundtable, for example, largely focuses on creating carbon-neutral conferences, developing internal resolutions in support of sustainability, providing reading lists, or encouraging individuals to make sustainability pledges (Sustainability Round Table, 2021). Other eco-initiatives within libraries focus on how we can transform our physical spaces to be "greener," lessen our energy usage through equipment choices, or direct our programming resources towards environmental topics (Baillot et al., 2021; Civallo & Plaza, 2016; Lawton, 2020; Sauli, 2021).

Though any strategy that results in a carbon decrease is essential, existing climate-related work in libraries and archives heavily centers on what *we* can do as individuals to adapt rather than what *pressure* we can apply to advance change at a higher level, especially related to our societal, professional, or organizational dependence on fossil fuels, whether direct or indirect. Thus far, the bulk of our *institutional* responses have echoed the greenwashing and virtue signaling that I have already demonstrated as being persistent in Big Tech and Big Oil. In the following section, then, I address these gaps in existing LIS practice and literature, highlighting the necessity for work beyond individual or incremental solutions, while also incorporating numerous examples from domains beyond libraries and archives. I argue for institutions and workers to act collectively in response to climate change by embracing an ethos of critical refusal and degrowth – and further, integrating that ethos into how we approach the adoption of new cloud-based technology, define innovation for ourselves, and re-imagine our professional futures.

### Critical Refusal

Engaging in critical refusal is not merely saying no as an act of lessening one's workload. Rather, critical refusal is a conscious attempt to opt-out of systems that reproduce or facilitate harm and oppression.

As defined by data and archival scholars Marika Cifor, Patricia Garcia, T.L. Cowan, Jasmine Rault, Tonia Sutherland, Anita Say Chan, Jennifer Rode, Anna Lauren Hoffman, Niloufar Salehi, and Lisa Nakamura (2019) in their "Feminist Data Manifest-NO," this kind of "refusal is work, one that – at its best – can help different feminisms recognize interlocking struggles across domains, across contexts and cultures... [which then] enables us to work in solidarity to prop up and build resilience with one another – to generate mutually reinforcing refusals" (Why Refusal section, para. 2). Within the "Feminist Data Manifest-NO," Cifor et al. embrace the work of "Latinx, Black, queer, trans- and Indigenous feminist thinkers who have mobilized critical refusal as a powerful tool to open up and insist on radical and alternate futures" (Why Refusal section, para. 2). They, in turn, make "a declaration of refusal and commitment" (Cifor et al., 2019) regarding harmful data practices in the academy and corporate world. They refuse various ways that data is manipulated and utilized – especially by extractive, hegemonic methods – and make direct commitments to act generatively and to co-construct better data worlds for the many rather than the few. Since critical refusal lends itself towards collective action and away from ideologies that center individual solutions or saviors, embracing the practice of developing "mutually reinforcing refusals" is necessary as we imagine more sustainable futures for the field of LIS. Academic librarian and scholar Lydia Zvyagintseva (2021) affirms and expands on this notion, stating that, "refusal cannot be understood at an individual level but must be seen as a collective effort" (p. 5).

The work of the Boycott, Divestment, and Sanctions (BDS) Movement utilizes critical refusal as an immediate and powerful tactic against the Israeli State's ongoing occupation of Palestine. A Palestinian-led movement, BDS gains inspiration from "the South African anti-apartheid movement, [and] urges action to pressure Israel to comply with international [human rights] law" (BDS Movement, 2016, April 25). Through encouraging refusal – including refusing the purchase of goods manufactured by the State of Israel or within occupied territories, as well as divesting from technology companies that support or facilitate the regime and occupation – BDS highlights the extent of human rights abuses taking place against Palestinians and champions allied divestment as a tool for socio-political, economic, and material change. For example, boycotting and divesting from Hewlett Packard (HP), which provides technology to the Israeli army as well as the exclusive use of their servers for a state-run biometric ID system, is

formally endorsed by BDS (BDS Movement, 2016, July 16).<sup>8</sup> This specific form of critical refusal directly aligns with recent community calls to disassociate from library-centered data firms that contract with Immigration and Customs Enforcement (ICE) in the United States and, consequently, facilitate deportations. Critical refusal vis à vis intentional divestment is a clearly defined form of economic action that can support collective, life-centered, and justice-oriented goals.

In the pivotal essay, “Librarianship at the Crossroads of ICE Surveillance,” librarian and law professor Sarah Lamdan (2019) documents how large publishing companies like RELX Group (Reed Elsevier), Thomson Reuters, and LexisNexis fuel big data policing and provide data that allows for, “tracking immigrants and conducting raids at peoples’ homes and workplaces” (para. 6). Lamdan (2019) asserts that, “our data is being collected by library vendors and sold to the police, including immigration enforcement officers, for millions of dollars” (para. 1). For libraries and library workers that oppose these developments, a vital response strategy is critical refusal. As evidenced in Lamdan’s work, we can refuse by supporting campaigns that call for publishers to break their ICE contracts – like End the Contract and #NoTechForICE initiatives that are led by law school students and immigrant rights organizations – or through canceling our own agreements directly and refusing to work with vendors engaged in this kind of data extraction and violence (*End The Contract Coalition*, n.d.; Mijente, n.d.; Moody, 2021). Consequently, many leading issues in our profession, including how we enable carceral systems, engage in damaging data practices, or fail to adequately support our communities through the climate crisis, all require multiple modes of critical refusal to build a culture that embraces change, takes definitive action, and centers planetary survival.

## Degrowth

As acutely demonstrated over the last several decades and heightened by the interlocking crises of the COVID-19 pandemic and the

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<sup>8</sup> While working on this chapter, popular news outlets reported that Google and Amazon shareholders are showing signs of dissent over proposed company involvement with a new Israeli-state cloud endeavor, Project Nimbus, which would centralize Israeli servers within the state and “insulate Israel’s computing needs from threats of international boycotts” (Biddle, 2022). The future of this dissent is, as of publication, unknown but demonstrates a new, wider recognition of the ethical implications present in the Cloud.

racial reckoning of 2020, library and archival workers are expected to perform social service duties beyond their professional ones, reach high levels of productivity regardless of whatever current events may be impacting them personally, as well as onboard new projects without adequate funds necessary for labor or maintenance. Our field, our responsibilities, and our collections cannot continue to grow in this manner under such perpetual duress. Further, rhetoric around initiatives like collection-wide mass-digitization or the eternal maintenance of digital objects (whether they be Digital Humanities projects or born-digital records) ignore the material realities bubbling underneath each administrative request or grant-funded project. While cloud adoption has eased many aspects of our work by providing accessible cataloging software, collaborative editing tools, or third-party preservation platforms, its promise of endless capacity has also allowed our field, especially those at the top, to invest uncritically in new and “innovative” products or technological tools that often increase our workloads rather than streamline them. Media and ecology scholar Sy Taffel links ideas of material agnostic growth, like that which occurs in libraries, with the cognitive dissonance of this cultural moment. He states that “the fantasy that digital technology is somehow immaterial – that data is the ultimate renewable resource – allows the imagined continuation of the infinite economic growth that is required for current capitalist economic models to avoid collapse” (Taffel, 2021, p. 13). Infinite growth is not possible; therefore, embracing degrowth as a necessary framework and tactic – where we produce less and consume less – is essential for an ecologically-sound and life-centered future.

Though degrowth has been a theoretical concept discussed across numerous academic fields – most notably economics – since the 1970s, sustainability-minded political, scientific, and social movements started to embrace the term in the late 20th century (Paulson, 2017, p. 427). In “Libraries, Sustainability, and Degrowth,” authors Edgardo Civallero and Sara Plaza (2016) establish degrowth as “a social movement anchored in ecologism, anti-capitalism and anti-consumerism” (p. 29). They argue that the ideology of degrowth “proposes that there are biophysical limits to growth that have already been exceeded... and it is therefore necessary to drastically reduce the levels of production and consumption – these levels being the main causes of all environmental problems (climate change, pollution, threats to biodiversity) and of many social inequalities” (Civallero & Plaza, 2016, p.

29). Throughout the article, Civallo and Plaza (2016) discuss existing environmental sustainability work within LIS as well as the necessity for libraries to become intentional activist spaces in favor of degrowth – encouraging workers to leverage collection-based resources and “critically assess the use and diffusion of particular technologies and the support they give them” (p. 35). In a direct reminder to the profession, Civallo and Plaza (2016) state that, “degrowth is no longer an option: the option is how to reach it” (p. 35).

For libraries, archives, and information work, degrowth offers us a critical lens with which to critique our administrative inner-workings – our budgets, vendor-agreements, technology selection, and service priorities. Anthropologist Susan Paulson (2017) argues that the “ideals of degrowth call us to shift value and desire away from productivist achievements and consumption-based identities toward visions of good life variously characterized by health, harmony, pleasure, and vitality among humans and ecosystems” (p. 426). As I have argued throughout this chapter, cloud-based technology has become ubiquitous within the realms of our work and our daily lives by providing us with an illusion of eco-friendly ease of use that is fully divorced from the waste, material constraints, and physical footprints that exist just outside our doors. The tools we choose to utilize, the projects we take on, and the protocols we follow are not apolitical or without power; thus, we must collectively prioritize new ways of thinking, working, and approaching climate change in our institutions and workplaces moving forward. In *Post-Growth Living: For an Alternative Hedonism*, Kate Soper (2020) embodies this call, stating that, “environmental crisis cannot be resolved by purely technical means, but will require richer societies substantially to change their way of living, working, and consuming” (p. 12). For libraries, archives, and other realms of information work – especially those who live in the Global North or otherwise emissions-heavy nations – responding to the crisis of climate change should not be about adopting new technology, buying up faulty carbon credits, attaching ourselves to the next “green” innovation, or appeasing our superiors through unachievable growth-based ideals of success. Rather, we should embody degrowth and critical refusal by scaling back our technological investments (including our use of the Cloud), restructuring how we work, as well as reprioritizing maintenance and repair in services and operations.

## Moving Forward

*Resistance to environmental degradation is scripted, expected.  
Actively pursuing environmental interventions is less so.*

– Buck, 2019, p. 164

Throughout their 2021 book, *Pollution is Colonialism*, scholar and scientist Max Liboiron elucidates the intrinsic connections between settler colonialism, pollution, and the global rise in plastic production, while sharing practical recommendations for doing anti-colonial science. In speaking about their intentional methods-centric work with the Civic Laboratory for Environmental Action Research (CLEAR), Liboiron (2021) offers that, “sometimes protocols are prescriptive, and sometimes they are about the maintenance of everyday life, but they are always orienting you toward a particular horizon and away from others. They are reproductive technologies” (p. 124). Much of Liboiron’s work with CLEAR highlights the power of praxis, and in libraries, archives, and across information work, we must see that the work we do is forever building upon itself. As libraries and archives are not ahistorical institutions, the future practices of our field have yet to be defined. Therefore, we can make different choices, refuse to perform tasks that are harmful, and decrease what projects we take on in a way that aligns better with what we need to do to support our planet, thereby supporting our communities and ourselves. Simply, our current path is not viable, and we need to shift our mindsets and actions towards the already arrived storm of climate change.

Engaging with critical refusal and degrowth at a state or national level, then, functions as a method of both institutional response as well as call to action. Through legislative lobbying by city, state, or national professional organizations, libraries and archives could reject the specific oil contracts, usage of non-renewable energy, and clandestine water rights given to data centers in our local areas. The potential for such organizations to successfully lobby against new oil and gas drilling contracts state-by-state would be extremely challenging but narrowing our focus to specific, active vendor relationships is possible and, in fact, reasonable. One vendor causing environmental havoc, in addition to being known for their predatory financial and data sharing behaviors (Buranyi, 2017; Lamdan, 2019; Resnick & Belluz, 2019), is RELX

Group (Reed Elsevier). Just as current cloud technology ensures the future of oil and gas, Elsevier has, “for more than a decade ... supported the energy industry’s efforts to optimize oil and gas extraction” as the top publisher for books aimed at expanding fossil fuel production (Westervelt, 2022). Could or should our field refute the holdings of academic publishing magnates? If so, what transformations within our field would be needed to generate this kind of collective, critical refusal? Lastly, for the public employees among us, we could lean on the same tactics of critical refusal to pressure our pension fund managers to take concrete action: first to divest from fossil fuels; then to divest from any corporation that utilizes their Cloud to boost new oil discovery. From my perspective, these questions and suggested actions call attention to the urgent necessity of transforming our professional practice in the face of the ongoing climate crisis.

Looking ever more closely at critical refusal and degrowth, I believe that workers within libraries and archives should also look toward our collective professional future(s) by examining the environmental viability of our initiatives, programs, and processes. To me, such internal assessments of information services extend beyond the performativity of reusable straws or eco-wellness programs, as they are instead grounded in the material realities of our work and provide space for broad *collective* – not individual – action. For instance, cloud-based digital archives and continued preservation are deeply energy-intensive and require constant attention – will there be a point at which we collectively sunset such activities (Pendergrass et al., 2019)? Or should we focus less on the relatively small energy footprint of digital collections and re-evaluate the ways in which our institutional practices ignore the ecological impact of the technologies we use? Can we restructure the “make-and-dispose approach” (Finn et al., 2020, p. 23) of entrepreneurial-driven makerspaces to those that center maintenance and repair instead? In eliminating some of our cloud-based and waste-heavy commitments, I believe that our field-wide definitions surrounding success, innovation, and progress will also need to evolve. For example, what does technological innovation look like after growth? Will institutional ideals of innovation in libraries ever mean reuse and repair? Though we cannot reject all cloud-based library technology since our dependence on these systems is too vast, as professionals, we must question how we select these tools, the terms on which we provide them to our communities, and what climate change discourse we maintain with our users.

## Conclusion

*Hope is a discipline.*<sup>9</sup>

– Mariame Kaba

For decades, we have been intentionally deceived about the realities of climate change by powerful corporations and failed by our governments in finding viable solutions as carbon emissions have continued to grow. Regardless, we still have more control over our future than those in power often lead us to believe. In echoing the words of Audre Lorde, taking informed action is the only path forward to meet this “approaching storm” (Lorde, 2012, p. 130). Though I have written specifically on the Cloud, the core of this theoretical framework applies to other areas of librarianship and archives work. Critical refusal offers those of us who labor in the information domain the possibility to reject collectively, or at least reduce our reliance on, technologies that perpetuate harm to our planet, our communities, and ourselves. Degrowth, then, allows for a collective release of unnecessary responsibilities and expectations, helping us create space for stronger alignment and deeper engagement around relevant, region-specific climate solutions.<sup>10</sup> Future examination of the questions raised here would benefit from an analysis of the influence of settler colonialism on libraries and computing technology, the characteristics of white supremacy culture (specifically the notion of urgency) in institutional responses to change (Okun, 2021), crisis epistemologies and the impact of entrenched power in institutional decision making (Whyte, 2020), as well as knowledge production in the time of climate change, among others. Rather than focusing on individual fixes that may have a marginal impact on carbon decline, we can direct our collective mental, physical, and emotional energy towards the structures that are both causing and benefiting from these numerous, intersecting disasters.

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<sup>9</sup> See Kaba (2022) – Mariame Kaba’s personal website – for an introduction to Kaba’s profound abolitionist work as well as a list of her numerous publications and interviews.

<sup>10</sup> See Brunvand (2020) for a deeper examination of sustainability-minded and place-based librarianship.

## References

- AI Now Institute. (n.d.). Retrieved January 31, 2022, from <https://ainowinstitute.org/>
- Amazon. (n.d.). *Water stewardship*. AWS sustainability. Retrieved May 20, 2022, from <https://sustainability.aboutamazon.com/environment/the-cloud/water-stewardship>
- Ambrose, J. (2019, September 20). Google signs up to \$2bn wind and solar investment. *The Guardian*. <https://www.theguardian.com/technology/2019/sep/20/google-says-its-energy-deals-will-lead-to-2bn-wind-and-solar-investment>
- Amoore, L. (2018). Cloud geographies: Computing, data, sovereignty. *Progress in Human Geography*, 42(1), 4–24. <https://doi.org/10.1177/0309132516662147>
- Baillet, A., Baker, J., Choksi, M. Z., Gil, A., Lam, A., Peaker, A., Scholger, W., Roeder, T., & Walton, J. L. (2021). *Digital humanities and the climate crisis*. <https://dhd-barnard.github.io/dhclimate/>
- BDS Movement. (2016, July 16). *Boycott HP*. <https://bdsmovement.net/boycott-hp>
- BDS Movement. (2016, April 25). *What is BDS?* <https://bdsmovement.net/what-is-bds>
- Biddle, S. (2022, May 18). Google and Amazon face shareholder revolt over Israeli defense work. *The Intercept*. <https://theintercept.com/2022/05/18/google-amazon-israel-military-nimbus/>
- Bowker, G. C., Timmermans, S., Clarke, A. E., & Balka, E. (2016). The ethnography of infrastructure. In *Boundary objects and beyond: Working with Leigh Star* (pp. 473–488). MIT Press. <http://ieeexplore.ieee.org/document/7580150>
- Brunvand, A. (2020). Re-Localizing the library: Considerations for the Anthropocene. *Journal of Critical Library and Information Studies*, 3(1), Article 1. <https://doi.org/10.24242/jclis.v3i1.94>
- Buck, H. J. (2019). *After geoengineering: Climate tragedy, repair, and restoration*. Verso.
- Buck, H. J. (2022, March 27). Decarbonization as a service. *Logic Magazine*. <https://logicmag.io/clouds/decarbonization-as-a-service/>
- Buranyi, S. (2017, June 27). Is the staggeringly profitable business of scientific publishing bad for science? *The Guardian*. <https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science>
- Burrington, I. (2015, December 16). The environmental toll of a Netflix binge. *The Atlantic*. <https://www.theatlantic.com/technology/archive/2015/12/there-are-no-clean-clouds/420744/>
- Burrington, I. (2016, January 8). Why Amazon's data centers are hidden in spy country. *The Atlantic*. <https://www.theatlantic.com/technology/archive/2016/01/amazon-web-services-data-center/423147/>
- California Library Association. (n.d.). *Climate justice*. Retrieved June 3, 2022, from <https://www.cla-net.org/page/1191>
- Carruth, A. (2014). The digital cloud and the micropolitics of energy. *Public Culture*, 26(2), 339–364. <https://doi.org/10.1215/08992363-2392093>
- Cifor, M., Garcia, P., Cowan, T. L., Rault, J., Sutherland, T., Chan, A., Rode, J., Hoffmann, A. L., Salehi, N., & Nakamura, L. (2019). *Feminist data manifesto*. <https://www.manifestno.com/>
- Civallero, E., & Plaza, S. (2016). Libraries, sustainability and degrowth. *Progressive Librarian*, 25, 20–45.
- Department of Defense. (2018). *Deputy Secretary of Defense memorandum: DoDcloud strategy*. <https://media.defense.gov/2019/Feb/04/2002085866/1/-1/1/DOD-CLOUD-STRATEGY.PDF>
- Digital Preservation Coalition. (2014, November 9). *The DPC aims to achieve 'A political and institutional climate responsive to the need for digital preservation'*. <https://www.dpconline.org/news/the-digital-preservation-coalition-dpc-aims-to-achieve-a-political-and-institutional-climate-responsive-to-the-need-for-digital-preservation>
- DLF. (2021). *2021 DLF forum: Online*. <https://www.diglib.org/dlf-events/2021-dlf-forum/>
- Donaghy, T., Henderson, C., & Jardim, E. (2020, May 19). *Oil in the cloud*. Greenpeace USA. <https://www.greenpeace.org/usa/reports/oil-in-the-cloud/>
- Edwards, P. N. (2017). Knowledge infrastructures for the Anthropocene. *The Anthropocene Review*, 4(1), 34–43. <https://doi.org/10.1177/2053019616679854>
- Elgin, B., & Mider, Z. (2020, December 17). The real trees delivering fake corporate climate progress. *Bloomberg*. <https://www.bloomberg.com/news/features/2020-12-17/the-real-trees-delivering-fake-climate-progress-for-corporate-america>
- Emanuel, Kerry. (2019). *Climate science, risk & solutions*. MIT. <https://climatep-rimer.mit.edu>
- End The Contract Coalition. (n.d.). *End the contract*. Retrieved December 16, 2021, from <https://endthecontract.wixsite.com/home>
- Ensmenger, N. (2018). The environmental history of computing. *Technology and Culture*, 59(4S), S7–S33. <https://doi.org/10.1353/tech.2018.0148>
- Finn, M., Rosner, D. K., Black, S., Cunningham, N., Dew, K. N., Hoy, J., McCraney, K., & Morgan, C. (2020). Troubled worlds: A course syllabus about information work and the Anthropocene. *Journal of Critical Library and Information Studies*, 3(1), Article 1. <https://doi.org/10.24242/jclis.v3i1.137>
- Fountain, H. (2022, February 14). How bad is the Western drought? Worst in 12 centuries, study finds. *The New York Times*. <https://www.nytimes.com/2022/02/14/climate/western-drought-megadrought.html>
- Garcia, P., Sutherland, T., Cifor, M., Chan, A. S., Klein, L., D'Ignazio, C., & Salehi, N. (2020). No: Critical refusal as feminist data practice. *Conference Companion Publication of the 2020 on Computer Supported*

- Cooperative Work and Social Computing*, 199–202. <https://doi.org/10.1145/3406865.3419014>
- Gonzalez Monserrate, S. (2022, March 1). The staggering ecological impacts of computation and the cloud. *Scientific American*. <https://www.scientificamerican.com/article/the-staggering-ecological-impacts-of-computation-and-the-cloud/>
- Google. (n.d.). *Cloud sustainability*. Retrieved May 20, 2022, from <https://cloud.google.com/sustainability>
- Greenfield, P. (2021, May 4). Carbon offsets used by major airlines based on flawed system, warn experts. *The Guardian*. <https://www.theguardian.com/environment/2021/may/04/carbon-offsets-used-by-major-airlines-based-on-flawed-system-warn-experts>
- Hogan, M. (2015a). Facebook data storage centers as the archive's underbelly. *Television & New Media*, 16(1), 3–18. <https://doi.org/10.1177/1527476413509415>
- Hogan, M. (2015b). Data flows and water woes: The Utah Data Center. *Big Data & Society*, 2(2), 1–12. <https://doi.org/10.1177/2053951715592429>
- Hu, T.-H. (2015). *A prehistory of the cloud*. The MIT Press.
- Ida B. Wells Just Data Lab. (2021). *Welcome to the lab*. <https://www.thejust-datalab.com>
- Irfan, U. (2021a, February 18). Scientists are divided over whether climate change is fueling extreme cold events. *Vox*. <https://www.vox.com/22287295/texas-uri-climate-change-cold-polar-vortex-arctic>
- Irfan, U., & Leber, R. (2021b, August 9). “There’s no going back”: The UN’s dire new climate report, explained. *Vox*. <https://www.vox.com/22613027/un-ipcc-climate-change-report-ar6-disaster>
- Johnson, A. (2019). Emplacing data within imperial histories: Imagining Iceland as data centers’ ‘natural’ home. *Culture Machine*, 18, 12.
- Kaba, M. (2022). About me. *Being MK – My personal website*. <http://mari-amekaba.com/>
- Lamdan, S. (2019). Librarianship at the crossroads of ICE surveillance. *In the Library with the Lead Pipe*. <https://www.inthelibrarywiththeleadpipe.org/2019/ice-surveillance/>
- Lawton, M. (2020, September 1). Ready for action. *American Libraries Magazine*. <https://americanlibrariesmagazine.org/2020/09/01/ready-for-action-climate-action-plans/>
- Leahy, S. (2021, July 31). If the hardest species are boiled alive, what happens to humans? *The Atlantic*. <https://www.theatlantic.com/ideas/archive/2021/07/billions-victims-heat-dome/619604/>
- Lewis, S. L., Wheeler, C. E., Mitchard, E. T. A., & Koch, A. (2019). Restoring natural forests is the best way to remove atmospheric carbon. *Nature*, 568(7750), 25–28. <https://doi.org/10.1038/d41586-019-01026-8>

- Liboiron, M. (2018, November 1). Waste colonialism. *Discard Studies*. <https://discardstudies.com/2018/11/01/waste-colonialism/>
- Liboiron, M. (2021). *Pollution is colonialism*. Duke University Press.
- Lorde, A. (2012). *Sister outsider: Essays and speeches*. Crossing Press.
- Markman, J. (2021, February 9). Why the cloud is Amazon’s future. *Forbes*. <https://www.forbes.com/sites/jonmarkman/2021/02/09/why-the-cloud-is-amazons-future/>
- Mattern, S. (2017). The big data of ice, rocks, soils, and sediments. *Places Journal*. <https://doi.org/10.22269/171107>
- Microsoft. (n.d.). Green cloud computing. *Microsoft Research*. Retrieved May 20, 2022, from <https://www.microsoft.com/en-us/research/project/green-cloud-computing/>
- Mijente. (n.d.). *#NoTechForICE*. Retrieved February 16, 2022, from <https://notechforice.com/lawletter/>
- Miller, S. (2021, December 8). The millions of tons of carbon emissions that don’t officially exist. *The New Yorker*. <https://www.newyorker.com/news/annals-of-a-warming-planet/the-millions-of-tons-of-carbon-emissions-that-dont-officially-exist>
- Moody, J. (2021, December 6). *Law students protest research database contracts with ICE*. Inside Higher Ed. <https://www.insidehighered.com/news/2021/12/06/law-students-protest-lexisnexis-westlaw-contracts-ice>
- Munn, L. (2021). Data and the new oil: Cloud computing’s lubrication of the petrotechnical. *Journal of Environmental Media*, 2(2), 211–227. [https://doi.org/10.1386/jem\\_00063\\_1](https://doi.org/10.1386/jem_00063_1)
- Nowviskie, B. (2014, July 10). *Digital humanities in the Anthropocene*. <http://nowviskie.org/2014/anthropocene/>
- Okun, T. (2021). Urgency. *White supremacy culture*. <https://www.whitesupremacy-culture.info/urgency.html>
- Parks, B. W. (2021, November 9). The Dalles approves controversial water deal with Google. *OPB*. <https://www.opb.org/article/2021/11/09/google-the-dalles-water-data-center/>
- Pasek, A. (2019). Managing carbon and data flows: Fungible forms of mediation in the Cloud. *Culture Machine*, 18, 1–15.
- Paulson, S. (2017). Degrowth: Culture, power and change. *Journal of Political Ecology*, 24(1). <https://doi.org/10.2458/v24i1.20882>
- Pendergrass, K. L., Sampson, W., Walsh, T., & Alagna, L. (2019). Toward environmentally sustainable digital preservation. *The American Archivist*, 82(1), 165–206. <https://doi.org/10.17723/0360-9081-82.1.165>
- Resnick, B., & Belluz, J. (2019, July 10). The war to free science. *Vox*. <https://www.vox.com/the-highlight/2019/6/3/18271538/open-access-elsevier-california-sci-hub-academic-paywalls>

- Riofrancos, T. (2019, December 7). What green costs. *Logic Magazine*. <https://logicmag.io/nature/what-green-costs/>
- Sauli, A. (2021, February 25). Study measured the carbon footprint of Finnish public libraries. *Libraries.fi*. [https://www.libraries.fi/news/study-measured-the-carbon-footprint-of-finnish-public-libraries?language\\_content\\_entity=en](https://www.libraries.fi/news/study-measured-the-carbon-footprint-of-finnish-public-libraries?language_content_entity=en)
- Sax, S. (2021, September 13). Why investing in libraries is a climate justice issue. *High Country News*. <https://www.hcn.org/articles/north-social-justice-why-investing-in-libraries-is-a-climate-justice-issue>
- Solon, O. (2021, June 19). Drought-stricken communities push back against data centers. *NBC News*. <https://www.nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344>
- Song, L. (2019, May 22). An (even more) inconvenient truth: Why carbon credits for forest preservation may be worse than nothing. *ProPublica*. <https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/>
- Soper, K. (2020). *Post-growth living: For an alternative hedonism*. Verso.
- Starosielski, N. (2015). *The undersea network*. Duke University Press.
- Suchman, L. (2020, January 11). Patterns of life: AI and “actionable data” in warfare. *BLARB*. <http://blog.lareviewofbooks.org/provocations/patterns-life-ai-translates-human-activities-actionable-data-war/>
- Sustainability Round Table. (2013, May 8). *Sustainability Round Table*. ALA Round Tables. <https://www.ala.org/rt/sustainrt>
- Sustainable Libraries Initiative. (n.d.). *About us*. Retrieved June 9, 2022, from <https://sustainablelibrariesinitiative.org/about-us>
- Sustainability Round Table. (2021, May 15). *SustainRT strategic plan 2021-2024*. <https://docs.google.com/document/d/17208EvSLmVGblRSLc6iVgOZv9F2HhaowOO6uU3ySKH4/>
- Taffel, S. (2021). Data and oil: Metaphor, materiality and metabolic rifts. *New Media & Society*, 1–19. <https://doi.org/10.1177/14614448211017887>
- Tansey, E. (2015). Archival adaptation to climate change. *Sustainability: Science, Practice and Policy*, 11(2), 45–56. <https://doi.org/10.1080/15487733.2015.11908146>
- Tansey, E. (2022). Archives and climate change. *UCLA California Rare Book School*. <https://www.calrbs.org/program/courses/archives-and-climate-change/>
- Taylor, A. R. E. (2019). The data center as technological wilderness. *Culture Machine*, 18, 30.
- The DAIR Institute*. (n.d.). Retrieved June 9, 2022, from <https://www.dair-institute.org>
- United Nations. (2021, August 9). IPCC report: ‘Code red’ for human driven global heating, warns UN chief. *UN News*. <https://news.un.org/en/story/2021/08/1097362>

- Very Like a Whale*. (2022, March 27). *Logic Magazine*. <https://logicmag.io/clouds/very-like-a-whale/>
- Vonderau, A. (2019). Storing data, infrastructuring the air: Thermocultures of the cloud. *Culture Machine*, 18, 12.
- Westervelt, A. (2022, February 24). Revealed: Leading climate research publisher helps fuel oil and gas drilling. *The Guardian*. <https://www.theguardian.com/environment/2022/feb/24/elsevier-publishing-climate-science-fossil-fuels>
- Whyte, K. (2020). Against crisis epistemology. In B. Hokowhitu, A. Moreton-Robinson, L. Tuhiwai-Smith, C. Andersen, & S. Larkin (Eds.), *Routledge handbook of critical Indigenous studies* (1st ed., pp. 52–64). Routledge. <https://doi.org/10.4324/9780429440229-6>
- Winn, S. R. (2020). Dying well in the Anthropocene: On the end of archivists. *Journal of Critical Library and Information Studies*, 3(1), Article 1. <https://doi.org/10.24242/jclis.v3i1.107>
- Zero Cool. (2019, December 7). Oil is the new data. *Logic Magazine*. <https://logicmag.io/nature/oil-is-the-new-data/>
- Zvyagintseva, L. (2021). Articulating our very unfreedom: The impossibility of refusal in the contemporary academy. *Canadian Journal of Academic Librarianship*, 7, 1–24. <https://doi.org/10.33137/cjalrcbu.v7.36367>