Selected Papers of #AoIR2023:
The 24th Annual Conference of the
Association of Internet Researchers
Philadelphia, PA, USA / 18-21 Oct 2023

DIGITAL INFRASTRUCTURES AND ENVIRONMENTAL JUSTICE: POLICIES, PRACTICES, AND VISIONS

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Environmental media scholars have long drawn attention to the physicality of digital systems, situating their work as part of the infrastructural turn (Larkin, 2013; Parks & Starosielski, 2015; Star, 1999). Contrary to the prevailing “cultural imagination of dematerialization” (Starosielski, 2015), digital supply chains – from data centers to AI systems to consumer electronics – depend on minerals, water, land, labour, and energy (Crawford, 2021; Cubitt, 2016; Hogan et al., 2022). This growth-based model of digital technology is based on assumed access to resources, implicating it in the extractive global economy shaped by ongoing colonial violence (Liboiron, 2021; Spice, 2018).

Transdisciplinary scholarship on the intersection of digital technologies and the environment has looked at online organizing and digital climate change action (McLean & Fuller, 2016; Pearce et al., 2019), indigenous resistance and data sovereignty

Suggested Citation (APA): Frenzel, J., Jansen, F., Liu, J., Ruddock, J., Finnegan, S., Radloff, J. (2023, October). *Digital infrastructures and environmental justice: policies, practices, and visions*. Panel presented at AoIR2023: The 24th Annual Conference of the Association of Internet Researchers. Philadelphia, PA, USA: AoIR. Retrieved from http://spir.aoir.org.

(Duarte, 2017; Kukutai & Taylor, 2016), the environmental impacts of large-scale data centers (Hogan, 2015; Velkova, 2016) and alternative social media (Laser et al., 2022), and what "responsible digitalization" could look like (Dwivedi et al., 2022). Building on already existing work that critically examines the material implications of digital infrastructures, this panel asks what environmental justice means in relation to digital technologies.

Turning against the language of revolution that too often gets leveraged by Big Tech to describe the latest "disruptive" technology that is allegedly going to solve the world's problems (Geiger, 2020; Tabel, 2022), we foreground subversive practices, regulatory interventions, and grassroots organizing and vision building as emancipatory alternatives to a for-profit, monopolized internet. From a theory of change that seeks to understand and challenge the extractive nature of digital technology production from all angles, we shed light on reform, repair, refusal, and resistance as paths for transformation.

Zooming in on Southeast Louisiana where hundreds of petrochemical processing and manufacturing facilities are located, the first paper examines how Internet access can be reimagined in landscapes shaped by extractive economies. The paper analyzes the challenges that activist and research groups face when using Internet of things (IoT) devices for real-time environmental sensing of air quality due to underdeveloped Internet infrastructures in a region that is becoming increasingly vulnerable to climate change.

The second paper engages with the material footprint and environmental implications of computing hardware production. It looks at the "Right to Repair" as one approach that challenges corporate control over design and obsolescence of electronic devices. By comparing examples of recent legislation in the EU, India, and the US, and analyzing them through the lens of design justice and discard studies frameworks, it argues that Right to Repair needs to be complemented by a substantial change in industry norms and practices rather than simply attempting to delay the disposal through repair by consumers.

The third paper examines community resistance to data centers in the United States. In the past years, activists have framed their resistance to data centers along three critiques, namely noise pollution, resource consumption, and lack of public input to permitting processes. The paper investigates how environmental justice activists use formal legal and regulatory processes such as public meetings, petitions, lawsuits, public records requests to organise against new data center developments, and the challenges they meet as part of their organising.

The fourth paper presents a "feminist principle of the internet on the environment" that was developed over several years in transnational collaborative work by practitioners. It addresses the interconnections between gendered online violence against land and environmental defenders on large social media platforms and on-the-ground resistance to extractive industries and outlines a new emancipatory vision for a different internet that centers planetary care and justice for communities and ecosystems.

The fifth paper presents an analysis of the Internet Architecture Board's (IAB) workshop on "Environmental Impact of Internet Applications and Systems", held online in December 2022. It uses an infrastructural lens to analyze which politics are embedded and missing from industry responses to the sector's environmental harms. While international regulatory bodies are slowly coming to terms with the environmental impacts of distributed digital networks, the paper argues that the proposed sustainability solutions are as of yet too narrow in scope.

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INTERNET ACCESS IN EXTRACTIVE LANDSCAPES: A CASE STUDY FROM SOUTHEAST LOUISIANA

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In this paper, I will discuss how expectations of the Internet as "always on" fall short in places that are experiencing accelerated effects of climate change. Specifically, I draw from ongoing fieldwork in southeast Louisiana on the impact of climate change on Internet infrastructures. This work includes how frontline communities living near sites of petrochemical industries face challenges in the installation, repair, and maintenance of digital environmental monitoring devices. When using Internet of Things (IoT) devices to do real-time tracking of air quality, residents are faced with issues of a sparse and aging Internet infrastructure that is vulnerable to hurricanes and other climate-change related impacts. I use this case study to reimagine what Internet access can look like in a dynamic and shifting landscape, shaped by histories of extraction.

For centuries, southeast Louisiana has relied on, and continues to rely on extractive economies, economies based on the exploitation of resources and labor without replacement. Following French claim to the Louisiana territory in the early 18th century, European settlers established slavery in the region, enslaving both Indigenous and African slaves for labor on newly formed indigo, cotton, and sugarcane plantations. After the abolishment of slavery during the American Civil War, Louisiana, like many Southern states, faced a period of stagnant economic development due to the previous reliance on enslaved African and Indigenous people for cheap labor. When the first oil well was successfully struck in the early 20th century, state policymakers, eager to transform the slow economy, provided generous tax incentives for these new gas and oil companies.

As a result of this increased investment in oil and gas extraction, many former plantations that lined the banks of the Mississippi River were transformed into oil refineries and other related facilities. Over 150 of these facilities are currently located in an 85 mile stretch along the Mississippi River between Baton Rouge and New Orleans. This area is nicknamed “Cancer Alley” due to the high levels of toxic waste and emissions that come from these factories. This toxic environment affects mostly low-income rural Black residents in the region, many of whom are descendants of the formerly enslaved (Allen, 2003). The impact of the oil and gas industry in the region has detrimental health impacts such as increased respiratory illnesses and cancer diagnoses for people living closest to these sites (Kang, 2021; Singer, 2011). Many activist and research groups have since used environmental monitoring to understand air and water quality issues, when corporate and government institutions have failed to provide adequate information and accountability (Blodgett, 2006; Gabrys, 2022; Rey-Mazón et al., 2018; Wylie, 2018).

In recent years, IoT sensors have been developed and deployed to provide real-time information about local environmental conditions. Instead of storing data locally, the sensors can transmit data over the Internet. One of the benefits of this is that the data from multiple sensors can be collected, processed, and visualized almost instantly – that is if there is a fast and stable enough Internet connection. For some of these frontline communities, these sensors can often be difficult to set up and maintain due to both the state of Internet infrastructures in this region (Gabrys, 2016). Many of these areas closest to petrochemical facilities do not have adequate broadband to bring these sensors online. For example, in St. James Parish, data shows that while 100% of residents supposedly have access to broadband, only 17% of residents have a subscription (FCC, 2022; Kahan & Ferres, 2020). Furthermore, many of these services are over DSL, cable, or satellite that may not have the necessary bandwidth to support real-time sensing devices. While Internet hotspots are used to enhance existing connections, these are temporary workarounds that can add to the cost and amount of labor is necessary in the setup. Furthermore, stronger hurricanes can also take electricity and Internet offline for prolonged periods.

Given the rising severity of extreme weather events associated with climate change, the infrastructures that we rely on for digital communications are at risk of breakdown (Durairajan et al., 2018). In southeast Louisiana, these weather events include hurricanes that have increased in both frequency and intensity. Warming ocean waters resulting from increased carbon emissions create conditions for storms to form with higher wind speeds and more precipitation. In 2020, the most active Atlantic hurricane season on record brought several Category 3 and 4 storms across the region. The

National Oceanic and Atmosphere Association (NOAA) predicts that the proportion of hurricanes that reach Category 4 or 5 levels is projected to increase over the course the next century (Knutson, n.d.). Much of the grid, which includes the utility poles which string together the Internet in southeast Louisiana was built to previous standards to brace winds at 110 miles per hour, equivalent to a Category 2 storm (Eavis & Penn, 2021). While networks built to these prior standards had been able to brace most hurricanes that have hit the region, they are no longer able to withstand stronger hurricane seasons.

Researchers have described the rise and demand of digital networks and devices as the "cornucopian paradigm," where a belief in the continued efficiency in computing will allow for continuous and unfettered growth (Preist et al., 2016). Under the 'cornucopian paradigm', Internet services are assumed to be not only high quality, but also continuous, instant, and eternal. However, these expectations do not always hold up. In the context of this case study in south Louisiana, this means that IoT devices that are designed with seamless Internet connections in mind will fail because of the state of current Internet infrastructures. Instead, one possibility is that both computing devices and infrastructures need to be considered and designed with intermittency in mind – that networks will go offline, but that life will still go on in the meantime. For sensors, this could mean having multiple ways to store data within a device. On the infrastructural level, this can entail changing state level policy to enable community or municipally owned networks that can be maintained locally to support the specific needs of residents.

In southeast Louisiana, the ongoing legacy of extractive industries has led to uneven development and deep socioeconomic disparities in the region, while increased intensity and frequency of storms cause severe damage and disruptions to the infrastructures that support everyday life for residents. These industries and storms are also enmeshed: the carbon emissions produced from industrial sectors contribute to warming ocean waters, which in turn create conditions for storms to form with higher wind speeds and more precipitation. Through this case study, I show how these two are also linked via the question of Internet access. Ensuring just and livable futures for the people who live here needs to include a vision of Internet that reflects this region.

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TACKLING THE ENVIRONMENTAL FOOTPRINT OF DIGITAL TECHNOLOGY THROUGH A “RIGHT TO REPAIR”

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Hardware is the prerequisite for data storage, processing, and transmission, and electronic devices enable access to digital platforms. Its production is part of global supply chains that rely on the availability of minerals and other materials, labour, and manufacturing capacity. It also contributes to a growing e-waste problem, which is compounded by planned obsolescence and lack of or restricted repairability.

This paper investigates legislation and socio-material practices around the design and disposal of computing hardware and the “Right to Repair”. First, it introduces the concept and practice of repair by situating it in the relevant transdisciplinary academic literature. Second, it presents examples of recent legislation from the EU, India, and the US, and analyzes the implications of these regulatory changes. Third, it mobilizes analytical concepts from design justice and discard studies as correctives that move the focus from the tail end of the issue – the attempt to delay the disposing of hardware at the end of its life through repair – upstream to how hardware is developed in the first place.

In one of the first comprehensive theorizations of waste related to digitization and datafication, Jennifer Gabrys has argued that the environmental damage resulting from the accelerated production and discarding of electronic devices is systemically obscured by “performances of abundance”. Devices appear in the cultural imagination as mere interfaces, making the virtual appear limitless and seemingly lacking any physical constraints (Gabrys, 2011). Critical scholarship in media and communication studies and related fields has built on this argument and called into question the arrival of an allegedly “post-extractive modernity” (Vondereau, 2017) that supposes a disembodied “information society” (Munster, 2011) or maintains a rigid distinction between content, software, and hardware, even though these are intimately intertwined (Taffel, 2019). Repair as a concept and practice challenges this imaginary of abundance by interrogating the existing socio-political and legal order that determines what can be repaired by whom, how, under which temporal and material constraints, and how this in turn effects what items and materials are “wasted”. While ‘innovators’ are usually revered for their entrepreneurial spirit and creativity in putting forward new ‘solutions’, those who undertake repair are often “seen as making do rather than innovating; repair happens in the face of austerity” (Crosby & Stein, 2020). Steven J. Jackson calls this the “productivist bias” (2014) that places power in the hands of producers who get to decide under what conditions repair is desirable and possible.

Right to Repair is a largely civil society-initiated approach that aims to reclaim at least part of that power from corporate control and bring down barriers that restrict access to knowledge, tools, and parts needed for repair (Perzanowski, 2022). It aims to reduce waste and new production by extending a product’s lifespan. As a concept, it opposes commercial incentives to respond to breakdown with immediate replacement or the most recent ‘upgrade’, thereby contesting notions of efficiency and economic growth (van der Velden, 2021). But it does more than that: repair, particularly at the local scale, is also a social and community-building practice that is enacted in neighbourhood maker spaces and skill-sharing workshops called “Repair Caf.s”, often across generations (ibid).

In terms of regulation, initiatives for Right to Repair legislation (which typically includes but is not limited to consumer electronics) focus on a variety of issues. For instance, the European Right to Repair campaign is built around the following three demands: 1) legislation that obliges producers to ensure that devices can be easily disassembled and parts which no longer work can be replaced, 2) that everyone have access to spare parts and repair manuals for the entire lifetime of a product ("fair access"), 3) the introduction of a scoring system that makes transparent to consumers whether products are built to be repaired or destined to be disposable when breaking (Right to Repair Europe, n.d.). These demands interconnect with the black boxing of proprietary diagnostic tools, the discontinuation of software updates that would allow older models of hardware to function longer, the incompatibility of current legal frameworks of copyright and intellectual property, trade secrets, competition, and product pricing (Grinvald & Tur-Sinai, 2019; Manwaring et al., 2022; Mellal, 2020).

The relevant literature already points to several potential risks and pitfalls of Right to Repair. For one, circular consumption choices (for instance, paying for repair services instead of buying new products) can have unintended "rebound effects", i.e., the decrease of material consumption in one area may lead to intensified material consumption in others, thereby jeopardizing the benefits of repair (Castro et al., 2022). While lowering independent repair costs, Right to Repair legislation may also trigger a price response from manufacturers to make up for profit loss if the legislation doesn't anticipate this (Jin et al., 2022).

Looking at three examples of new regulatory initiatives – the Right to Repair frameworks of the European Commission (expected in March 2023) and the government of India (expected later this year), as well as New York State's Digital Fair Repair Act from 2022 –, I will read these examples through the analytical lenses of Design Justice (Costanza-Chock, 2020) and the framework for Discard Studies proposed by Max Liboiron and Josh Lepawsky (2022). Design justice establishes principles for non-exploitative, non-oppressive technologies, such as evaluating design based on outcome and accountability to those directly impacted by it rather than the vision or intention of the developers. Discard Studies asks how things are made disposable in the first place, focusing on the systemic structures that produce the problem rather than on how to best deal with pollution and waste when it is already in the world.

By mobilizing these concepts, I ask in how far the legislative examples are successful in reigning in corporate power and establishing an accessible Right to Repair for citizens, and what their limitations or shortcomings are. I argue that the debate around repair needs to refocus on industry standards and protocols instead of consumer practices to move towards more environmentally just, circular models of hardware production. Repair, however, remains a significant concept to draw attention to how the growth-based economic model of value creation offloads harms as "externalities" onto bodies and ecosystems. While it needs to be complemented by industry regulation to be effective at scale, it is a useful prompt for slowing down resource extraction and conversion that resonates with practices of social and planetary care, and ultimately goes against the grain of Silicon Valley's accelerationist and disruptive model of technology development.

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PERMITTING/RESISTING THE CLOUD: A COMPARATIVE LEGAL ANALYSIS OF COMMUNITY RESISTANCE TO FOSSIL FUEL INFRASTRUCTURE AND DATA CENTERS

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This paper looks to situate data center permitting and construction within a broader history of industrial infrastructure expansion and community acceptance/resistance in the US. It builds upon other critical research that aims to “resituat[e] the history of computing within the larger context of the history of industrialization” (Ensmenger 2020) – a framing I embrace here as a lens for examining community resistance to the permitting, construction, and operation of data center facilities in three US regions: the mid-Atlantic (Swinhoe 2022, Peterson 2017), the Southwest (Miller 2022, Pineda 2021), and the Pacific Northwest (Rogoway 2022, Parks 2021). It seeks to fill a gap in current US legal scholarship on the expansion of data center infrastructure, which largely focuses on state-level regulatory incentives to entice data center construction.

As many other scholars have described, the relative invisibility (Star 1999) of internet infrastructure and in particular the rhetorical framing of “the cloud” obscures a material reality that ties internet infrastructure into long legacies of colonialism, extractivism, and industrialization (Tarnoff 2022, Vgontzas 2022, Ensmenger 2018, Hu 2016, Star 1999). In the case of data centers, corporations, local governments, and communities are finding themselves on well-trodden ground in environmental disputes between extractive/polluting industries and the communities in which they seek to operate (Solon 2021, Bade 2017, Varsalona 2016). From challenges to permitting decisions to a lack of public transparency regarding resource consumption and potential environmental impacts, local concerns surrounding the construction and operation of data centers are squarely in line with fights waged by communities against more “traditional” industrial infrastructures, from power plants to large-scale factory farming operations to oil and gas pipelines. The proactive and reactive behaviors of local governments and technology corporations continue to trace similar patterns, too.

This research will focus on community resistance channeled through formal legal and regulatory processes. These processes include participating in public meetings with regulatory agencies, initiating public records requests and pursuing related litigation, and passing restrictive local ordinances. This research will also examine the potential challenges facing communities when those sanctioned methods of petition fail or are insufficient (Ruddock 2019, Stump 2017).

At the same time, this research will examine how the legal tools and strategies employed by corporate actors in these case studies – Google, Facebook, and AWS – replicate long-standing tactics deployed against communities in the construction and operation of fossil fuel infrastructures. In the selected case studies, these tactics include the veiling of corporate identity behind local subsidiaries, shielding operational information critical to community-led oversight, invoking legal protections for trade secrets to obscure potential environmental impacts, and taking advantage of local regulatory environments skewed to empower industry actors over community opposition.

One illustrative case study involves Google and The Dalles, Oregon. The Dalles is a small city that sits on the Columbia River, the second-largest river in the US, as well as on the edge of the Oregon high desert (Parks 2021). Google has operated a data center in The Dalles since 2006 and has plans to construct a new data center on a site once occupied by an aluminum smelter – Google had already acquired the water rights formerly associated with that operation (Parks 2021). Local officials claimed that their proposed deal with Google would involve the company transferring these water rights to the city and then paying a standard rate to access water as needed, but both Google and local government officials declined to specifically disclose the amount of water Google expected to draw from the city for its future data center operations, despite community concerns (Parks 2021). In response, local news organization The Oregonian/Oregon Live submitted a disclosure request under the state's public records law – prompting local officials to sue The Oregonian in an effort to prevent the release of those records (Rogoway 2022).

Google's initial position was one familiar to many communities adjacent to active or proposed fossil fuel infrastructure projects – that this information constituted a "proprietary trade secret" and, accordingly, local officials had signed a non-disclosure agreement preventing them from disclosing the information, information that was central to the agreement the city had reached with Google regarding its additional data center (Parks 2021). After litigating the case for over a year, The Dalles finally reached a settlement with The Oregonian/Oregon in which it agreed to provide both past and future annual water usage data to the public – with Google committing to covering the city's legal costs as well as the settlement costs (Rogoway 2022).

The comparison between data center and fossil fuel infrastructure permitting has more than a superficial or procedural resonance, though legal and regulatory processes will provide a key lens for this research. As Nathan Ensmenger notes, while the particular invisibility of computing infrastructures often obscures the materiality of, for example, our internet-enabled activities, foregrounding "the places where large-scale computation happens" ensures that "the digital present does not seem quite so discontinuous with our industrial past." (2018). Examining the processes by which data centers are sited and permitted provides a new lens on this line of inquiry while also prioritizing the ways in which frontline communities initially encounter and are expected to contend with these infrastructures. But while the ongoing growth of large-scale computing infrastructures is a relatively recent development (Monroe 2022, Tarnoff 2022, Ensmenger 2018, Hu 2016), the widespread expansion of fossil fuel infrastructures is not. Drawing connections to the processes by which fossil fuel infrastructures have been and continue to be sited and permitted connects emergent local struggles against the environmental impacts of expanding computing infrastructures in the US to longstanding local struggles against extractive/polluting industries – and, by extension, to the decades of lessons learned by communities engaged in those struggles.

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PRINCIPLES OF SHARED RESPONSIBILITY: BUILDING A FEMINIST INTERNET WITH AN ETHICS OF COLLECTIVE CARE

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In 2019, the Association for Progressive Communications' (APC) Women's Rights Programme (WRP) embarked on a collaborative process to develop a feminist principle of the internet (FPI) for the environment, building on 17 principles that were first developed in 2014. This process reflected on the destructive impacts of the internet on the earth and all life, while imagining safe, inclusive, and diverse digital spaces, tools and systems that respect the rights of all life and the rights of nature.

The Feminist Principles of the Internet (FPIs) are a series of statements that offer a gender and sexual rights lens on critical internet-related rights. The principles were first drafted in April 2014 and updated in 2016, through convenings organised by the Association for Progressive Communications (APC) that brought together activists and advocates working on gender, sexual rights, and digital rights to collectively identify, prioritize and discuss issues at these intersections (Feminist Principles of the Internet, n.d.).

Currently there are 17 principles for a feminist internet, available in 11 languages and organised in five clusters: access, movements, economy, expression, and embodiment. Together, they aim to provide a framework for women's movements to articulate and explore issues related to technology. The principles are used by feminist activists and adapted, localised, and made relevant to various contexts and issue-areas. We recently developed the FPI Engagement Toolkit to assist in holding local conversation on the FPI's.

Towards a feminist principle of the internet for the environment

APC Women's Rights Programme (WPR) collaborations with human rights defenders have deepened our understanding of how the internet is being used by governments and corporations to surveil, censor, discredit, and violate rights. Digital attacks against land and environmental defenders often target family and friends and create a chilling effect in their communities. Most of the digital platforms and spaces in which these attacks occur are owned and operated by private companies that are far removed from the realities of these defenders and are unable or unwilling to adequately address these attacks and rights violations (Poetranto et al., 2020).

At the front lines of resisting extractive industries and defending territories are women and girls with all their diverse identities as well as gender non-conforming and nonbinary people. These diverse identities exacerbate the threats they face. Digital safety and care are critical to ensuring the agency, safety, and resilience of climate defenders.

How do we build ethical and fair practices?

The development of a feminist principle of the internet for the environment has been deeply informed by conversations in 2019 at a hackfeminist gather in Chiapas, Mexico, in which 26 women from diverse backgrounds met together for three days to explore technology and affection, and imagine a principle for a feminist internet that centers collective care, and weaves together policies of co-responsibility and interconnections between all life, and land.[1]

In this hackfeminist gathering, participants posed the question: "How do we build ethical and fair practices to ensure that our use of technologies respect the environment?" This question invited deeper engagement with a feminist exploration of environmental justice, and how to shift away from extractive and destructive digital technologies, challenge the roots of climate catastrophe in systemic injustices, and move towards and

[1] The hackfeminist meeting in Chiapas in July 2018 was co-organized by Sursiendo, APC and Instituto de Liderazgo Simone de Beauvoir and Tecnológico de Monterrey. For more information, please see Radloff (2022).

ethics of digital safety and care.

Participants in the hackfeminist gathering developed a new draft principle for a feminist internet:

"A feminist internet respects life in all its forms; it does not consume it. Our proposal for a feminist internet principle in relation to the environment re-signifies care towards an ethics of collective care in choices around design, extraction, production, consumption, and disposal of the technologies involved."

This statement invites us to re-imagine and re-shape our relationships with technology to center collective care and shared accountability (Ciacci, 2020). Two publications that resulted from the hackfeminist gathering in Chiapas offer critical insights for the future of a feminist internet for the environment:

"Technoaffections" (Cort.s et al., 2022) investigates the politics of shared responsibility and speaks to our first relationships with technology through memory, feelings and emotions. The 12 chapters unpack the politics of shared responsibility as creative and collaborative, rooted in experiences of land defence, feminism, and social movements. How do we build ethical and fair practices to ensure that our use of technologies respects the environment?

"Let us imagine" (Ricaurte & et al., 2022) contains hackfeminist writings for alternative technologies that look at relationships between ideas of love, work, alternative economies, and memory that teach us about care to arrive at strategies that nurture our communities. This collection of 20 writings from participants are a rich and diverse collection of thoughts and creativity about the politics of shared responsibility for people and the Earth.

The road ahead

In 2023, APC and Sursiendo will gather feminist, digital rights activists and organisations working on land and environmental justice, the internet, and extractive industries in an online convening to finalise an 18th FPI and explore ways of integrating this into wider environmental justice discussions and actions.

APC's work to contribute to environmental justice and sustainability is framed within feminist principles, adopting intersectional approaches, fostering communities of digital safety and care, contributing to the fight against environmental racism, and centring respect for the rights and sovereignty of Indigenous peoples and traditional communities (Finnegan, 2022).

An FPI on the environment will provide a framework for feminist movements to articulate and explore issues related to technology, digital rights, and the environment. Linked to this, there will be a way forward mapped to bring this text to life through engaging in spaces where we can influence policy, donor advocacy, public awareness and build momentum for collective action to actively shift the devastating impacts of the technology industry on the earth.

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INFINITY, ABUNDANCE, AND OPTIMIZATION: AN UNRELENTING INTERNET INFRASTRUCTURE IDEOLOGY

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The climate crisis, planetary scarcity, and (geo)political conflicts force internet practitioners to rethink internet infrastructures. Industry and policy responses to these crises remain tech solutionist, in which technology is positioned as the way out of the crisis without acknowledging that internet infrastructures themselves are increasingly becoming the subject of environmental controversy. Data centers are linked to disputes over land, water, and energy in public debate (Jansen 2022). Computing and hardware demands are seen to intensify the extraction of critical raw materials (Sutherland 2022). Rising energy costs because of the war against Ukraine create an economic incentive to handle computational processes sparingly.

How the global internet governance community approaches the environmental impact of technology has not been extensively researched so far. This paper aims to start filling this gap by analysing the agendas that are currently being created, and the limits of these approaches. Taking the example of the Internet Architecture Board's (IAB) workshop entitled "Environmental Impact of Internet Applications and Systems", which was held online in December 2022 (IAB 2022), I argue that the internet governance community is slowly coming to terms with the environmental harms of distributed digital networks but that the proposed sustainability solutions are narrow in scope. Applying an infrastructural analytical lens allows us to see which politics are embedded and missing from government and industry responses to the digital sector's environmental harms. Here, I use the term internet infrastructures to refer to both its material layer – the data centers, cables, routers, and devices – and its immaterial layer – computational processes, policies, and ideologies (ten Oever 2020).

Research on the environmental impact of the internet has gathered pace within computer sciences. In this discipline, research engages with calculating the environmental impact of end-user devices (Sutherland 2022), data processes, such as the energy consumption and carbon emissions of AI models (Hao 2019; Bender et al. 2021) and streaming services (Makonin et al. 2022), and the estimation of water needs to run data centers (Siddik, Shehabi, and Marston 2021). Another strand of research aims to quantify the environmental impact of the extraction and production of a single critical raw material, such as silicon, needed to maintain and expand the internet infrastructure (Williams 2004). When it comes to developing sociotechnical imaginaries on sustainable technologies, dominant debates solely focus on how computing can support carbon reduction in other sectors or assessing claims on the role technology play in the reduction of carbon emissions domains such as transportation, building, manufacturing, agriculture, and energy (Pargman et al. 2020; Rasoldier et al. 2022). While these strands of research present a unique insight into the environmental impact of a single technology, they omit to engage with the underlying values of infinity, abundance and growth that drive industry and policy solutions, which have been critically examined by media studies scholars such as Brodie (2020), Velkova (2021), and Gabrys (2015).

The Internet Architecture Board's (IAB) workshop on "Environmental Impact of Internet Applications and Systems" brought together those from the technical, standards, and research communities who are interested in and feel the urgency to reduce the environmental impact of internet infrastructures. Drawing on the papers submitted to the workshop as well as the workshop and mailing list discussions, I will outline how this group of internet practitioners frames the nexus between environment and infrastructure, their problem statement, and proposed solutions, before discussing how these technical visions of the internet connect and diverge from an environmental justice framework.

The IAB workshop research papers and discussions foreground that internet practitioners see the nexus of environment and technology as a complex challenge in which industry needs to account for extractive practices, the energy, water and land consumption in manufacturing and operations of the internet, the origins and sustainability of energy sources, and hardware equipment lifespan. Yet, solutions are limited to measurements and methods to optimize for the reduction of carbon emissions. In part, the narrowness of the solutions can be attributed to the type of internet practitioners that participated in the workshop, primarily network engineers, and in part, I will argue that is because the community tries to solve environmental problems within an existing internet infrastructure logic of infinity and abundance.

If we assume, as this paper does, that infrastructures have become ‘the rules that govern the space of everyday life’ (Easterling 2011), a more holistic approach to sustainable internet infrastructures is needed in the fight against climate change and environmental degradation. Situating the problems and solutions in an environmental justice framework opens up questions about who gets to frame the problem and prioritize the solutions that are being proposed, and what are the social and environmental costs of these solutions. This offers insights into how even progressive approaches to minimizing environmental harms are still rooted in the logic of abundance and optimization, which in turn prompts and allows us to theorize in relation to limits and reductions, where infrastructures are considered temporal and can scale down.

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