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Renewable Ruse: Bioenergy Development in North Carolina's Coastal Plains

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Abstract

Rural communities in eastern North Carolina are responding to the emergence of bioenergy development as an extension of environmental injustices, rather than sustainable solutions to climate change as presented by state and industry actors. We examine how biomass and biogas development entrench logics of extraction, rather than transition, as they are built as extensions of pre-existing concentrated animal feeding operations (CAFOs) in a landscape prone to climatic fluctuations. Using a polyvocal approach to knowledge co-production that builds from multi-year collaborative ethnography, the co-authored text demonstrates a commitment to the value of environmental justice (EJ) leaders' knowledge—to advance environmental analytics. We argue that despite its claims, bioenergy operates as a *ruse of renewable energy*: it is a technological sleight of hand, that deepens rather than mitigates exposure to socio-ecological harm. Discursively hinged to sustainability claims, biomass and biogas attempt to signify a temporal, moral, and technological breakaway toward a different kind of techno-social future when, in fact, there is no real rupture from the well-established export-driven, extractivist logics of production.

Keywords

bioenergy development; environmental justice; greenwashing; collaborative research; rural; North Carolina

From Fossil Gas to "Bio"Energy in North Carolina's Rural Coastal Plains

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In 2020, Dominion and Duke Energy halted construction of the Atlantic Coast Pipeline (ACP) due to mounting expenses, denial of necessary water permits, and sustained resistance. The 600-mile fossil gas route began Virginia, entered North Carolina (NC), then terminated near NC's southern border in Robeson County, homeland of the 60,000 member Lumbee Tribe. This region comprises a lowland territory marked by winding rivers and significant biodiversity and by social distress compounded by a network of polluting infrastructures.[1] Local leaders recall their success in blocking the ACP as a watershed moment for forming multi-racial, interstate coalitions under Indigenous and Black leadership.[2] The ACP battle illuminated ongoing debates over the environmental and social risks of oil and gas pipelines globally (Ramírez-Camacho et al. 2017) and the jurisdictional politics of pipelines in rural Indigenous territories, specifically (Emanuel 2019, 2024; Emanuel et al. 2021; Estes 2019; Montoya 2019; Noisecat and Spice 2016; Whyte 2017).

Even with the ACP defeated, communities throughout the coastal plains remain sites of extraction, now for industrialized bioenergy, a "greener" form of "predatory extractivism": large-scale, intensive, and with substantial social and environmental impacts (Gudynas 2013, 167). Yet where most focus has been on mining, extractivism in rural eastern North Carolina has sedimented in the fungible materiality of commodified animal flesh and feces, pine forests, and methane gas, recently recast by state and industry actors as "renewable" energy. These projects harvest forest matter and poultry waste for wood pellet biomass and target industrial hog operations for factory-farmed methane gas from hog waste lagoons. They rely upon existing industrial infrastructures and extractivist logics to produce energy for export and meet new state mandates for climate mitigation. Bioenergy thus advances powerful "sociotechnical imaginaries" (narratives that conceptualize new futures) that suggest transition, when in fact, bioenergy development in this region entrenches longstanding social and ecological distress.

In 2007 the NC Renewable Energy and Energy Efficiency Portfolio Standard ("REPS") required investor-owned utilities to use renewable energy or energy efficient steps for 12.5 per cent of their energy needs and electric cooperatives and municipal systems for 10 per cent of their energy needs (North Carolina Senate 2007). The requirements could be met by utilizing "a biomass resource like agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane" (ibid.). Advocates of bioenergy technologies champion them as "renewable," because they rely on resources that are seemingly regenerable (trees and forests) or in excess (industrialized hog, poultry, and wood waste). Such resources provide alternatives to burning coal; they enable the state to meet its renewable energy goals. Communities living intimately with these technologies offer a different story, which we elaborate here. Offering a polyvocal assessment of expanding bioenergy transition in rural eastern NC, we ask, *what precisely is being renewed by bioenergy development*?

[1] The inner North American Coastal Plains is a biodiversity hotspot in danger with "more than 1,500 endemic vascular plants and greater than 70 percent habitat loss" (Noss 2016). Robeson County has the highest violent crime rate of any city in NC (Srdjan 2023).

[2] Donna Chavis, interview with Amy Goodman, Democracy Now, July 7, 2020 (Goodman and González 2020); also Donna Chavis, interview with Powell and Witter, Lumberton, NC, October 12, 2020.

We approach this problem ethnographically and collaboratively (Fortun 2012; Ahmann and Kenner 2020), building upon several years of co-reach and analysis, sustained conversations, policy review, toxic tours and digital archiving. Three authors write from direct intimacy with organizing against environmental harm in the region: Danielle Melvin Koonce, sociologist and community member from the Cape Fear Watershed in Sampson County (see figure 7); Jefferson Currie (Lumbee), ecologist-historian and riverkeeper; and EJ organizer, writer, and theologian, Mac Legerton, both from the Lumber River Watershed in Robeson County. Each leads the authorship of a section in succession below, drawing from our collective assessments of how a *ruse of renewability* is at work. Koonce, Currie, and Legerton have sparked and guided Powell and Witter's university-based analyses, closely tracking bioenergy's emergence in the region. Powell and Witter write as collaborating ethnographers, each with roots in eastern NC (Powell from Johnston County, Witter from Lenoir).

We find that in rural eastern NC, bioenergy renews underlying historical inequities and infrastructures of extraction that have long threatened lives and livelihoods in the region. Though cast as climate solutions, they instead expand the reach of rural capitalism by entrenching the commodity production of mass-scale pork, poultry, and pellets. Bioenergy development in NC enables an unprecedented merger of industrialized agriculture and industrialized energy production processes, both long critiqued for inadequate and unfair regulations. Yet, logics of transition achieve this maneuver by rendering industrialized agricultural and deforestation processes *essential* to bioenergy development. Thus, bioenergy development provides a proxy for a politics of sustainability that evades historical and political economic conditions that beget the very need for transition. Under the banner of *renewability*, there is, instead, a *continuity*: a sustained environmental *in*justice as rural communities bear the social-ecological risk of green energy. In this manner, we argue that these emerging bioenergy technologies operate as *renewable ruses*: they operate as signs for sustainable futures, while in fact concealing a host of inequities and contributing to – not mitigating – climate disruption.

In what follows, we introduce the emergence of environmental justice movements in eastern NC and sketch the contours of the two material forms of bioenergy that concern us: factory-farmed swine CAFO "biogas" and forest and poultry-based "biomass." We then develop a triptych of empirical analytics examining implications of infrastructures that advance the "ruse." Finally, we examine the concepts of transition and extractivism to suggest that in rural eastern NC, that which is being renewed is the ruse itself: extending environmental injustice under the banner of transition.

Environmental (In)Justices: Movement and Momentum in North Carolina

Contamination related to extractive and toxic industries is well-established in eastern NC, which has shouldered hazardous manufacturing and industrial agricultural operations for decades, as co-author Mac Legerton clarified more than two decades ago (Regan and Legerton 1990). At the same time, the rural region has a deep legacy of robust, community-based organizing, launched in the late twentieth century to resist contamination and part of a broader movement across the American South (Bullard 2000) and Southwest (Moore et al. 1990). In 2022, we participated in the 40th anniversary commemorating the birth of the EJ movement: in 1978 the Ward Transformer Company in Raleigh dumped 75,000 gallons of oils containing PCBs (polychlorinated biphenyls, which were banned by the US EPA in 1979) across 24,000 miles of rural

roadsides in eastern NC. Four years later, in 1982, the state sited the majority African American town of Afton, in Warren County, NC, for a toxic landfill to dispose of 40,000 cubic yards of the cleaned-up PCB-laden soil. The 1982 anti-PCB protests in NC launched a merger of civil rights and anti-toxics movements that "transformed environmentalism," (McGurty 2007; Sandler and Pezzullo 2007) prompting movement leaders to advance the concept of "environmental racism" through a groundbreaking national report correlating "toxic wastes and race" (Commission for Racial Justice 1987). Through direct action in a small southern town, amplified by national civil rights activists, this articulation of racial violence and environmental harm marked a critical turning point in the anti-toxics movement (Taylor 2002). This history of activism established eastern NC as a proving ground for critical analytics of environmental justice, with reverberations that are ongoing in rural eastern NC counties, described elsewhere as "specters of rural capitalism" (Witter and Powell 2022).

This anti-industrial, anti-racist activism, also fueled by Black-led labor rights struggles from the late 1970s, spawned the formation of the NC Environmental Justice Network (NCEJN), a regional coalition of people-of-color led EJ organizations that continues to thrive.[3] Early leaders of the NCEJN articulated the dangerous confluence of hog Concentrated Animal Feeding Operations (CAFOs) and coastal hurricanes, along lines of race and class. And by the 1990s, eastern NC had deepened its EJ organizing in response to the proliferation of CAFOs in the region (Ladd and Edward 2002). For decades, CAFOs have moved wealth out of NC while exacerbating socio-ecological harms and health disparities (Miller and Longest 2021; Wing et al. 2000). Known for noxious odor, fecal and chemical contamination of water and air, and endangerment of roadways and neighborhoods (Guidry et al. 2018; Herring 2014; Wing, Cole, and Grant 2000), CAFOs are increasingly dangerous as the cesspools leak into waterways during storm surges. Now, these technologies are currently being made *doubly* profitable in the name of renewable biogas: they offer an infrastructural base for methane capture on football-field-sized feces "lagoons." This maneuver by the industry is now understood by critics as "greenwashing" (Newsome 2021), that "disproportionately threatens Black, Latino, and Native American North Carolinians" (Graddy 2020). Likewise, the slow but steady generational loss of landholdings among Black farmers has escalated with the geographic expansion of CAFOs (Edward and Ladd 2000), and health outcomes for communities living near CAFOs has very clearly declined (Wing and Wolf 2000). These effects have been articulated by Black and Indigenous women who are at the forefront of this movement, including Elsie Herring, Naeema Muhammed, Donna Chavis, and Susie Weathersbee, pictured in figure 1 below with a "Hogs Stink" placard.

[3] Naeema Muhammed, interview with Powell and Witter, Rocky Mount, NC, October 6, 2020.

Figure 1. Eastern NC resident protests in Raleigh, NC against the expansion of rural hog CAFOs (Source: Courtesy of Gary Grant and the Tillery History House, Halifax County, NC, October 6, 2020).

Forty years on, the region is still described as "a crucible of 21st century environmental justice struggles" (Yeoman 2021), with water crises as a unifying theme (Emanuel 2019; Emanuel and Wilkins 2020). Our focus on bioenergy development, and its effects on water, has been primarily in Sampson and Robeson Counties, along the Cape Fear and Lumber River watersheds, though these infrastructures extend across the region. The two counties have different environmental justice histories: in Robeson, just after the anti-PCB movement noted above, two successful environmental justice campaigns began in 1984, blocking a multi-state low-level radioactive waste incinerator and a multi-state hazardous waste treatment facility and initiating a series of victories that carried into the 1990s (Shabecoff 1986). The Lumberton-based Center for Community Action was instrumental in this work, and its co-founders, Legerton along with Donna Chavis, have since initiated other grassroots collectives that extend beyond the county and state. In Sampson County, EJ organizing emerged in the 1990s in response to the development of a landfill that has since become the largest in NC, a veritable 'mountain' of waste in a predominantly African-American neighborhood (Pluska 2023). The landfill is also on the state's docket for biomethane capture. Recently, Sherri White-Williamson, a native of Sampson County and recent retiree from the US EPA, grew concerned through her work with environmental justice advocates and communities across the country that her home

county was experiencing many of the injustices that she had seen elsewhere. With colleagues from Vermont Law School, she co-founded the Environmental Justice Community Action Network (EJCAN) in July 2020 to bring resources to tackle these issues from a rural perspective, working with residents from the Snow Hill, NC community to define the core issues of landfill, industrialized agriculture, and wood pellets, all confounded by a lack of meaningful access to water infrastructure.

Sustainability, Renewability, and the Sociotechnical Imaginary

One of our aims is to unsettle facile "transition" narratives that tend toward a strategic forgetting of the accumulation of impacts and also expand conventional EJ analysis. Distributive and procedural injustice, core tenets of EJ literature, activism, and policy, fall short in instances of energy development (from extraction to waste storage) when American Indian nations and tribal sovereignty are involved, prompting important redefinitions of EJ altogether (Emanuel 2024; Ishiyama and Tallbear 2001; Gilio-Whitaker 2019; Parsons et al. 2021; Ranco et al. 2011; Whyte 2018a, 2018b). A dynamic body of scholarship demonstrates how environmental injustices and other forms of racial and gender oppression (Buckingham and Kulcur 2009) can be introduced and even exacerbated in efforts to achieve sustainable development goals, including in contexts of renewable energy development (Normann 2020; Howe 2019; Boyer 2019; Powell 2017, 2018; Li 2015; Mookerjea 2019). The complex relationship among interpretations of justice, sustainability, vulnerability, and transition come to the fore in industrialized bioenergy; scholars have shown how forced and violent transitions from customary crops to fuel crops, like biodiesel and bioethanol, generate greater vulnerability in the name of sustainability (McMichael 2010; Mol 2007), especially where "green" projects enable global land-grabbing and alienation from land and labor in settler and/or postcolonial contexts (Borras and Franco 2012; McMichael 2009; McCarthy 2010). Such work demonstrates how "transition" technologies too often elicit uneven social impacts, including "enclosure, exclusion, encroachment, and entrenchment" of land, planning, and environmental health (Sovacool 2021). Indeed, energy systems can convey and curtail political and economic power, subjectivity, and extend the reach of empire (Howe 2019; Winther 2010; Winther and Wilhite 2015; Strauss et al. 2013). Critical responses to this include "community energy" transition initiatives that aim to localize and decentralize production (Siamanta 2021; Lai 2019).

The notion of a "sociotechnical imaginary" helps us to illuminate the ruse: defined as "collective visions and accompanying policy frameworks for achieving a "good society" via technology development," these imaginaries are affective *and* policy-oriented (Burnham et al. 2017, 66). With moral and material implications, such imaginaries shape energy policy, but are challenged empirically by the non-uniform pathways that bioenergy (or other renewable systems) might take, in geographically and culturally particular locales. In the case of the US, Burnham et al. argue:

> The national bioenergy sociotechnical imaginary rests on using biomass resources to reduce fossil fuel dependence, revitalize rural economies, ensure energy security, mitigate climate change, and provide environmental services such as water quality improvement (ibid., 66).

The imaginary becomes a powerful narrative of policymakers, investors, and capital in a broad sense, deploying future-oriented, transition and "innovation" narratives driven by technological expertise. Such "greenwashing" is of course not only underway in NC, as Gittelson et al. show in their study of biogas, but

across rural communities where manure-to-energy projects are introduced as solutions to climate change; yet with complexities that deepen hazardous conditions for communities, entrench fossil-fuel based industrial agriculture, and pit frontline communities against farmers—when in fact both are harmed by this system (Gittelson et al. 2022). The designation of bioenergy for eastern NC occurs in the public marketing of these projects and in techno-scientific analyses and reports, contributing to its power as a sociotechnical imaginary that can sway lawmakers, investors, and the public, advancing the ruse of renewability. We see there is a "politics of imaginaries" in play, inasmuch as there are rivaling visions of rural futures: entrenched CAFO lagoons "sustaining" factory-farmed methane-capture to meet state targets for climate mitigation.

While earlier work focused on fossil fuels transitions at such scales within relatively homogenous notions of "community" (Hopkins 2008), more recent studies emphasize the centrality of difference, placing questions of historical violence and marginalized peoples at the center of analysis. These de/anti-colonial (Lai 2019; Lennon 2017, 2020; Gudynas 2013; Escobar 2018; Curley 2023; Montoya 2016) and feminist approaches (Bell et al. 2020; Mookerjea 2019) not only critique unbridled growth but engage the theoretical work of social and EJ movements, wherein the systematic "de-mattering" of certain bodies is central (Lennon 2017). Over the past decade, scholars have also developed methods for examining how "transition imaginations" operate among planners, designers, and activists (Escobar 2018).

We argue that the renewable "ruse" can operate due to the prevalence of this imaginary; it operates as a sleight of hand that dispossesses, even as it claims to usher in better futures. Through techniques of "rights" and "participation," we see how sustainability and renewability knowledge-claims tend to protect rather than transform the status quo (Cornwall and Nyamu-Musembi 2004; Uvin 2007; Witter and Satterfield 2019; Witter 2021). At the same time, these threats illuminate the strength of existing and new grassroots knowledge and organizing for socio-ecological justice, with local environmental knowledges offering crucial vantage points for both policy changes and critical theories of environmental defense (Carroll 2015; Roane and Hosbey 2019).

Experimental Polyvocality, Collaborative Ethnography, and Co-Analysis

While scholarly examinations of bioenergy are now established (Ahmann 2019; Burnham et al. 2017; Borras et al. 2011), less attention has been directed to the critical analytics of those working and living intimately with bioenergy infrastructures. Our polyvocal, collaborative method intervenes here. Building from ethnographic approaches to EJ (Gutierrez et al. 2021), our approach is field-based (see figure 2), empirical, and grounded in co-research in eastern NC, undertaken at time together and at times individually, from 2020-23. The five of us have engaged in an iterative process of dialogue, coterminous with the formation of new community-based EJ organizations, emerging from the longer history of EJ in eastern NC and responsive to the colliding threats of climate change and bioenergy development. Along with Sherri White-Williamson and Donna Chavis, we formed a partnership called the Environmental Justice Collaborative ("EJ Co-Lab"), through which we have: co-organized and participated in community-based meetings about bioenergy development; attended and documented state environmental regulatory meetings; co-initiated community-based water quality testing with public health colleagues; and engaged in sustained conversations, interviews, and field observations with one another.

Figure 2. Witter (left) and Powell (right) interview Currie and Legerton in Lumberton, NC (Source: Jefferson Currie, October 13, 2020).

Our collaborative method attends to questions of difference (our own) as a central tenet and carries an engaged commitment to imagining and enacting the world beyond "how it is" through our relations (Law 2016). Methods matter, as not only describing the social world, but in creating those realities (Law 2004). As such, we also advance a method-and-ethic for knowledge co-production to enhance collaborative ethnographic STS methodologies for environmental justice that builds knowledge infrastructure (Fortun et al. 2021; Casas-Cortés et al. 2008). We link qualitative methodologies in STS with emergent work in anti-colonial environmental action research: following Max Liboiron's "method-as-ethic" approach (2021), we intentionally hyphenate to emphasize the method/ethic entanglement. We are interested in that what critical environmental scholarship says, but also how scholarship "gets made and done" (Downey and Zuiderent-Jerak 2007 cited in Liboiron 2021, 119).

Biogas in eastern NC: Changing States of Matter and Morality

Founded in 1936, Smithfield Foods has since become a transnational corporation, owned by the WH Group based in Hong Kong, and the largest pork producer in the world.[4] In the late 1980s, with the enforcement of environmental regulations in Virginia, the company began to establish a network of hog farms in eastern NC. By the 1990s the region became the second largest pork producer in the US:

> Between 1989 and 1995, vertically integrated corporations and their contract growers built 700 Concentrated Animal Feeding Operations (CAFOs) in Eastern North Carolina while 7,000 smaller hog farmers went out of business. The emergent "megalopolis" of confinement houses quartered 8.2 million pigs that produced twice as much manure as the population of New York City without a sewage treatment plant in sight (Miller and Longest 2021, 524).

As hogs began to outnumber people and scaled-up operations replaced small farms (Nicole 2013), the industrialized waste of the confined animals became a new entity for toxic exposure. Concentrated in nearly 4,000 open-pit lagoons, hog feces contain pathogens, heavy metals, and antibiotic-resistant bacteria (ibid. 2013, 183; Wing et al. 2008[5]); not confined to NC, these industries have a well-documented track record of socio-ecological harms across rural communities (Wilson et al. 2002). Operators dispose of the manure-mix waste by spraying it via sprinkler systems or from trucks onto nearby fields (see figure 3). Airborne spray reaches ditches, yards, gardens, homes, and human bodies, transforming a generations-old relationship to the land (Herring 2014).[6]

[4] China's Shuanghui International, later the WH Group, bought the "pork giant" in 2013 for $4.7 billion USD, the largest industrial agriculture purchase in US history (Philpott 2013).
[5] While rotating manure onto agriculture fields can be a highly desirable and indeed renewable metabolic transfer, the sheer amount of excrement means that the nutrients become concentrated, toxic, and unabsorbable.
[6] Naeema Muhammed, interview with Powell and Witter, Rocky Mount, NC, October 6, 2020.

Figure 3. Agricultural field in Sampson County, NC, being sprayed with hog waste from a hog "lagoon" (Source: photo by Danielle M. Koonce, July 10, 2020).

Emissions from industrial hog operations have been documented to contain "ammonia, hydrogen sulfide, hundreds of volatile organic compounds, dusts, and endotoxins." These "mixtures" cause respiratory dysfunction, mood disorders, and compromised immune function (Wing et al 2000, 225). Julia Kravchenko et al. (2018) extended these findings to underscore the challenges to life expectancy due to anemia, kidney disease, tuberculosis, and low birth weight among those living close to CAFOs. Moreover, the odor is noxious, causing nausea, embarrassment, disorientation, and social loss in community continuity as people can no longer maintain culturally meaningful practices like gardening, going for walks, or gathering outside to share food (see also Tietz 2006; Horan 2021), creating an affective form of violence. There are also impacts for ground and surface water: the seepage from the often-unlined lagoons has contaminated groundwater, and extensive flooding has caused devasting spills of toxic waste into waterways, contributing to harmful algal blooms, fish kills, and eutrophication in rivers and estuaries (Wing et al. 2000; Wing et al. 2008; Wing 2002; NCCN 2021).

Figure 4. Hog CAFO in eastern NC following the flooding from Hurricane Florence, 2018. The lagoon of pig excrement turns pink from bacteria (Source: *The New York Times*, September 19, 2018).

Such contamination escalates with storm-related flooding, common in the lowland region. Land in the inner coastal plains is flat, drained by ditches and canals that flow into the small branches and slow-moving swamps that amble into the tidal rivers, eventually emptying into the inlets and sounds that reach the Atlantic Ocean. Except, that is, for those seasons when hurricane floods push water in the other direction, flooding and in some cases drowning the region and its industrial animal operations (see figure 4). Following

the 1995 lagoon breach that spilled 25 million gallons of hog waste into the New River, "Hurricane Bertha triggered an additional 1.8 million gallon hog waste spill" (NCCN 2021, 9), and in 1999, Hurricane Floyd "washed 120,000,000 gallons of unsheltered hog waste into the Tar, Neuse, Roanoke, Pamlico, New and Cape Fear rivers," drowning pigs, and leaving operations and lagoons several feet underwater (Tietz 2006).

In response to these disasters, the state legislature "enacted a moratorium on the use of the lagoon and spray field system at any new or expanded hog operation" and ordered the Department of Agriculture to phase out the lagoons and spray field system altogether (NCCN 2021, 10). In 2000, Smithfield committed to developing new technologies for waste management that would eliminate discharge and emission and seepage of pollutions to air, land, and water. When subsequent environmentally superior technologies developed, Smithfield refused to adopt them. In 2013, the Hong Kong-based WH Group acquired Smithfield, making this ostensibly local problem a more explicitly global one (Philpott 2013).

Environmental Analytic 1.

Contamination Notification: Hogs and Biogas in Sampson County

Authorship led by Danielle Melvin Koonce

In January 2020 a public notice appeared taped to the front door of Mt. Zion African Methodist Episcopal (A.M.E.) Church, in the rural town of Delway, in the heart of Sampson County, NC. The bold-black ink warned:

> MT ZION AME CHURCH WATER HAS HIGH LEVELS OF NITRATE. . . . Do not give the water to infants or use it to make infant formula.

It was not the first, or even second notice that the church my father, Rev. Jimmy Melvin, pastors had received regarding the high nitrate levels in its only water source, at that time, a shallow ground well. These notices would appear mysteriously, without warning, without identification, and without explanation to causation—thus no indication of responsibility. Parishioners would simply find a notice posted to one of the front doors of the church when they arrived for Sunday worship. My father's church is located near two hog CAFOs. After asking around, I learned that the operations had been spraying hog excrement on the field directly adjacent to the church. Members of the church had seen the spray trucks and smelled the liquid and dry hog waste sprayed over that field. Our estimation was that the hog waste had potentially seeped into the church's well water.

After exhausting bottled water and purchasing a water supply cooler, the church decided to dig a new well—one that would be deep enough to avoid the runoff and seepage of nitrate-ridden waste. The well was dug 225 feet deep, cost close to $5,000 (USD), and, finally, in July 2020, an inspection declared the water safe to drink. Yet, the new well served as a sober reminder that other neighbors might be unaware that their own groundwater may be contaminated by conditions they didn't create, and lacking the financial resources to mitigate their exposure.

We soon learned that in November 2018, Smithfield Foods and Dominion Energy formed the Align Renewable Natural Gas (Align RNG) venture, earmarking $250 million over a decade to capture methane from company-owned and contract hog farms in rural NC: locals referred to this project as the "Grady Road Project." The plan was to connect nineteen hog farms throughout Sampson and Duplin Counties to a biogas

facility via pipelines that would crisscross the counties, carrying methane gas captured from hog waste lagoons to consumers outside of the region. In 2020 Align RNG mailed the brochure (figure 5), explaining industrialized biogas development, to my father's church.

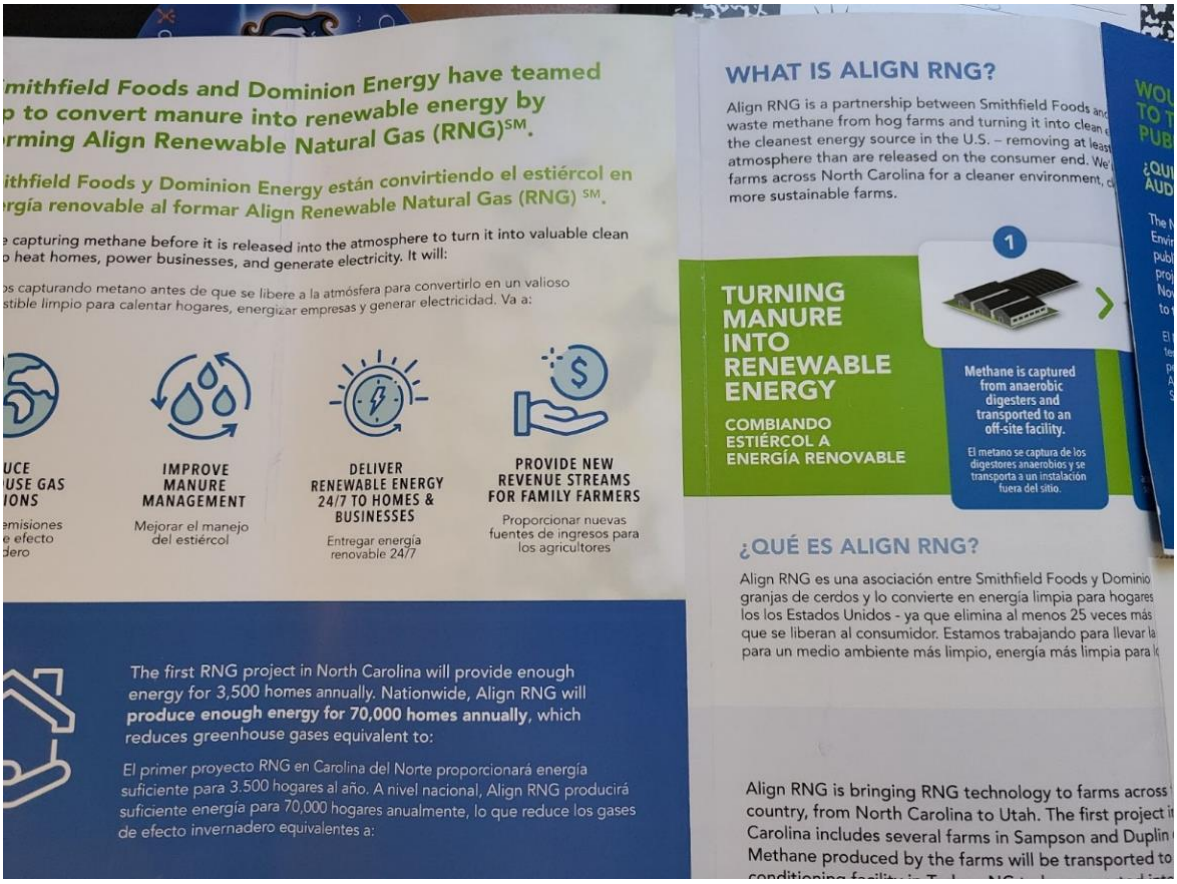

Figure 5. Pamphlet from Align Renewable Natural Gas (Source: Danielle M. Koonce, August 15, 2020).

In NC, biogas production does not require the superior technologies that would stop the harms associated with industrialized hog operations. Instead, it requires the installation of anerobic digesters, which can be "an impermeable layer of material" (i.e., a thick tarp) that covers the lagoon, to capture methane from industrialized hog waste (Miller and Longest 2021, 539-540). These "farm to energy" technologies are lauded as an industry best standard, that, as advertised in figure 6, is "harnessing clean, renewable energy from our nation's hog farms for the good of the climate, consumers, and family farmers" (Align RNG n.d.). These expressed commitments to nationalism, to family farms, and to climate progress obscure and bely the cumulative impacts in the community's that "host" these technologies. Among these concerns is that "covering and pressurizing lagoons" may in fact increase seepage and nutrient concentration while the increased need for pipeline transportation is projected to "increase the burden of communities of color" (ibid.).

Figure 6. Dominion Energy and Smithfield Foods' joint venture as Align RNG, invokes nostalgia for family farms, placing hog CAFOs alongside wind turbine as ruses of renewable energy futures (Source: https://alignrng.com).

The introduction of factory-farmed methane gas capture in Sampson and nearby counties compounded the congregation's water worries, leading my father to make the church's water contamination public. In May 2021, joined by my mother, he traveled to Raleigh to speak before the NC Senate against biogas production on hog farms. That same month, Mt. Zion Church hosted a town-hall meeting inviting neighbors and county residents, some of whom had already experienced water contamination, to come and share their grievances and concerns. Two members of the NC House of Representatives attended, representing other parts of the state, but with ties to Sampson County. With a crucial Farm Bill (N.C. Farm Act 2021) at stake, they wanted to hear from community members. For two hours, community members shared challenges that they had encountered with industrialized hog operations and concerns over the potential contamination of their water. One resident had not been able to use her groundwater since 1996—it discolored her clothing and stained her car. Another had spent over $11,000 to have a new well installed but the water continued to be contaminated.

Public attention garnered a letter from Smithfield, commiserating the church's water issues while attempting to assure the church that, due to elevation levels, the water contamination was not due to the Smithfield-owned farm. Meanwhile, Smithfield and Dominion continued to make decisions that could bring more hazardous water to communities surrounding the church. Despite the testimonials, public hearings, and general disapproval from community members, the Farm Bill passed in July 2021 and included a section (Section 11) that would enable the industry to use one general permit for county-wide development, rather than requiring each hog operation to obtain its own permit. The effect is that the permitting process can

bypass community input as more factory-farm methane gas facilities are developed. Community experience, according to state regulatory logics, is considered "beyond the scope of relevant matters" and beyond the responsibility of state regulatory responsibilities. When I shared with neighbors that the Bill had passed, one responded, "it is like we don't even matter." Despite the contamination, trips to the capitol, op-eds, and community meetings, it was as if our grievances were of no concern in the face of state goals for renewability. We still have serious water problems in our county and against the wishes of many, industrialized biogas moves ahead.

Figure 7. Koonce and her father, Rev. Melvin, at their church in Delway, NC (Source: Koonce's own photo, November 11, 2021).

Biomass: Transforming Local Forests into Global "Green" Fuel

In the same rural watersheds where excess industrialized hog waste is being repackaged as "renewable" biogas, there is also rapid deforestation of woodlands for the industrialized production of "renewable" biomass. In 2009, the European Union's "Renewable Energy Directive 2" named "sustainable biomass" a key method for achieving the EU's carbon reduction goals (Ouzts 2019). A decade later, in 2019, British forest management company AEG announced plans for a wood pellet production facility in Robeson County.

Following the logic of extraction, biomass companies have outsourced the production-site contamination to rural communities where they have little or no relations. Thus, in the same territory that hosts excess industrialized hog waste, woodland deforestation for biomass compounds the impacts of coastal hurricanes, increasing both in frequency and magnitude.

Figure 8. Enviva Inc.'s wood pellet plant, Garysburg, NC (Source: photo by Rebecca Witter, October 8, 2020).

Biomass is a growing, transnational industry, enabled by "ample forests, lax business regulations, and ports along the Atlantic coast" (Purifoy 2020, 1). It is expanding rapidly across the US, yet without ample monitoring (Aguilar et al. 2020). Every year, forests across the US South have moved through 23 mills to become, annually, 10 million metrics tons of wood pellets (see figure 8) for export (ibid.). The Enviva Corporation (see figure 9) opened the first mill in Ahoskie, NC, homeland of the Meherrin Indian Nation. It opened a second mill opened in 2013, in Garysburg, NC, in a "Tier 1" economically depressed, predominantly African-American county, where Belinda Joyner educates and organizes neighbors on the lived impacts of

the processing facility in their backyard.[7] Three other mills have opened in the inner coastal plains, including one in Sampson County and in homelands to the Coharie, Lumbee, and Waccamaw-Siouan Nations. Emissions from the mills release an estimated 3.1 million tons of greenhouse gases per year containing carbon monoxide, nitrogen oxides (smog), and volatile organic compounds that are not accounted for by customer (European) states in their domestic carbon release numbers.

The EU imports wood pellets from southeastern US forests to meet its goals for carbon reduction. Scientists and advocacy groups have shown how the associated math and sustainability science are problematic (Mai-Moulin et al. 2019), amounting to what Searchinger et al. described as a "critical climate accounting error" (2009). EU renewability logics treat "all bioenergy as carbon neutral regardless of the source of the biomass, which may cause large differences in net emissions" (Searchinger et al. 2009, 1). They moreover assert that wood pellet production will reduce coal usage, and thus, decrease atmospheric carbon. The EU's official calculations of greenhouse gas emissions do not account for the carbon lost when trees are cut, when roots decompose, when tailpipes transporting the pellets emit, and when pellets are burned. This is because the forests, it is argued, will regrow (even as it takes a century or more) and recapture the carbon. The Drax Group® purchases Enviva's American wood pellets and burns them as a substitute for coal.

As shown in the image, Enviva promotes narratives of undisturbed, wooded wilderness when in fact it has become a leading source of deforestation in the US Southeast, replacing loblolly short-leafed pine forests with mono-cropped stands of trees. By Legerton's assessment, these areas are "ghost forests," replanted for the sole intent to harvest and burn (see figure 10). The multiple values of biodiverse ecosystems thereby become reduced to a monetized exchange value. As diverse forests are converted to plantations of trees, the hauntings come with the hurricanes and floods, with the species loss and the inability to recover, and with the alienation that adjoins the sacrifice of forest relations for commodity exchange.

The "booming" biomass production transforms accumulated energy of rural NC forests into single-use energy materials for European pellet-burning domestic stoves (see figure 10), enabling the EU to outsource the production-site contamination, forest degradation, and related flooding (Popkin 2021). These processes are enabled through a feat of carbon emissions accounting that we return to below. Such diversions of responsibility in the name of renewability are a central concern of Riverkeeper Jefferson Currie, evidenced through his research along rural waterways (figure 11).

[7] Belinda Joyner, interview with Powell and Witter, Garysburg, NC, October 8, 2020.

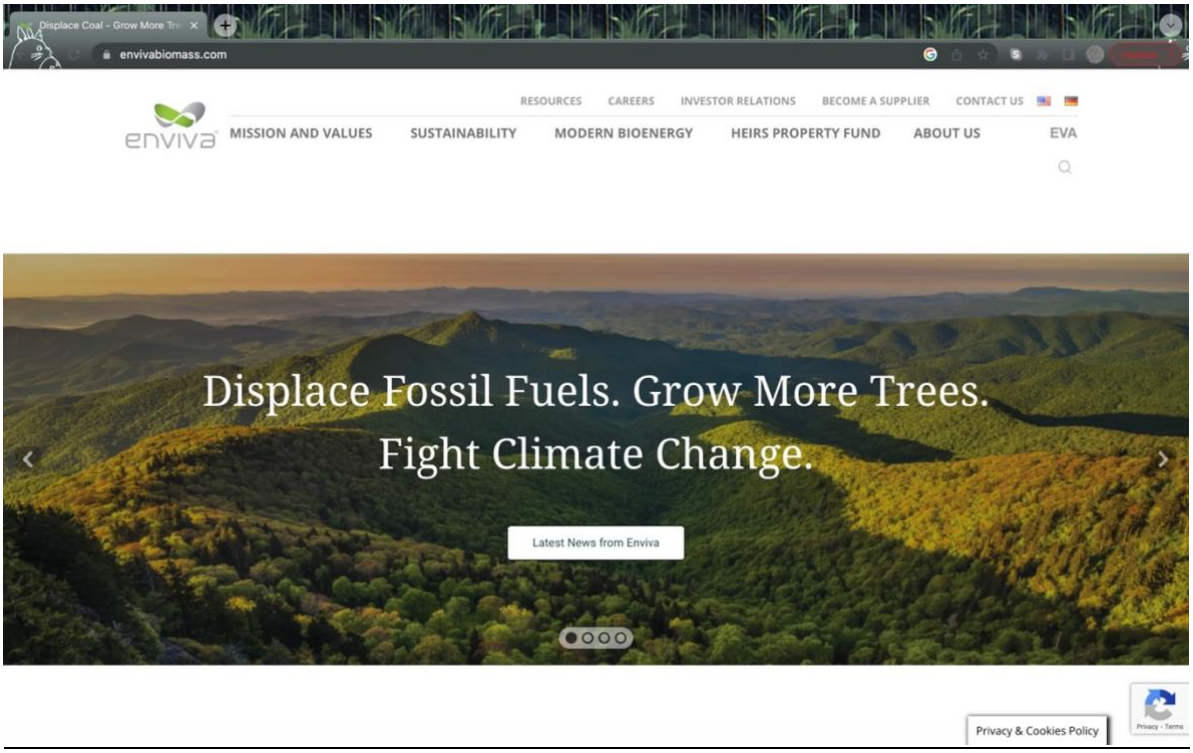

Figure 9. Enviva, Inc. online advertisement (Source: www.envivabiomass.com, 2021).

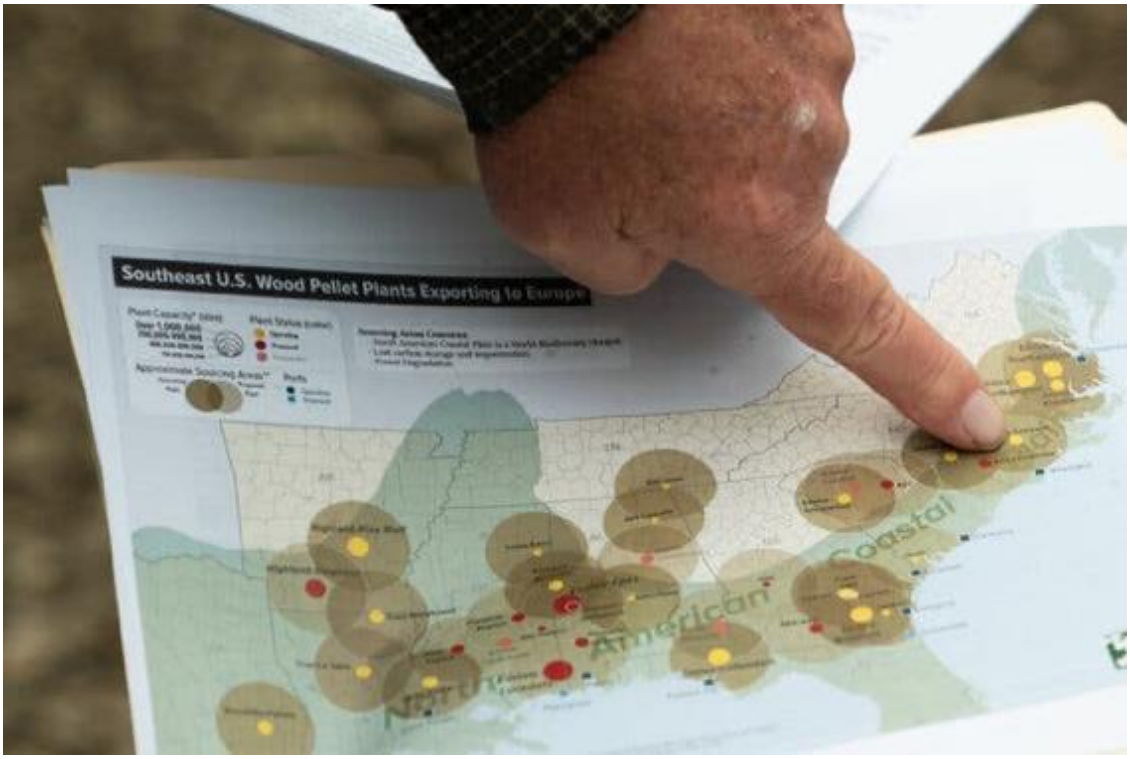

Figure 10. Southeast US Wood Pellet Plants Exporting to Europe (Source: *The New York Times*, April 19, 2021).

Environmental Analytic II

Diversions: Deforestation, Hurricanes, and Bioenergy in Robeson County

Authorship led by Jefferson Currie II

In late 2018, I was helping a team of university researchers look for rural private wells being used for drinking water. This project of well water sampling was part of a "rapid response" grant following back-to-back hurricanes: the region saw Hurricane Matthew in October of 2016 and Hurricane Florence in September of 2018, with these major storms compounded by the devastation caused by the associated 1,000-year floods.

Our research team sampled wells in Bryant's Circle, a predominately American Indian community, whose residents identify as Lumbee (like myself) and/or Tuscarora. Most of the wells we tested were shallow (9ft-35ft). They were either sand-point/push-down wells, driven into the abundant porous sands in the coastal plains region, or they were "washdown" wells installed by "washing" (through the force of water from a hose connected to an older nearby well) a PVC pipe into the shallow surface aquifer. Local folks have been putting in wells like this for years: no need to hire a well digger if someone can wash down a well for the cost of materials and a pump. In much of the Bryant's Circle community, the floodwaters from Hurricane Florence were two to five feet deep and many of the well heads had been flooded for a few days after the storm. For months, higher than normal rainfall caused flood waters to surge in the low-lying areas. As a result, nobody was drinking the water that came from their wells, using it only, if at all, for cooking (after boiling), showers, washing clothes, and outdoor tasks.

When I asked one resident, Clayton Dial, what he thought caused the flooding, he pointed westward, saying that flooding in what he called, "Uncle June's Ditch," began getting worse a couple of years *before* the hurricanes. The ditch's name comes from the octogenarian "June" Bryant who dug the canal generations before to help drain community land. Such ditches are common in this area, formed by humans to help move water from one place to another.

Intensive flooding, it seemed to Dial, came from clearcutting across the road from Bryant's Circle, in a wooded area being harvested for timber. I confirmed through satellite imagery that the large parcel was indeed deforested before Hurricane Matthew. Using the USGS National Wetlands Mapper, I noticed that the land included wetlands variously classified as intermittent and seasonal, previously covered with an array of woodland types and wetland plants.

I also noticed on the map that nearby, there were more wetlands and even a *Carolina Bay*, an oval-shaped depression that occurs in the coastal plains from Delaware to Florida but are most frequent in the Carolinas. Bays are known to overfill, discharging water during heavy rain events. With the forests cleared, the bay and wetlands across from Bryant's Circle overflowed during Hurricane Florence, headed for Uncle June's Ditch and other human-dug drainage canals toward the river, but the "Ditch" couldn't handle the over 30 inches of rain. There are numerous other issues in the area, Dial explained, some large crop fields without breaks and a solar array that shed water in the direction of Bryant's Circle. While all this infrastructure (natural and human-made) contributed to the flooding, Dial emphasized the deforestation of the swampland across the road from Uncle June's Ditch as the most significant.

Figure 11. Jefferson Currie examines terrain impacted by industrialized agriculture in Robeson County, NC (Source: photo by Dana E. Powell, October, 14, 2020).

Dial's analysis resonates. Deforestation of the Lumber River Watershed is an ongoing problem with trees being cut for paper, for powerline and pipeline rights-of-way, for poultry farms, and increasingly, for biomass development. With so many timber extraction companies operating in the region, it is hard to know which specific wood-related industry is clear cutting large parcels of timber throughout the Watershed. Nonetheless, the lands and waterscapes reveal a story both of ongoing and accumulating injury. Biomass is the latest harm, further gutting our forests and making landscapes more vulnerable in the face of intensified hurricanes and flooding.

However, many people had been worried about the water even before the hurricane-related floods and before the introduction of biomass. Older industrial sites, shuttered during the steady exit of manufacturing and the collapse of textile industry in the 1990s and 2000s, left a legacy of polluted locations in this region, combined with the now over 40-year struggle to control nutrient and bacterial runoff from agricultural operations, and exacerbated by emerging contaminants such as PFAS/PFOS. Following Dial's observations and assessment, in 2022 I canoed several times downstream of the Lumber River State Park to study the changes to the forests, visible from the river. In areas with hardwood bottomland swamp, there is a healthy canopy of trees and understory of plants that shade the river from extreme temperatures and shield

the river from runoff. But just outside park and conservation-owned land, the picture is very different: clearcuts of gum and cypress bottomland swamp run for a couple of miles along the western side of the river.

The state's "Best Management Practices (BMPs)" along a waterway such as this call for leaving an adequate buffer of wetland forest when logging, but in many of the logged areas, I saw little to almost no buffer. There is no forest left to control high temperatures and runoff, prevent erosion, siltation, or pollution from entering the river, and no wetlands buffer to store the floodwaters following the recent hurricanes. Seemingly, the logging industry ignores the BMP's, as an unenforceable regulatory suggestion.

From the deforestation to the pellet mills, to rate hikes for fracked gas (Currie 2019), to the most recent move to harvest "hog gas," rural residents are told all these enterprises are part of a new slate of renewable industries, while the official story omits and seems to forget the harmful impacts on ecosystems and health of our communities. As an indicator of, and by way of assuring, that decision-makers can forget—little has been done to understand causes and impacts of past and present flooding in the Lumbee River Watershed. This strategic forgetting bolsters the ruse of renewability: no listening sessions were held to hear what happened to flooded residents. Moreover, there was no outreach to municipal and county governments and no thorough hydrologic assessment or modeling of the watershed, which should include evaluating the depth, flow, flow direction and many other parameters for branches, creeks, and swamps and the thousands of canals, channels, and ditches—Uncle June's is just one of these—that have been dug in last 500 years. There has been even less done to limit new problems that will contribute to future flooding, such as preventing the siting agricultural infrastructure in the floodplain, as hurricanes intensify along the coast. Local Indigenous elders and leaders, those with deep knowledge about our land and waterways, haven't been contacted so that they might better inform development of climate mitigation and adaptation processes.

Meanwhile, Cardinal BioEnergy®, a new partnership between Smithfield Foods Group® and a Missouri-based Roselein Alternative Energy LLC, proposes a new biomethane gas project in Robeson and Scotland Counties, like the "Grady Road Project" of Align RNG that Koonce describes above. With the Cardinal Bio Energy initiative, Smithfield aims to harvest biogas from dozens of their hog finishing operations, meaning that those communities along our waterways, already suffering through the stench and pollution of the hog industry, now worry about deforested pipeline rights-of-way. American Indian, Black, Hispanic and high poverty communities in this watershed already bear the weight of the pollution from industrialized agriculture and other industries, not least during hurricane season, in an increasingly deforested landscape.

With biomass industries needing more forest mass to make wood pellets for Europe, and with biogas industries clearcutting swaths of land through our wetlands for new "natural" gas pipelines for hog-generated methane, the waterways and communities along the Lumber River are on the wrong side of new "clean energy" policies. Looking across the Lumber River Watershed, I see the story of Bryant's Circle as a harbinger of things to come when there are so many damaging impacts to our waterways and land that old fixes for flooding, like Uncle June's ditch, won't be enough to divert.

Worry over water diversions, in the wake of hurricanes co-mingling with bioenergy infrastructure, concerns long-time community organizer Mac Legerton, in the same Lumber River Watershed (see figure 12). In the section below, Legerton details how "building relationships of organized influence" is a primary method-as-ethic for transformative action.

Figure 12. Legerton shows Powell and Witter the riparian forest, noting how cypress grow "knees" that twist upward out of the blackwater Lumber River (Source: photo by Rebecca Witter, October 13, 2020).

Environmental Analytic III

Relationships of Organized Influence: Challenging "fantasy solutions"

Authorship led by Mac Legerton

In the same year that Pastor Melvin's church received the notice of nitrate contamination (2020), as Koonce describes above, the state's Department of Environmental Quality (DEQ) held a public hearing on the proposed Active Energy Renewable Power (AERP) wood pellet biomass facility in Robeson County. Covid-19 made this a virtual hearing, and yet over 150 people attended and as many as 50 people from across the state spoke. Testimony against the facility was widespread and indicated significant reasons to halt the permit: its experimental nature; major risks to air and water quality; poor corporate finances and questionable practices; the disproportionate siting of polluting industry in communities of color; massive deforestation and the important role of forests in preventing flooding and climate destabilization; and export of the state's trees for burning overseas. Locally, opponents showed how biomass does not meet the state's Clean Energy

Plan.[8] Despite massive local and statewide opposition, the DEQ approved the air quality permit for the AERP facility in August 2020.[9]

In response to this major loss, a multi-racial team of EJ leaders in Robeson County proposed regular meetings with EJ leaders in the other four counties hosting wood pellet facilities with the invited assistance of state and national environmental organizations, including Dogwood Alliance, NC Climate Solutions Coalition, and Friends of the Earth. The aim was to build strong relationships of organized influence. Through its Lumber River Keeper Program, Winyah Rivers Alliance and the Southern Environmental Law Center filed a lawsuit against AERP on March 10, 2021, alleging violations of the Clean Water Act.[10] Due to ongoing local opposition, legal action against AERP both inside and outside NC, and its own production difficulties in Maine, AERP announced the sale of its Lumberton operation in March 2022 and an end to its plans to open a fifth wood pellet production facility. That same year NC Renewable Power, a poultry and wood waste incinerator and AERP partner in Lumberton, was also cancelled.

Building relationships of organized influence also included educating public officials, as we took the critical issue to the state legislature. In the Spring of 2021, our "Where's [Governor] Cooper?" Wood Pellet Campaign questioned the state's accountability for environmental permitting of biomass development. Four county-based organizations with whom we work—Robeson County Cooperative for Sustainable Development, RedTailed Hawk Collective, Winyah Rivers Alliance, and the Robeson County NAACP—joined with state and national organizations to oppose the AERP facility. Driven by community concerns and mounting legal challenges, the NC DEQ made a visit to the AERP facility and found that it was installing equipment that was not permitted and had a process that would have emitted additional toxic pollutants. The DEQ filed a notice of violation of the AERP permit in 2021, requiring AERP to file a permit modification and report tests of the wood pellet production from their facility in Maine. AERP's operations were suspended in NC, pending reception and analysis of pollution test results (Sorg 2021). Yet, as a result of "production problems," the promised test results from AERP's facility in Maine never arrived. Meanwhile, AERP continued discharging polluted water into the Lumber River, all the while denying the need for a permit. Finally, in April 2022, AERP announced its plans to close the Lumberton wood pellet facility (Gracia 2022).

This victory against AERP sparked local organizations to expand our communications with transnational environmental organizations, especially those based in Europe. We know that opposition must

[8] North Carolina's 2019 Clean Energy Plan (NC Department of Environmental Quality 2019).

[9] Political analysts recognized that the state's Commerce Department had already promised the company $500,000 in incentive grants and over $7 million to the entire wood pellet industry. Many noted the egregious conflict of interest between one government agency providing massive subsidies to this highly polluting industry prior to it receiving operation permits from another agency—especially one responsible for protecting the environment.

[10] News on the original legal action against Active Energy Renewable Power (AERP): Johnson 2021; and a subsequent lawsuit against AERP filed by these parties alleging ongoing toxic emissions and violations of the US Clean Water Act: Winyah Rivers Alliance v. Active Energy Renewable Power, LLC. 2022.

be increased on both the supply side in the US and the demand/consumption side in the UK, the Netherlands, and across Europe where most of our locally-devastated forests are being burned, as pellets. In the end, the wood pellet industry cannot persist in the open market without massive subsidies in the US and Europe. Forest-based biomass is an unsustainable business model that is polluting low-income communities of color in fragile ecosystems; destroying forests, the most important natural resource preventing flooding and climate disruption; exporting a commodity and burning it overseas that is worse on the climate than burning coal; and misrepresenting what constitutes a "renewable" source of energy. In the UK, John Randall, environmental advisor to former Prime Minister Theresa May, deemed biomass a "fantasy solution to climate change," arguing for the UK to "back away from bioenergy" (Randall 2021). This "fantasy solution" echoes emerging scholarship—our own and others'—on the "false promise" of biogas and its contribution to, rather than eradication of, environmental injustice (Gittelson et al. 2022).

The Renewability of the Ruse: From Extractivist Logics to 'Just' Transitions

As the observations and analytics above demonstrate, *that which is being renewed is the ruse itself*. The rub is that rather than replacing harmful technologies, bioenergy sustains and extends the logics and practices of extractivism. Certainly, biomass and biogas extraction are not the first infrastructures to bring these watersheds into the transnational capitalist economy: textiles, pork, poultry, and migrant labor have long done so. But twenty-first-century bioenergy technologies fuse industrialized agriculture with corporate energy interests in unprecedented ways, advancing a sociotechnical imaginary of "renewability" that is re-shaping energy policy in the favor of entrenching, rather than ameliorating, the harms of industrialized meat and fuel production.

The persuasive cunning of renewability discourses tend toward an uncritical advancement of a speculative claim to a better future, anchored in decontextualized, technocratic responses to energy (over)consumption (Nadesan et al. 2022). When state and industry actors present energy projects as renewable, without a careful examination of the histories and experiences of those living with the legacies of other extractive infrastructures (including enslavement, colonialism, and industrial animal confinement), they re-entrench traumas of dispossession and contamination (Boyer 2019; Curley 2023). We want to push the edges of renewability critiques, to ask, *what exactly is to be 'renewed'*? Forests, or mono-cropped plantations? Methane, or the hog CAFO economy of Fordist "standardized life" (Blanchette 2020) and faulty waste management? Certainly, as our three analytics and the wider work they represent demonstrate, bioenergy in this case renews forms of violence that are both structural and diversely embodied, along these watersheds.

Biogas and biomass production diminish social and ecological integrity while advancing the state's green energy targets. In these transmutations and new materializations of energy, we see the ruse manifest: struggles over "fact" and the interpretive, theoretical, and empirical work of environmental defenders on the ground is at stake, as well as the way bioenergy is cast by neoliberal state-industry compacts in rural places, as the "sustainable" transition solution to fossil fuels. This kind of renewability is a ruse: a beguiling sleight of hand that works to conceal the dangerous entrenchment of hazardous energy infrastructures atop longstanding risks. Centering equity in planetary crisis demands a re-thinking of 'renewability' and thus

offers an altogether different diagnosis of the problem. Tracking this critique in the empirical analytics in rural eastern NC emplaces what are all-too-often the abstract universals of transition narratives.

Much like the resistance to the Atlantic Coast Pipeline, the ruse of bioenergy development in NC's inner coastal plains is being challenged through legal action, direct action, citizen science, and coalition-building among EJ collectives in the region. In 2022, the community-based organizations in the five counties most impacted by the biomass industry formed the Impacted Communities Against Wood Pellets Coalition; and in 2024, our collaborators formed the Southeastern Coalition for Clean Energy[11] to challenge Piedmont Natural Gas and the NC Utilities Commission (NCUC)'s plans for industrialized waste-to-energy projects. The NCUC pilot program was first approved in 2016 and is the "docket" for biogas buildout across the state. At the time of this writing, it includes sixteen approved pilots and serves as the institutional base and governmental agency responsible for accepting and approving all biogas projects into the state's energy portfolio. These coalitions engage in "building relationships of organized influence," to return to Legerton's core method-as-ethic for impacting rural bioenergy development. This grassroots work has built upon the ACP fossil gas struggle in eastern NC, which engaged land-based knowledges and re-ignited Indigenous solidarities with African-American communities in defense of territory. This process continues, in the face of emerging bioenergy struggles: Donna Chavis notes how these coalitions strengthened existing social infrastructures for resisting extractivism and creating more flourishing communities, building upon four decades of multi-racial organizing anchored in Robeson County.

Environmental defenders call for more robust public debates on energy science and technology, including critical examinations of the policy infrastructures that favor the promotion of mass consumption over equity, ecological well-being, and movements for just transition and degrowth. Recent scholarly work in this area not only questions modernity's commitment to technological progress (D'Alisa 2015; Demaria et al. 2013) but seeks alternative framings of what it means to live a "good life," characterized by post-extractivism (Gudynas 2011). Gudynas' call for post-extractivism is a theory of transition that is not a development alternative (e.g., biogas and biomass in eastern NC), but an "alternative to development" that casts a wider, more critical perspective on the entire ideology of progress and modernity (ibid., 168-170). This approach to just transition links the eradication of poverty with the conservation of biodiversity with a pursuit of ecological justice (ibid., 173). Such intersectional thinking re-approaches "just"—an interrogation of terms that emerges from the locality, knowledge, and practice of movements for socio-environmental defense.

The global movement toward "just transition," which emerged from the Paris Agreement, has more locally grown antecedents in the Transition movement in the UK (Hopkins 2008) though was preceded by Indigenous-led energy justice movements in North America (LaDuke 1999). The key difference in these two was that while the former took climate change as the core problem and zero-carbon emissions as the goal, the latter elevated Indigenous self-determination and historical justice to the aims. This is a critical

[11] The Southeast Coalition for Clean Energy is a coalition of the Robeson County Cooperative for Sustainable Development, RedTailed Hawk Collective, Friends of the Earth, and Lumber River Keeper, a program of the Winyah Rivers Alliance.

difference. Once institutionalized, by Paris, labor rights emerged as the central concern (just transitions for workers to move from industrial to "green jobs") with states and industries held to (limited) accountability by UN mechanisms (ITUC 2017). It is now well understood that "transition" policies and their enactors often fail to account for the cultural and historical dimensions of the "just" in justice, especially regarding the role of what Ryan Jobson calls "fossil capital" in ongoing processes of colonialism and racial capitalism (Jobson 2021; see also Curley 2018, 2023; Powell 2017; Todd 2018).

Challenging conventional approaches to transition—continuous with EJ's challenges to environmentalism, across four decades—Myles Lennon describes the re-enactment of "racial grief" and memory loss that transition projects often carry; as we also observe, these often repackage colonial, racist relations into high-tech promises for settler futurities (Lennon 2020, 2021). In rural eastern NC, we refuse to forget the infrastructures and relations that underpin and extend bioenergy. Indeed, any "just" transition has less to do with finding the better technological fix (e.g., deforested wood pellets or factory-farmed biomethane), or the best participatory democracy (Szulecki and Overland 2020), and more to do with mounting fundamental cultural critiques of dominant cultural, political and economic arrangements of late industrialism, that are surely "structures of unsustainability" inbuilt in modern designs (Escobar 2018, 2019). This labor includes challenges to state environmental policy as cultural practice, as Koonce, Currie, and Legerton have shown in this essay, and continue to experience in their grounded work in rural eastern NC. And though industrialized bioenergy might appear to be an alternative to the assembly-line structures of fossil fuel-dependent natural resource extraction, it appears to require an increase, not a decrease, in the factory-farmed commodification of forests, poultry, and pigs, to survive. Bioenergy development's ruse banks upon a non-responsive regulatory system and economic incentives and appears to assume that impacted communities have lost sight of the deeper, historical accumulation of harms that give way to high-tech false solutions. Yet in the very region where rural direction action against contamination sparked the environmental justice movement in the US, communities are not forgetting.

A more critical transition politics demands intersectional, empirical analyses and deepened engagement with knowledge co-production. Our experimental approach aims to elevate epistemic and methodological innovation, recognizing that impacted community members are all too often diminished by state and industry agents as "anti-development" actors. Those who know their water quality from a life of intimate observation, testing, and tasting, smelling and seeing, experience the ways in which structural violence and racism literally seep into some wells, while other wells remain protected (George et al. 2023). Diversions along rural waterways overflow with similar stories of dispossession. In the end, scaling up grounded EJ analytics to assess novel interventions of rural capitalism requires the ongoing translation of our attunements to territory into the vernacular of policy as well as into a more inclusive scholarship.

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Author Biographies

Jefferson Currie II is a citizen of the Lumbee Tribe, ecologist and historian, and the Lumbee/Lumber Riverkeeper with Winyah Riverkeeper Alliance in eastern NC (US), working to protect and preserve water quality in the Lumbee/Lumber River watershed for clean and safe fishable, swimmable, and drinkable waters.

Danielle Melvin Koonce is a sociologist whose research engages social movements, political sociology, the rural south and race; she is a resident of Sampson County, NC (US).

Mac Legerton is an ordained minister in the United Church of Christ, co-founder of the former Center for Community Action, and co-founder/co-director of the Robeson County Cooperative for Sustainable Development and the NC Disaster & Resiliency School (US).

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