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– INTERVENTIONS

– URBAN ECOLOGICAL FUTURES: Five Eco-Community Strategies for more Sustainable and Equitable Cities

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Abstract

Cities are critical sites for understanding, and potentially ameliorating, the effects of global ecological change, the climate emergency and natural resource depletion. Contemporary cities are sociomaterially connected through global markets, trade and transportation, placing ever-increasing demands on the natural environment and generating dangerous pollutants and emissions. Current approaches to address these environmental crises are dominated by neoliberal forms of 'green' urban development, carbon accounting and techno-economic solutions, which extend corporate control over cities and tend to entrench inequality. A more strategic approach for enabling ecologically sustainable and equitable urban futures is urgently needed. We present five strategies for urban ecological futures in the global North, derived from qualitative and ethnographic empirical research with international eco-communities, which open up discussions about how to tackle this challenge by acknowledging the role and potential of: (1) non-extractive community economies; (2) democratic processes of co-operative action; (3) social approaches to resource management; (4) participatory collaborative governance; and (5) urban heterogeneity and social justice. We explore the relational, contested and contextual processes through which these approaches could become embedded in urban policy and planning, thereby offering the strategic capacity required to move towards truly sustainable cities.

Introduction

Contemporary urban challenges—the climate emergency, sociospatial fragmentation, infrastructural fragilities, socioeconomic inequities and changing governance arrangements—are not being adequately ameliorated, indeed are often entrenched, by current reliance on neoliberal technocratic, entrepreneurial and 'smart' approaches (Hodson and Marvin, 2010; Long and Rice, 2019). Critical urban scholars have long examined alternatives to dominant neoliberal models of development. Here we draw upon the numerous worldwide examples of urban eco-communities experimenting with ways of collectively living within environmental means to critically examine their sociomaterial and infrastructural innovations (Pitzer, 2013; Litfin, 2014; Schelly, 2017; Nelson, 2018; Pickerill, 2021). Based on international empirical research, we propose

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five strategies that move beyond neoliberal and technological urbanism by centring key social, environmental and material relations in the transformation to more ecologically sustainable and socially equitable cities. We examine how these innovations have taken shape and use these examples to explore how approaches that centre community collectivity, mutual care, management of the commons and resource sharing can inform urban development strategies and to reflect on the possibilities that they offer.

In doing so, we are cognisant that eco-communities, like other alternatives to neoliberalism, are always struggling with being with, against and beyond capitalism and other structures of oppression, including patriarchy, racism, heteronormativity, colonialism and, at times, the state. Indeed, eco-communities are aware of and actively operate in and through existing political-economic frameworks, especially in the urban examples we focus upon in this essay (North, 2014). The complexity of how eco-communities have navigated these tensions (or not) is a key learning contribution that they make in advocating new sociomaterial practices and relations. This approach—a focus on analysing what eco-communities actually do, achieve and struggle with—builds on Erik Olin Wright's (2010) call for a radical epistemology and an emancipatory social science that diagnoses, challenges, designs and then shares alternatives. Likewise, North argues that a generative 'post-capitalist politics examines the *conditions* rather than the fundamental *limits* of possibility' (North, 2014: 248, emphasis in original).

Eco-communities are collective and collaborative housing and livelihood projects that seek to balance human with environmental needs (Ergas, 2010; Chatterton, 2013). We deliberately adopt a broad concept of eco-communities that encompasses eco-villages, intentional communities, low-impact developments and different forms of collaborative and participatory housing initiatives with intentional environmental goals, including many cohousings *baugruppe* projects and housing co-operatives, among other interventions (Pickerill, 2021). We are interested in the commonalities that unite these expressions of living differently, rather than how these interventions are individually constituted. Eco-communities have multiple drivers, including housing needs, political agendas, social and economic services, and/or spiritual foundations. There is also an emerging focus in the past few decades on city-based experiments, such as Lilac (low impact living affordable communities) in the UK; Spreefeld in Berlin, Germany; Andelssamfundet I Hjortshøj in Denmark; Kailash Eco-Village in Los Angeles Eco-Village; Peninsular Park Commons, USA; and Wohnprojekt Wien in Austria.

Whether we speak about public participatory housing projects, community food co-operatives or corporate-led car-sharing schemes, foundational roots can often be traced back to eco-community pioneering experiments (Pitzer, 2013). There are numerous examples of how eco-communities have had demonstrable impacts on their local neighbourhoods. Their values and activities are often co-created with other grassroots or local development projects. They inspire and co-develop various innovative environmental and human-centred practices, initiatives and approaches at a range of scales, involving different institutions at diverse levels of formality, with traces in certain mainstream corporate-led sharing and platform economies.

Eco-communities extend from and build upon a long history of earlier attempts at shifting values and practices towards more participatory and ecological ways of living, including socialist and municipal-led initiatives that provide material and welfare services (Kanter, 1972; Pepper, 1991; Fois, 2019; Miller, 2019; Russell *et al.*, 2022). Eco-communities are of particular interest now because of the recent surge in urban configurations and their explicit focus on responding to the climate-emergency and housing crises. This makes their experiences and provocations directly relevant to sustainable urbanism, in the hope that they can attract greater political attention through proximity and visibility.

We can therefore learn a great deal from eco-communities' experimentation—and their mistakes. At the same time, we recognize and explore further on this essay

how specific spatial and temporal opportunities, and particular social and historical landscapes, shape their emergence. They are not separate or immune from the deep and enduring challenges of social and environmental injustice within the places in which they are situated (Chitewere, 2018). Rather, many eco-communities have arisen in direct response to social and environmental ills experienced in place. Many may thus not be as ‘disconnected’ or peripheral to contemporary urban challenges and development strategies as some critics suggest (Sargisson, 2012).

To examine how, and to what extent, eco-community practices might contribute to more sustainable and equitable cities, we have structured this essay into five key urban policy and planning challenges facing cities in the global North: (1) extractive forms of development; (2) entrepreneurial restructuring; (3) technocratic resource management; (4) opaque and imbalanced governance; and (5) sociospatial fragmentation. We use our collective empirical research to outline the possibilities, limitations and complexities offered by contemporary eco-communities to these challenges.

Eco-communities are highly dynamic and always-in-the-making; they manifest a variety of exclusions, can be contradictory and messy, and are heterogeneous in nature. Given this, we are not proposing these strategies as fixed one-size-fits-all solutions for sustainable and just urban development. Rather, we advocate these strategies as potentially generative new forms of relations that can help create urban spaces that experiment with, advocate and adapt them. In doing so, we position eco-communities as provocations—partial, incomplete and at times contested—that suggest new relations that overlap, interlink and work at multiple scales. Eco-communities are propositional, pragmatic and practice-based—balancing an aspirational intent with everyday realism. While eco-communities offer innovative material interventions (low-tech, low-budget, low-skill systems and infrastructures), it is in the social formations (collective decision making, sharing, common resources and reconfiguring priorities) that, we argue, eco-communities offer most promise for more sustainable and equitable cities.

We write as a heterogenous collective of urban scholars and eco-community researchers from geography, urban studies, sustainability studies, environmental politics and anthropology who have come together explicitly to seek to bridge the intellectual, empirical and political gap between critiques of the contemporary city and work on eco-communities. Our empirical research is predominantly, but not exclusively, from the global North, and includes the UK, USA, Australia and countries across Europe. We share our expertise in qualitative, ethnographic, interview-based and participatory methodologies and data collection. Our collective work required mutual learning that involved defining and understanding different terminologies, being open to critique and challenge, and reflecting on the limits of each of our knowledges.

Neoliberal urban development and community economies

Harvey (2007: 12) has argued that neoliberalization has divided cities into ‘micro-states of rich and poor’. Processes of privatization and capital extraction in cities, aided and abetted by municipal governments whose primary roles have shifted from benefiting citizens to creating a good business climate, are well documented (Harvey, 2003; 2007). These processes of extraction result in sociospatial disparities in employment and housing.

While neoliberal processes share commonalities, for example, the dominance of market logic and the attendant transformation of the public into consumers, the shrinking of the state is deeply contextual and path dependent (Brenner and Theodore, 2002). Increasingly, researchers recognize the ways in which everyday life in the city is shaped by these neoliberal processes. Notably, the rise of precarious employment and the ‘gig economy’ has served to produce new economic spaces and scales (Anwar and Graham, 2020). Gig workers and their employment platforms are ‘simultaneously embedded and dis-embedded’ from the places where they operate (Katta *et al.*, 2020).

For example, corporate- and technology-led innovation has shifted the focus of market mechanisms to households. In the new logic of on-demand and access economies, known also as platform capitalism (Cockayne, 2016) or the sharing economy (Martin, 2016), companies (start-ups) develop digital platforms through which households (quasi-freelancers) buy/sell their products and rent/let goods and services to other households. There have been several attempts to conceptualize the sharing economy. Frenken and Schor (2017) define it as peer-to-peer platforms in which users grant temporary access to goods, possibly—but not necessarily—for money. Acquier *et al.* (2017) propose an umbrella construct that contains all elements of sharing: (1) access; (2) the platform economy (two commercial elements); but also (3) a community-based economy often involving non-contractual, non-hierarchical and non-monetized forms of interaction. Proponents of the sharing economy emphasize the potential of shared consumption in lowering material and energy demands by providing temporary access to underutilized physical assets (Mi and Coffman, 2019). Critics argue that savings are limited owing to the Jevons paradox (Murillo *et al.*, 2017) and that this form of exchange ignores social stratification and income inequality.

Eco-communities have also been developing sharing economies as non-extractive community economies—a democratic economy based on ethical socio-environmental actions (Gibson-Graham *et al.*, 2013). The stability of eco-communities and the collective structures of people living together support the principles of the community economy through non-market economies of scale. The greater the capacity of the non-market community economy, the smaller the potential costs of household production (such as time spent on cooking, shopping and maintenance), and the greater the potential ‘community basket’ of goods and services (such as sharing of materials, knowledge and care, onsite food co-ops, mobility sharing schemes, community-supported agriculture and community land banks), the less (in principle) residents need to work because they are sharing more (Chatterton, 2013; Blažek, 2016; Jarvis, 2019).

There are thousands of non-profit or not-only-for-profit urban initiatives across the world that focus on the *needs* of local communities in self-provisioning of food (soup kitchens, food pantries, community gardens and food co-operatives), housing (homeless shelters, cohousing and housing co-operatives), mobility (bike sharing or carpooling), and jobs and collective production of services (job training centres, working co-operatives, bike kitchens), often emerging from eco-communities (Seyfang and Haxeltine, 2012; Sekulova *et al.*, 2017). Eco-communities extend household principles of a common budget, income and resources to wider structures—to a group of co-living individuals, several cohousing families, and even dozens or hundreds of members in a local community or neighbourhood. They provide space to experiment with alternative economic models of housing and living that aim to secure the basic needs of people and enhance quality of life. These models prioritize the democratic management of common-pool resources with low (or lower) material throughput and consider different types of commons that align with the communities’ ways of living (Litfin, 2014; Asara *et al.*, 2015; Schramm, 2022). They can include solidarity funds, sliding-scale costs for food and rent, community basic income, community currencies and gift (exchange-free) trading. This sharing economy encompasses a wide diversity of social enterprises, workers’ co-operatives and informal economies. For example, in Christiania (established in Denmark in 1971), a myriad economic activities and forms overlap with state institutions, banks, corporate funders and conventional legal structures, albeit wherever possible organized and governed at a neighbourhood scale.

These sharing-community and diverse-economy approaches overlap and build upon a range of non-neoliberal economic interventions such as degrowth, foundational economy and postcapitalism (Chatterton and Pusey, 2020; Russell *et al.*, 2022). For example, activists involved in Can Masdeu (Catalonia, established 2001) have used degrowth ethics to build a brewery business, bakery and a community garden, thereby

shifting economic practices to being time based rather than profit driven. There are, however, ongoing tensions in sharing economies. Community-wide income sharing is increasingly rare, as is the provision of a basic income for all. There is often a purposeful attempt to minimize economic needs—through self- or shared provisioning and a voluntary simplicity of making do with less (Vannini and Taggart, 2013). In practice, many eco-communities struggle financially, do not generate much surplus, and residents often rely on external conventional employment (a patchwork of economic activities), multiple jobs (at times similar to gig economies) or state welfare systems. It is not always clear if or how foundational needs are met. Kallis *et al.* (2012: 174) duly critique eco-communities as failing to acknowledge their reliance on ‘the surplus—and products and infrastructures—provided by the rest of the industrial economy’, and point to the hardship that residents voluntarily endure, which the less committed are unlikely to want to replicate. Therefore, despite considerable economic innovation, or maybe because of the variety of such innovation, eco-communities’ sharing economies are partial, incomplete and fragmented.

Aligned with these broader economic concerns is an explicit focus on housing. While cities have arguably always been marked by inequality, new forms and processes have emerged in and through neoliberal policy, especially in housing. For example, corporate-led gentrification, often subsidized by the state to encourage investment in areas deemed ‘undesirable’, has led to significant displacement of residents and certain economic activities (Smith and Graves, 2005; Aalbers, 2019). Accordingly, the poor and other marginalized urban residents are imagined as blight or as failed urban residents who must be removed from view (Birkinshaw and Harris, 2009; Bose, 2014). The core and foundational function of most eco-communities is the provision of housing (Nelson and Chatterton, 2022). Eco-communities were early adopters of innovative financial and legal frameworks, such as direct ethical loans, the development of bonds, mutual home ownership and tenant syndicates, that help to reduce the need for individual bank loans, limit personal investment required, eliminate speculation and increase housing affordability (Czischke *et al.*, 2020; Lockyer, 2021). Community members’ active participation throughout the dwelling life cycle—in planning, construction, installation, repair and renovation processes—enables collective ‘learning through doing’ and reduces the overall costs of housing provision (Pickerill, 2016).

Among numerous heterodox geographic theories on how to advance progressive, non-neoliberal and non-extractive economies—including diverse economies, degrowth, doughnut economies and foundational economies—eco-communities offer examples of sociomaterial practices that provide for basic needs (especially housing) and wellbeing based on new social values and non-materialistic ethics (North, 2014; Nelson and Chatterton, 2022). They demonstrate how sharing economies are created in the messiness of sociopolitical frameworks and how resulting contestation can be negotiated, even if only partially and currently only at localized scales.

Climate action as entrepreneurial restructuring or co-operative action

Cities account for 75% of global carbon dioxide emissions and are predicted to be home to seven out of ten people by 2050 (C40 Cities, 2021). International policy consensus is that urgent climate action in cities and urban regions is needed to meet the requirements of the 2015 Paris Agreement for Climate Action¹ (Castán Broto, 2020). As mediators of globalized and intensive flows of energy, resources, water, waste, people and goods (Burnett, 2007), cities are recognized as ‘reshaping global planetary ecologies through resource depletion, carbon production and pollution’ (Hodson and Marvin, 2010: 301). Urban areas hold opportunities to govern climate action, while

¹ This means limiting global warming to below 2 degrees Celsius, and preferably 1.5 degrees Celsius, compared to pre-industrial levels.

simultaneously their moribund physical form and infrastructural path dependencies frequently make it difficult to retrofit the city in more sustainable directions, and efforts end up embedding sociospatial inequalities (Hommels, 2005). The 1990s saw a shift in focus from state-level regulation of climate-change mitigation to local responses at the urban level. Early city-scale climate-focused planning approaches were largely opportunistic environmental governance strategies that facilitated new forms of 'green' development and urban revitalization (Betsill and Bulkeley, 2005). However, similar critiques to those levelled at the sustainable development project, which was widely criticized for prioritizing efficiency, cost-effectiveness and voluntary commitments over ecological integrity (Bailey, 2007), can be levelled at urban climate responses.

Pioneering municipalities sought to develop urban interventions that increasingly considered climate adaptation alongside mitigation responses (*ibid.*) and, in 2005, the C40 network committed the world's largest cities to tackling the climate crisis (C40 Cities, 2021). Like some of these pioneering municipalities, eco-communities have centred climate action at the core of their activities and values through mitigation and adaptation by seeking to challenge neoliberal approaches, and the focus on unlimited economic growth and on material urban restructuring. Eco-communities have developed climate-change responses that are low-cost and feasible to implement at neighbourhood scale. For example, the around 40 members of Los Angeles Eco-Village (LAEV, USA, established 1993) live communally while improving the ecological sustainability of local urban residences and residents. Established in two East Hollywood blocks, members have advocated for and worked with Los Angeles associations in campaigns to move from car to bike use. They have offered discounts to car-free renters with long-term tenure. They have encouraged and offered opportunities for locals to work locally—for example, one member runs a bike repair business—and have installed car-slowness art and protocols on their neighbourhood streets. They were influential in establishing cycle pathways and policies across Los Angeles. Similarly, LAEV members have made a concerted effort to improve neighbourhood self-provisioning in food by spreading permaculture skills and activities, such as establishing a local bulk and organic food produce co-operative open to all, and local vegetable gardens and fruit trees where locals garden and harvest food. While successful examples abound, eco-communities' rejection of market-based capital has limited the scale at which these adaptations are, and can be, implemented.

Given the challenge of scalability and political power imbalances associated with these community climate-change responses, pursuit of 'carbon control' and forms of city-regional climate governance experiments linked to energy supply, infrastructure and carbon accounting have become the guiding mechanism for urban restructuring (While *et al.*, 2010; Hoffman, 2011). The urban climate action agenda, operating as it does within neoliberal modes of governance and accumulation (Andersson, 2016), is now dominated by economic actors and investment opportunities, but with few examples at the municipal level of non-neoliberal approaches. These powerful interests serve to reinforce neoliberal policies of securitization, measurement and control (Castán Broto and Westman, 2020), entrenching existing inequalities and encouraging new ones.

Long and Rice (2019: 1) warn that 'market-based investments in vital urban infrastructures, technological fixes and strategic policy approaches' made under the guise of 'climate urbanism' threaten to 'exacerbate a crisis-contingent mode of capitalism that would intensify various forms of inequality and injustice' (*ibid.*: 2). They go on to argue that there is an urgent need to understand and challenge 'the enduring power structures that limit a more heterogeneous, democratic and transformative vision of climate futures' (*ibid.*). It is in developing and practising democratic governance that eco-communities offer some useful challenges to neoliberal approaches. Many eco-communities have sought to practise democratic governance through commoning and the co-operation this requires to facilitate equality and social justice. In eco-communities, commoning entails groups of people working collectively and in horizontal, participatory manners to

manage and steward resources that may be physical, digital, cultural and/or intellectual in nature (Nelson and Chatterton, 2022). Learning from eco-communities is not about the principle of commoning per se, but about *how* this concept is put into practice and how the everyday, seemingly mundane, is changed, and about the time this aspiration requires.

Most eco-communities purport that an individualist, utilitarian orientation to consumption presents a fundamental barrier to patterns of social and material life contained within planetary boundaries. They usually, therefore, involve some form of collective ownership and stewardship of property, whether that be land, housing, infrastructure or all three. These actions require that deliberate attention be paid to creating social and cultural governance structures and infrastructures for effective sharing. Providing alternatives to neoliberal entrepreneurial governance also requires careful processes of experimentation and learning, as it takes time to challenge embedded consumption values and practices. For example, Celo Community (USA, established 1937) has successfully created infrastructures for social and cultural commoning and cultivated this approach across generations over the past 80 years (Lockyer, 2021). They demonstrate that the identifiable, if somewhat porous, social and spatial boundaries that define their group, and the property and resources they steward and share, are essential. Furthermore, they ensure a defined but adjustable process for collective decision making that enables benefits to group participation, commensurate with the costs of participating. This process of participatory governance is defined by a set of policies and processes for commons stewardship, alongside graduated sets of sanctions that are agreed upon for dealing with disputes.

Existing economic and political power relations are resistant to shifts towards collective ownership of land, energy and water resources. This is why historically there have been a greater number of rural eco-communities than urban examples, as land is cheaper to purchase there and, in countries such as the USA, planning legislation is less restrictive (Pickerill, 2016). Urban eco-communities are navigating these challenges through legal avenues—such as privately purchasing and renovating existing buildings as collectives (Los Angeles Eco-Village; Kailash Eco-Village, USA, established 2007), below-market-rate purchase of government-owned brownfield sites (Lilac, England, UK, established 2013) or open-market land purchase (Cascade Co-housing, Hobart, Tasmania, established 1992)—and through less legal means (Christiania, for example, is based on an initial squat of the land and existing structures).

The provocation from eco-communities is the extent to which residents and planners are willing to embrace deeply radical alternatives to current approaches. If they remain resigned to operating within the constraints of existing neoliberal systems of governance and ownership, then climate action will remain slow and grounded in corporate forms of entrepreneurial restructuring. But if co-operative action is more openly embraced and the urgency of climate action understood, then more radical approaches to urban action become possible—actions that do not necessarily rely on accessing state-led services or complying with existing legal systems. Eco-communities demonstrate what change is possible if people are willing to be creative and work collectively, even if these approaches are not easy to undertake.

Technocratic and social approaches to resource management

A wide range of political and economic interests promising enhanced security in energy supplies and reduced energy costs have come to view cities as arenas within which new forms of a low-carbon economy can be developed (While *et al.*, 2010; Bulkeley *et al.*, 2012). This strategy is heavily influenced by promises of urban technological innovation, which primarily rely on the development and diffusion of new technologies and infrastructures to enable clean production and resource-efficient consumption. At the municipal level, interventions have been concentrated on the energy sector to prioritize energy efficiency measures, renewable energy generation, green building

initiatives and public transportation policies, alongside public–private partnerships, sustainable public procurement policies and educational efforts to change individual behaviour (Hausknot *et al.*, 2018). However, it is now increasingly recognized that large technological projects coupled with rational behaviour change initiatives are insufficient to achieve urgent structural changes to society and carbon neutrality that can regulate energy and resource supply and demand. Furthermore, large technological projects tend to be controlled by coalitions of corporate actors and city elites, and risk entrenching a postpolitical technocratic approach to the city (Swyngedouw, 2009).

Recently, the role of smart digital technologies and automated and robotic infrastructures within the city have gained attention as a means to drive sustainable development and low-carbon transformations (Luque-Ayala and Marvin, 2015; Macrorie *et al.*, 2021). This technological vision promises a flexible means of simultaneously addressing the challenges of urban growth and renewal, responding to climate change and building an inclusive society through the smooth meshing of networked infrastructures, high-tech urban development, the digital economy and e-citizens (Luque-Ayala and Marvin, 2015; Taylor Buck and While, 2017). The smart vision is premised on the ability to monitor, manage and regulate city circulations in real time using ICT infrastructure and ubiquitous computing, and advocates new transparent modes of urban governance (Kitchin, 2014). In the smart city, the challenge of providing clean energy to large urban populations can be addressed by installing smart meters, deploying smart grids and managing them using a digital urban operating system, rather than considering community energy generation. Similarly, the challenge of managing urban waste is reframed as a matter of optimizing urban logistical flows through algorithmic calculation, as opposed to challenging consumption levels. Moreover, smart urbanism is underpinned by assumptions of economic growth that actually serve to reinforce and accelerate material consumption and environmental damage (Viitanen and Kingston, 2014): the benefits of digital innovation will be unevenly experienced, embed greater levels of centralized control and amplify urban inequalities (Wiig, 2016).

In contrast, most eco-community strategies explicitly seek to reduce resource demand and consumption to achieve substantially lower environmental impacts than average urban citizens. They rarely rely solely on technological innovation and would not be considered ‘smart’ infrastructures. They develop and adopt multiple changes to their use of environmental resources, including reducing the use of private motor vehicles, use of micro-renewable energy generation, onsite food production and sharing of equipment and tools (Gausset, 2019). For example, Lancaster Co-housing (England, UK, established 2006) actively encourages walking and cycling by linking with a local cycle path into the city. Use of cargo bikes and tricycles is encouraged for families or transporting goods and supported through a large shared storage infrastructure. Car parking is restricted to one end of the site; a car club enables easy sharing of vehicles, including electric cars, and lift sharing is encouraged through open communication. Energy is generated through solar panels, a shared bio-mass boiler and a community micro-hydro scheme in the nearby river. Resource use is further reduced through shared guest rooms, a food store, laundry, tool shed and the common house. Onsite workspace is available to reduce the environmental and financial cost of commuting. Furthermore, the notion of resources is broadly considered in eco-communities—beyond just energy and waste—and includes the use of green space. The community seeks to preserve and reduce the use of resources primarily through changes in social practices and the communal management of land and physical resources through appropriate (micro-)infrastructures, such as the use of small-scale photovoltaic energy generation (Lockyer, 2017; Chitewere, 2018; Roysen and Mertens, 2019).

By localizing energy production, building construction, water management and food growing, eco-communities make circular processes of generation, use and waste management/repair and recycling visible and embodied to different degrees within the

community. Such decentralized approaches require the development and use of different material infrastructures (for example, natural building materials, locally grown/harvested resources, micro-grids and off-grid installations). Green space is created by urban eco-communities for food production, animal and insect rearing (particularly chickens and bees), waste management (through composting and sewage filtration ponds), alongside spaces for play and leisure. This includes designated sections of allotments but also—perhaps more importantly—spaces between homes, on pavements, doorsteps and roofs (for example, at Los Angeles Eco-Village and Lilac). Similarly, eco-communities seek to reconfigure mobility by encouraging non-fossil fuel forms (such as car and bike sharing/repair schemes). Purposefully built infrastructures that require sharing, such as laundry rooms, bike storage, communal spare bedrooms, libraries (for books and tools) and include social systems of sharing cooking, childcare, food shopping and bulk buying of dried foods, create a shared understanding of resource use while actively minimizing resource waste. This inbuilt sharing does generate tensions and relies on considerable trust. For example, at Lilac, a resident struggled with other users' lack of cleanliness in the laundry room. While there are likely scale limitations to the configurations in which these shared infrastructures work, some aspects, such as book swaps, community food-growing gardens and tea stations, have been demonstrated to be effective in public urban locations (Barron, 2017).

The collective organization of resource management also demands different social relations, which attempt to be equitable and inclusive. Treating natural resources as a commons requires collective management but also shared responsibility, combined with expectations that residents participate and share the work of maintaining the land, infrastructures and resources (while also accommodating residents' differing skills and abilities). These participative social interactions bring residents directly in touch with the everyday requirements of decentralized resource management. Focused attempts to reduce resource consumptive practices, and the ability to have a direct input into shaping sociomaterial infrastructures, also enables individual and collective agency. While this requires energy and time in terms of participation, it equally reduces the possibility of alienated disconnection or 'offsetting' from crucial environmental dilemmas. These forms of direct engagement generate new social-ecological relations and reframe climate adaptation, resource management, food production and mobility as shared challenges. In other words, eco-communities not only advocate reducing material consumption (rather than merely optimizing energy or material flows), but also demonstrate that operating and sharing at a community (or neighbourhood) scale is more efficient than relying on a smart urbanism that focuses on individual behaviour change.

In developing a collective sense of ownership and responsibility that successfully marries infrastructural changes with collective social practice change, eco-communities demonstrate a successful social approach to resource management. This strategy frames 'smart' urbanism in a contrasting way to neoliberal-led smart urbanism. In cities where lives have become increasingly individualized and autonomized, rather than perfecting resource flows and real-time monitoring, this eco-community strategy encourages the exchange of new knowledges, development of competencies and social interactions to collectively govern and manage resources. Such learning takes time and requires a shift in values and commitment.

Urban heterogeneity and social justice

Cities have long been unequal living and working sites. However, neoliberalization has reinforced and created new forms of sociospatial fragmentation. Today's cities—a conglomerate of privatization, liberalization, globalization and application of new technologies—are fragmented and splintered, and this sociospatial fragmentation affects the health and life chances of different neighbourhoods (Graham and Marvin, 2001; Chitewere *et al.*, 2017). Scholars have pointed to environmental injustices that demarcate

the fragmented city, arguing for a broadened analysis of cities to include social and ecological domination rooted in colonialism, slavery and structural racism (Pellow, 2004; Rothstein, 2017). These histories have been instrumental in how urban spaces have evolved and continue to shape cities today (Caldeira, 2020), entangling disparate privilege in their planning (Pulido, 2017).

Other dynamics contribute to this process. Gentrification describes the loss of the use value of land, key environmental resources and access to mobility and public services experienced by those who inhabit urban places now deemed desirable for political and economic goals (López-Morales, 2015). Ethnicity and caste intersect with class to reinforce inequalities, generating what Ranganathan (2022) terms 'environmental unfreedoms'. Migration of people also creates complex dynamics of urban reconstitution (Collins, 2012), for example, through the legal and social complexity of urban refugee camps (Ramadan, 2009) and the politics of fear around migration in an increasingly right-leaning European political context (Hall, 2017). While cities can be uniquely vibrant lived environments, changing social structures and norms can also heighten experiences of isolation, loneliness and attendant health effects for the elderly, migrants, those exposed to violence, adolescents and others.

These dynamics reshape the city both as an imagined milieu of opportunity and cosmopolitanism and as a lived hostile environment. They also raise important questions about urban citizenship—not regarding who belongs but who is allowed to belong in the city, who can make a claim on the city and to the available rights and resources for a successful life (Blokland *et al.*, 2015).

Eco-communities offer ways to think through an emancipatory, socioculturally heterogeneous politics and practice. Working at the community scale requires an understanding of interpersonal relations, while shared governance requires inclusiveness, sharing of resources and self-provision. Increased attention in eco-communities to structural racism and exclusion, especially in housing, can help ensure that equity and inclusion are realized. Reflections on the racial, ethnic and class composition of an eco-community emerges as one tool to examine elements of persistent sociospatial fragmentation even in consciously non-neoliberal spaces. For example, the intentional efforts of participants of Ecovillage at Ithaca (EVI, USA, established 1996) demonstrates the need for critical self-reflection as a tool for effecting social and environmental change. Although recognized for its innovative and creative design, EVI includes a growing group of residents that acknowledge the privileged space they occupy and the risk this has of perpetuating exclusion and inequality (Chitewere, 2018). While some moved into city neighbourhoods, others continue to actively support various causes in Ithaca, such as community-supported agriculture, youth engagement, community conflict resolution and internal reading groups.

That many eco-communities have struggled to acknowledge and/or act on their privilege is indicative of the complexity of incorporating social justice into environmental initiatives (Pickerill, 2023). Indeed, by failing to attend in particular to their racial or class diversity eco-communities can replicate exclusionary neoliberal rationalities (Chitewere, 2010). While many eco-communities intend to be diverse and centre social-justice concerns, over time environmental issues can take priority and spaces are built (materially and socially) that serve to exclude the disabled, non-white and non-wealthy (Chitewere and Taylor, 2010). In addition, seemingly subtle assumptions about food choices, common values and availability for onsite communal work activities shape understandings of belonging. As Rubin (2021) explains in detail, members of Dancing Rabbit (USA, established 1997) have erected barriers to exclude newcomers they fear might disrupt their collective identity and intentions. Here, residents do not consider their privileges to be the result of structural advantage. They therefore reject any obligations or responsibility to engage with systematic social-justice change. Unfortunately, this demonstrates how easy it is to deny privilege and for

residents to articulate their struggles as equivalent precariousness (such as noting a lack of financial capital or income) in an attempt to underplay racial privilege.

Ever-expanding models of eco-communities, including the Black, Indigenous, People of Colour cohousing network, illustrate the multiplicity and diversity of resources to draw upon. Given the disproportionate vulnerability of marginalized people to social unrest, climate change and ecological devastation, urban futures can take inspiration from heterogeneous models of confronting injustice. Those keen to tackle social-justice issues confront their privilege by reaching out and working with and supporting existing anti-racist initiatives (Kendi, 2019). This reaching out from rather than inviting into white-centred spaces, is a crucial act (Nieto, 2014) and needs to happen alongside training on cultural appropriation, racism and white supremacy (Rios, 2020). Likewise, eco-communities that are successfully doing this are focusing on issues that centre social justice—such as issues of land ownership, housing, use of public spaces and sharing of resources—to co-create equitable solutions for all.

Conclusions

We have identified five strategies associated with eco-community commitments, practices and sociomaterial arrangements that we suggest have merit for rethinking contemporary urban policies, plans and processes in ways that are more financially and ecologically sustainable, less wasteful, more participative and more inclusive. First, community economies and experimental models of housing provision and labour practised in eco-communities demonstrate how economies of neoliberal urban development can be reconfigured in a more sustainable and equitable manner. Secondly, eco-communities offer a wealth of examples of how more collective and convivial patterns of sharing and co-operation can be organized, by advocating decision making at a decentralized level. Achieving such processes and outcomes in an inclusive manner means that urban living and commoning endeavours must pay deliberate attention to issues of inequity and injustice, or they fail. Thirdly, eco-communities' decentralized systems and shared infrastructures for sustainable resource management are most productive at the collective scale: they are co-located, not spread across a city, radically improving accessibility and ease of participation for residents. Fourthly, collaborative and participative governance involves constant discussion and collective decision making to establish and maintain ecological and social initiatives. These democratic forms of sharing knowledge, acknowledging different opinions, interests and dissensus, and working towards making collective decisions can serve as models to guide wider sustainable urban development interventions. Finally, eco-communities are increasingly acknowledging their structural dynamics of privilege and attempting to create socioculturally heterogeneous and inclusive spaces. White-centred eco-communities are beginning to use their privilege to collectively challenge conventional ways of being and organizing, which requires building new forms of radical and racial relationality. However, significant further work is required.

The multitude of ways in which eco-communities have sought to intervene have led to innovation and new social practices, diverse economies and novel society-environment relations. Issues of inclusion are negotiated. Moreover, eco-communities offer possibilities for how collective change can be enacted, reveal what challenges arise through such experimentation, and how vital it is that processes of change are understood as always-in-the-making, contingent and requiring ongoing modifications and improvement. There are, then, similarities between eco-communities' efforts towards socio-environmental transformation and the efforts of other actors engaged in climate urbanism (such as attempts at foundational economies). The usefulness of eco-communities' contributions lies in how they differ from these other actors and interventions. For example, while eco-communities have invested in being educational—as sites of demonstration, knowledge creation and teaching—there is little evidence that programmatic attempts to inform

and influence behaviour (seen in educational behaviour change programmes) provide an effective strategy for change (Maloney and Strengers, 2014). Instead eco-communities attempt to achieve systematic change through several of the commonalities that underpin the five strategies identified here.

First, eco-communities reveal the complexity of social practice change in the necessity of shifting intrapersonal beliefs and values to engage constructively in new systems of sharing and decision making, and to recognize privilege in social-justice initiatives (Pisters *et al.*, 2020). This 'internal' and relational work requires initial political convictions (to start the process of transformation), space and time to experiment with new practices, and collective support in trying out and repeating new approaches that alter how residents live and interact with each other, and with materials, nature, the market and the state.

Secondly, eco-communities benefit from the semi-bounded physical and social space they create to experiment within. This is akin to Erik Olin Wright's (2010) notion of interstitial transformation, where alternatives embed in spaces on the fringes of capitalism. Here experiments can be developed, tested, demonstrated and improved, democratic egalitarian solutions evolved and support slowly secured. Wright argues that this form of transformation might be slower than ruptural methods (direct revolutionary confrontation), although these more confrontational methods might still be employed when limits to change within eco-communities are reached. Equally, tipping points might be met that create rapid social change as novel practices and infrastructures achieve quicker, broader and more normalized uptake.

Thirdly, once 'tested', eco-communities reach out locally to share their knowledge, skills and capacities to advocate for change. While eco-communities might represent an initial 'cocooning' of experiments, they do seek reproduction beyond their borders (Russell *et al.*, 2022). For example, Lebensgarten (Germany, established 1985) took a leading role in energy transitions in its region, and the Instituto Biorregional Do Cerrado (Brazil, established 2012) was able to advocate for socio-biodiversity conservation, using its voice in local politics (Roysen and Schwab, 2021). Tir y Gafel (Wales, UK, established 2009) has actively changed regional planning legislation, which has led to the growth of other eco-communities under the One Planet Development approach, and Lilac has supported replication of its modular strawbale house construction techniques. Eco-communities are able to stimulate broader transformation in financing, energy infrastructures, food production, planning and house construction, often at a regional scale.

Fourthly, as Wright (2010) has argued, it is vital to understand that eco-communities perhaps act most transformatively when they work with state agencies or corporate developers. Likewise, Russell *et al.* (2022) argue that the foundational economy is perhaps most usefully enacted in place-based terms through alliances of hybrid organizations, and North's (2014) work on alternative local currencies demonstrates the vital inclusion of local commercial business to give strength to material practices. While eco-communities have facilitated replication of some of their strategies, wider adoption has relied on collaboration with organizations that do not necessarily mirror their intent or values (Boyer, 2015). For example, developer-driven projects have tended to be weaker versions of eco-community exemplars (see Nelson, 2018: 190–213) and 'non-committed' versions of communal living that do not 'equip new members with the necessary skills for shared practices and [for] establish[ing] a common ground' (Temesgen 2020: 1). Similarly, municipalities' and states' attempts at mediating collaborative housing introduction within neoliberal urban governance logic through facilitation of market actors have proven challenging and reproduced problematic dynamics (Hagbert, *et al.* 2019). A successful response has seen the emergence of companies such as Baerebo (Denmark), run by those with eco-community experience who seek to channel corporate finance into cohousing but with greater emphasis on enabling necessary social elements and skills.

Finally, that eco-communities are dynamic and unfinished signals the important temporalities of socio-environmental transformations. Many eco-communities fail or endure a gradual weakening of values and intentions that erode their social and communal elements (Pitzer, 2013; Sullivan, 2016). These processes of erosion, failure and abandonment demonstrate the impermanence of transformation and the need to understand the shift to more equitable and sustainable cities as necessarily in-the-making and remaking, and as always in motion.

Eco-communities' strategies for shifting urban development are particularly promising in the ways they demonstrate the vital interdependencies and synergies necessary to build sustainable and equitable cities. For example, their progressive economic strategies make visible sharing, care and the centrality of (often women's) unwaged work in social reproduction and beyond. This ethical praxis, which is holistic and relational, while always incomplete, also informs further prefigurative attempts at non-neoliberal futures. For example, eco-communities demonstrate the risks of not assertively tackling racism and privilege when attempting inclusive decision making.

Eco-communities warn us of the perils of piecemeal approaches to tackling urban challenges and yet also of blueprints that are monolithic. Instead, eco-communities—in their praxis, heterogeneity, always-in-the-making, reflexive and adaptable experiments—demonstrate a pragmatism that acknowledges the multiple economic, political and power relations opposing their ideas. Yet they preserve regardless, as Chatterton and Pusey (2020: 28) argue, 'a set of activities and ideas that have multiple and interconnecting characteristics simultaneously in, against and beyond the present condition'. Eco-communities provide political, social and environmental imaginaries, but most notable is the way their social relations intersect across contemporary urban concerns to reconstitute the actual and moral subjectivities of what is an acceptable quality of life, as well as their approach to interacting with one another and with nature with appropriate care and compassion. Eco-communities, as innovative, proactive and critically self-reflective, offer examples and complex experiences that might not map out fully formed pathways to transformation, but do detail the start of the journey. However, further empirical research into how change manifests and the systematic implications thereof is still required, and we can look to eco-communities for critically informed hope.

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