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Published online: 01 Feb 2021.

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Climate changed urban futures: environmental politics in the anthropocene city

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ABSTRACT
In the 30 years since the journal *Environmental Politics* was founded, we have witnessed a profound shift in how we understand climate from its initial framing as global problem, to one that is increasingly understood as transnational, personal, urban, networked, and regional. Charting the rise of climate change's urban agenda over the past decade, I suggest we are now witnessing a 'third wave' of climate urbanism in which the challenge of addressing climate change is recognised as deeply connected to wider issues of sustainable development and social justice. These shifts are in turn shaped by and giving rise to new developments in terms of the form of climate politics, how it is conducted, and where the battle lines over what it means to act politically under conditions of climate change are being drawn. Recognising that the nature of climate urbanism is continually emergent and highly contested will be critical for future work in this field.

Introduction

Reflecting on 30 years of *Environmental Politics* is sobering at the best of times, and these are not the best of times. The Intergovernmental Panel on Climate Change have shown the magnitude of the challenge facing the global community in shifting the planet onto a trajectory of only 1.5 degrees warming, the first global assessment of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services has demonstrated that climate change is having a critical impact on nature and its diversity, while the emergence of Extinction Rebellion and School Strike for Climate have drawn attention to the lack of progress towards the goals of the Paris Climate Agreement. Throughout, we have witnessed the emergence of widespread political tensions and in some cases resistance towards proposed state-led action for climate action. Yet for the most part, the framing of the climate problem has remained unchanged as one of a matter of managing the global commons, underpinned

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by a continued belief in the main tenets of ecologically modernist thinking – that increasing scientific evidence will propel ever more action, that once the costs of climate change are internalised economies can be redirected to take this into account, that governing the global commons requires global institutions, and a faith in (technological) progress. Such an outcome would have been relatively predictable for scholars of environmental politics even as this journal was launched thirty years ago. More unexpected has been the growth in the *urban* politics of climate change, the seeds for which were also sown in the late 1980s as local authorities began to set their own targets for taking action to combat rising levels of GHG emissions. By the early 1990s, these voluntary municipal efforts were being marshalled through transnational organisations set up to combine and co-ordinate local efforts and to provide them with visibility on the international stage (Bulkeley and Betsill 2003, 2013), efforts that were rapidly expanded as a whole host of new actors, networks and forms of finance came into the urban arena in pursuit of climate change goals (Aylett 2014, Castán Broto 2017, Fuhr *et al.* 2018).

In 2013, writing to commemorate the 21st anniversary of this journal, Michele Betsill and I reflected on how far our 2003 account of the role of cities in the governing of climate change had stood the test of time. We found that while many of the propositions we had put forward held true, the world of cities and climate governance had evolved considerably (Bulkeley and Betsill 2013). First, while many urban responses to climate change remained dominated by the kinds of largely voluntary actions carried out by and confined to municipal authorities that we and others had documented during the 1990s (Collier 1997; DeAngelo and Harvey 1998, Kousky and Schneider 2003), climate change had taken on a *strategic* importance for urban authorities and indeed that cities had become strategically important for the climate governance imperatives of a range of other organisations. In short, a new 'wave' of responses was visible over and above *municipal voluntarism*. This shift was in part driven by concerns for what Hodson and Marvin (2010, p. 194) term 'urban ecological security' leading cities to develop strategies to reconfigure their infrastructures to "secure their ecological and material reproduction' alongside new projects for 'carbon control' as the basis for a new mode of state restructuring (While *et al.* 2010), as well as being driven in some contexts by avowedly political claims to oppose dominant national interests that sought to undermine climate action. We suggested that this emergent form of urban climate politics could be characterised as *strategic urbanism* where climate action comes to be bound into the strategic priorities of economic and urban development at the urban scale.

Second, while the framework of multilevel climate governance remained a valid tool for analysis, it was clear that it contained important omissions. Accounts of multilevel governance tend to focus on public authorities as at the heart of both hierarchical and horizontal governance arrangements, with more

limited attention to the multiple forms of agency and modes of governing through which urban climate politics takes place. As Anguelovski and Carmin (2011) found 'the lack of accepted norms and the varying needs and capacities of individual cities has led many to find creative ways to embed mitigation and adaptation into existing plans, channel resources to support multiple agendas, and engage a variety of civil society actors to achieve or further their goals.' As climate change rose up the urban agenda with the growth of strategic urbanism, not only were new ways of framing the climate issue being generated but these were, in turn, beginning to reconfigure the sites, dynamics, and nature of urban climate politics. Finally, we suggested that the 'battle lines' around which contests over how and by whom climate change should be addressed as an urban issue were undergoing rapid shifts, as new strategic issues entered into the arena and alternative ways of thinking about urban futures – from the corporatist visions of securing resilience for high-value real estate to the imaginaries of localised economies and new forms of living advanced by organisations such as Transition Towns – came into view. Far from being a straightforward matter of identifying the co-benefits of climate action and ensuring that municipal authorities had the right knowledge, tools, and resources to do the job, our account pointed to the increasingly complex and contested world of climate change urbanism (see also North 2009, While and Whitehead 2013, Whitehead 2013)

Our analysis demonstrated the highly contested nature of climate change responses in cities, the multiple sites and forms through which it was taking place, and how new ways of thinking and doing climate changed urbanism were emerging. Since then, both urban climate responses and interest in them has grown exponentially. At the Paris Summit in 2015, non-state action taken by cities, regions, businesses, and civil society organisations became formally tied to the UNFCCC through the Marrakech Partnership for Global Climate Action (Chan *et al.* 2016, Hale 2016). Cities have been a crucial part of this mobilisation, with analysis suggesting that a fifth of the world's population now inhabit a city taking action on climate change (Galvanising the Groundswell of Climate Actions 2019). Yet others caution that despite the growing political support for urban climate change action this has yet to lead to tangible impacts (Reckien *et al.* 2014, Bansard *et al.* 2017).

Turning once more to how climate urbanism has evolved, here I want to explore how this analysis can help us navigate the contradictions between the hope and disappointment we find invested in the possibilities for city climate action. To do so, I pick up on the three themes that emerged from our 2013 article – how urban climate politics is evolving, what this means for how governing is conducted, and where new battle lines for the heart of the city are being drawn. I suggest that the dynamics of climate urbanism that are now emerging are a product of the Anthropocene city, where the urban itself as a category, a way of thinking, living, and relating to one another and the

future, are fundamentally shot through with the profound shifts in socio-material orders that have come to be labelled as the Anthropocene. As Derickson (2019, p. 426) suggests, the city has emerged as the 'as the deus ex machina of the Anthropocene', the unlikely solution to the knotty problems of how society has come to shape the future of the natural world, whilst at the same time the kinds of solutions heralded by those promoting resolutions to the crisis of the Anthropocene have started to pervade the governance of cities. The outcome is that the artifices we have created to govern the environment in ecologically modernist terms, taken for granted as they so often are, may be coming undone.

From strategic urbanism to the climate connected city

In the past decade, work on cities and climate change has grown exponentially. Cities are increasingly positioned as of strategic importance to accomplishing the global governance of climate change and an essential means to 'bridge the gap' between international ambitions to reach a 1.5 degree C planet and the existing commitments of nation-states (Hsu *et al.* 2018, Davidson *et al.* 2019). Although transnational municipal networks seeking to mobilise climate action are diverse (Gordon and Johnson 2017; Acuto and Leffel 2020), urban action is increasingly mainstream and holds a strategic position across a vast swathe of cities (Johnson 2017, Hsu *et al.* 2018, Gordon 2020). Further, the commitments being made are not trivial. Analysis of over 1000 cities that are members of the EU Covenant of Mayors found that they 'have achieved 51,405,666 tCO2 emissions reductions to date (1.08 tCO2 per capita), equalling an average 14.87% reduction from their respective baseline emissions' and that 60% of these cities are on track to meet their commitments for reducing emissions by 20% by 2020 (Hsu *et al.* 2020). At the same time, there remain significant differences in terms of the capacities and responsibilities for mitigating emissions and many of the critical issues facing cities in the global South remain hidden from view and severely under-resourced (Castán Broto 2017).

Yet despite these assessments, commentators have also drawn attention to the limited evidence concerning the impact and effectiveness of urban responses. In their analysis of climate action planning being undertaken in European cities, Reckien *et al.* (2018) found that approximately a third lack a stand-alone local climate plan. Further, research that has sought to interrogate the effectiveness of transnational municipal networks finds that they are skewed to the involvement of European and North American cities, such that 'transnational municipal networks are not (yet) the representative, ambitious and transparent player they are thought to be' (Bansard *et al.* 2017, p. 242–243).

At first glance, the conclusions appear straightforward. The growth of *strategic urbanism* has led much to be promised but little delivered. On closer inspection, a more complex story unfolds. Many analyses of urban climate action have operated within a relatively narrow frame, such that they have been most concerned with evidence of explicit climate plans, policies, regulations, policy instruments – the traditional repertoire of (national) environmental policy transposed into the urban climate domain. This neglects the fundamental way in which what constitutes the climate problem has evolved over time. If in the 1990s it was possible to think of climate change as a matter of reducing GHG emissions from the 'end of pipe' and taking singular adaptation measures, over the past two decades this has shifted to focus on the challenge of *decarbonising* the economy and making society *resilient* (Shaw 2011; Wakefield and Braun 2014, McGuirk *et al.* 2016, Luque-Ayala *et al.* 2018, Bouzarovski and Haarstad 2019, Stripple and Bulkeley 2019). This new framing positions climate change as a *systemic* issue, deeply embedded in the working of the economy, socio-technical systems, urban infrastructure, and the cultures, routines, and practices of daily life. This shift in the nature of the problem has also shaped the kinds of solutions that are seen as necessary and (politically) viable. We should therefore not be surprised to see that what constitutes the terrain for climate action has expanded to include the multiple infrastructure systems that underpin urban development, the ways in which housing services are provided, particular forms of consumption, the ways in which urban nature is put to work towards new kinds of ideas about what makes a city resilient, and so forth.

As the terrain of climate urbanism has expanded, it has come to be regarded not only as a strategic issue in its own right but also as requiring action that extends beyond the immediate sphere of GHG emissions or adaptation into the systems and structures that shape the possibilities of climate change and as a means through which multiple other agendas can be addressed (Bulkeley 2019). Features of this form of climate urbanism include both the ways in which climate change has come to be tied into a complex of intertwined sustainability concerns (e.g. the 'nexus' of food, energy, and water) and its multivalent character. What constitutes the urban dimension of climate change is increasingly open-ended (from car sharing schemes to community gardens, solar panels, and campaigns against fast fashion) and what it means to take action on climate change is increasingly diverse. As a consequence, the agents and sites of urban climate governance are ever more dispersed and its politics embedded in and inseparable from what are often termed the 'co-benefits' of climate action (clean air, liveable cities, energy savings, economic regeneration). Given the increasing prevalence of such forms of climate urbanism, it can be characterised as a new 'wave' of response: *climate connected*. Three particular forms of climate connection

are gaining particular prominence, each of which demonstrates how the shifting nature of the climate problem is generating new kinds of politics.

First, climate change is being increasingly connected to urban consumption. For example, the C40 Climate Leadership Group recently analysed the significant effect that cities have on global emissions through the consumption of goods and services (C40 2018), whilst a UNEP report suggests that material consumption of cement and steel constitute the lion's share of urban emissions. In so doing, the legitimate arena of climate action is significantly expanded while notions of where responsibility lies is shifted from cities as sites of production to spaces of consumption. Second, there is an increasingly explicit attempt to tie urban climate action to the Sustainable Development Goals, specifically as related to biodiversity, energy access, food and water quality. New transnational initiatives focusing on the urban dimensions of biodiversity governance and its relevance for climate action are now being established, and initiatives that seek to target the food-energy-water nexus often reference climate change as their guiding motivation. This has significant implications for how these agendas are being addressed. The climate-related aspects of water, land, and nature come to the fore, potentially to the detriment of other environmental concerns, whilst also shifting the nature of the actors, resources, and means through which the urban climate challenge is configured. This creates unlikely new coalitions and potentially generates new forms of contestation over who should have a say in the making of urban futures. Third, climate change is increasingly being connected to social justice. A broader outlook on sustainability, together with a concern with the ways in which urban climate action has tended to privilege certain interests at the expense of others, has led to growing calls for climate responses that are both socially and environmentally just. At the same time, social justice movements and interventions have found common cause with climate change whilst also recognising that the urban climate agenda is a means through which to gain both political traction and additional resources.

Forms of climate urbanism that emerge from this *climate connected* perspective are not replacing ongoing efforts of municipal voluntarism or strategic urbanism, but rather sit alongside and come to be interwoven with them. In some places and for some actors, climate change remains framed as largely a matter of voluntary initiatives to reduce direct GHG emissions within the scope of municipal control. Elsewhere, climate change still occupies a strategic position around which new forms of economic development, risk reduction, and political advantage can be secured. And yet jostling for position both within the transnational networks and governance arenas through which climate urbanism is relayed as well as in specific urban contexts, a new articulation of urban climate change as connected to one or more of consumption, sustainability, and justice are emerging. This not only means that the urban climate problem and its solutions are continually being recast, but also

that what constitute the sites and means for intervention are also in flux. Set against these shifts, the lack of an integrated and consolidated form of climate planning and measurable outcomes may be of concern, but equally important is that such diagnoses also fail to grasp the full range of ways in which we might evaluate the success or otherwise of urban responses.

Cities governing climate: the rise of experimentation?

Considerable momentum has gathered over the last decade behind the notion that the governing of climate change is not limited to formal political arenas but instead takes place through experimentation (Bulkeley and Castán Broto 2013). As Smeds and Acuto (2018, p. 550) have argued, 'understanding urban climate governance in the post-Paris era requires a broader conceptualisation of governance that unpacks how a multiplicity of urban experiments are governed in the city.' Recent work has sought to expand both the conceptual repertoire and empirical sites through which we understand the governing and politics of climate change in the city, such that governing is not seen as a seamless process but 'comes to cohere at the level of particular interventions, shaped at particular scales through relations forged between constituent elements' (McGuirk *et al.* 2016, p. 3). Governing is then accomplished through the pursuit of multiple interventions over time that serve to: mobilise particular discourses about the nature of the problem and its appropriate solutions; use calculative and emotive techniques to circumscribe the domain within which action is required and generate new forms of conduct amongst constituents; and serves to reconfigure socio-material networks and flows towards these ends (Bulkeley 2015).

It has been within this alternative reading of the nature and politics of governing the city that experimentation has arisen as a key focus within the literature on climate urbanism (Bulkeley *et al.* 2014). Research that has examined the politics of urban experimentation has now become sufficiently established that it is possible to identify two distinct approaches. For those writing in the transition studies tradition, experiments and the niche innovations they produce are fundamentally regarded as a stepping stone towards a form of system change that involves the breakdown or removal of existing regimes and their replacement with novel socio-technical configurations developed within niches. Experiments in this sense are regarded as spatially and temporally discrete moments that provide the testing, breeding, and learning grounds for widespread system change, and the central challenge that must be overcome is the scaling up of experiments (Karvonen 2018, Davidson *et al.* 2019, Peng *et al.* 2019). In contrast, research on urban experimentation as a mode of governing and a form of politics suggests instead that we may be witnessing the emergence of the 'city of permanent experiments', such that 'experiments might not simply serve as one-off trials to provide evidence and justification

for new low-carbon policies, regulations, and service provision through existing circuits of policymaking and regulation. Instead, these activities are emerging as a new mode of governance in themselves.' (Karvonen 2018; see also Bulkeley 2015, 2019). For Hodson *et al.* (2018) experimentation serves as a means for 'successfully materially embedding 'new' sustainable infrastructure interventions in a particular place' that 'requires configuring place-based interests, infrastructural technologies and forms of knowledge in ways which aren't always clear a priori' (Hodson *et al.* 2018, p. 1481). Rather than being a form of intervention that is designed to test and scale new innovations, experimentation here is regarded as a disposition towards the city, a shift necessitated by seeking to govern in a context where what constitutes urban improvement is indeterminate and contested (Edwards and Bulkeley 2018). In this sense, experimentation becomes a means through which the ways of knowing and thinking the Anthropocene city, as Derickson 2019) puts it, come to be realised in practice. A means for 'the staging of encounters through which new possibilities for politics might emerge along with new political subjectivities' (Braun 2015, p. 242), creating in turn 'an unruly dynamic of new configurations and potential circulations which may be more or less successful in opening up existing obdurate socio-material regimes' (Castán Broto and Bulkeley 2018).

That experimentation has come to be a distinctive feature of the landscape of urban climate politics over the past decade has raised three fundamental questions. First, why this is the case – where has experimentation come from? Second, the matter of its significance – for whom and on what terms does experimentation matter? Third, and perhaps most hotly debated, is it sufficient – where is experimentation leading? Space does not permit a full elaboration of these issues, but some initial considerations can be made. In terms of where experimentation comes from, each of the perspectives outlined above point to different insights. For those within the transition studies field, experimentation is usually associated with the practice, politics, and policy of innovation – driven by individuals/firms seeking to bring new ideas/inventions to market or as an outcome of deliberate policies established by the state to foster new forms of economy. Certainly, there is evidence that such forms of intervention have been significant in relation to urban sustainability. The growth of Urban Living Laboratories, driven by funding and conditions established by the European Union, nation-states, corporate actors, municipalities, universities, and other strategic actors, is one such example. Evidence suggests that experimentation through Urban Living Labs has become a key element of strategic urbanism approaches towards energy, transport, housing, and other facets of the climate/sustainability challenge at the urban level (Voytenko *et al.* 2016). From the second approach to experimentation, researchers pointed to wider issues concerning the fragmentation of authority and constraints on governance capacity as leading to a more provisional,

piecemeal approach to urban governance. More or less explicitly, the argument goes, experimentation has arisen as (ecologically) modernist approaches to planning and control are challenged and a 'more provisional, adaptive understanding of the city … which view the city as an emergent and heterogeneous assemblage' (Evans 2016, p. 429) comes to hold sway.

Determining the significance of experimentation is of course a contested matter. There is ample evidence of experimentation being a global phenomenon through which urban climate action and its politics are unfolding (Evans *et al.* 2016). Yet instances of what might be regarded by some as true experimentation – where there are active processes of learning that in turn generate shifts within wider regimes (Sengers *et al.* 2019) – appear rather rare, with many analyses of experimentation suggesting that processes of learning are at best weak and at worst non-existent. The prevalence of experimentation coupled with concerns about its traction in addressing climate change lead some to consider it as a form of green gloss, applied readily but with limited sticking power. From this perspective 'it is arguable that the entire notion of experimentation needs to be critically considered against the wider socio-ecological crisis facing humanity in the urban age. The time left for urban testing and trialling may be rapidly coming to an end in the face of manifest shocks, especially climate change' (Davidson *et al.* 2019, p. 12). Certainly, it is critical to recognise that experimentation is a form of politics, and its intentions many and various. Research has found evidence that experimentation can be designed and implemented as a means through which to foster and extend particular versions of sustainability that champion technical and market solutions whilst seeking to contain critiques that more radical reforms are needed (Paprocki 2018). At the same time, there is evidence that experimentation can provide a powerful form of intervention that challenges the status quo and makes space for alternative approaches to urban ways of life alongside addressing climate change (Evans *et al.* 2016, Chu 2018). Intriguingly, there is now emerging evidence that such forms of experimentation are being resisted by incumbent interests. Nciri and Levenda (2019) find that incumbent interests seek 'sustainability fixes', interventions 'that simultaneously meet profit-making and environmental goals without addressing structural inequalities' and where experimentation fails to deliver such fixes they are actively constructed to have 'failed' in order to prevent their further embedding or dissemination.

Arguably then, experimentation is significant because it has come to form a central means through which urban politics of climate change is conducted and contested. Yet the vital question of whether experimentation can deliver the kinds of outcomes needed to address climate and wider sustainability goals remains. Of course, this is a question posed about each and every kind of societal response to the climate challenge, yet it is somehow more pointed when honed in on interventions that appear to be small, dispersed, and fragmented. As Vanesa Castán Broto and I have discussed

elsewhere (Castán Broto and Bulkeley 2018), experimentation is regarded as insufficient precisely because it does not comply with existing norms of effective forms of governance, which are derived from (implicitly modernist) assumptions about the importance of acting 'at scale' in order to address 'big' challenges. From a planning or regulatory gaze, experimentation is unwieldy and often inconvenient, such that efforts to extract, sanitise, integrate, and scale up are needed to develop governance arrangements and approaches that can be effective. From the perspective of innovation, diffusion is an essential ingredient in the success of experimentation. Yet, despite the accepted wisdom that scaling is essential in order to make experimentation matter, the significant efforts put into scaling by transnational municipal networks and with the notable exception of recent work by Kern (2019) to embed an understanding of the processes of scaling within the context of multilevel governance, 'little is known about . . . how successful experiments and innovations travel across contexts or about how they are transferred' (Peng *et al.* 2019, p. 303). As Smeds and Acuto (2018, p. 554) put it 'the pathways through which 'scaling up' occurs in cities, or could ideally occur, remains relatively unclear with limited systematic analysis within city networks or academia' and there are broad concerns about a lack of understanding of how these processes actually contribute to achieving better outcomes (Hughes and Besco 2018; see also Nevens *et al.* 2013). Indeed, detailed case-study work appears to suggest that what is important in making experimentation a viable response to climate challenges is not so much the process of scaling, but one of *embedding* (Hughes and Besco 2018, Peng *et al.* 2019). Goh (2019) calls our attention to the presence of *network formations* as a means through which resources, ideas, actors, and power come to be held in relation to one another and create the capacity to intervene in diverse urban contexts as experimentation with urban water management travels globally from the Netherlands. Making experimentation matter is then a question of ensuring that they come to disrupt, reconfigure, and circulate through the more-or-less spatially extensive or socially-politically 'dense' networks of which they are already part, opening up cracks in the urban milieu that allow for other forms of possible urban futures to take hold (Castán Broto and Bulkeley 2018, Edwards and Bulkeley 2018).

Redrawing the battle lines

From the vantage point of 2020, it is clear that the new battle lines that Michele Betsill and I identified in our 2013 review were merely the initial skirmishes of a much more fraught contestation over what it means to govern the climate through the urban, for and by whom, and with what consequences. The past decade has witnessed at least three critical issues

around which such battle lines are being entrenched, redrawn, and circum-scribed. First, and perhaps most familiar, this has been a period in which the politics and movement for environmental justice have come to take up residence in the climate urbanism debate. For example, considerable effort has gone into understanding how and on what terms urban citizens should be involved in the processes of determining climate action. For some, this has led to an emphasis on the development of governance arrangements and processes that are both co-evolutionary and co-designed (Hölscher *et al.* 2019). Within this school of thought, considerable weight has been given to the importance of co-production – a method and an ethos through which the knowledge that informs decision-making is seen as a joint endeavour and through which new ways of thinking about and acting on climate change (and other sustainability challenges) can be generated. Yet recent critiques suggest that a failure to engage with the underlying power dimensions of such processes and a lack of critical attention to the way in which they come to be dominated by 'a particular depoliticized discourse that uses rational and scientific arguments to evoke universalized ideas of what is 'the best' solution' (Turnhout *et al.* 2020, p. 16) has served to fundamentally under-mine their promise as a means of ensuring authentic forms of participatory democracy. The challenge then in seeking to generate processes that are genuinely transformative for those participating in them and the outcomes that they produce is that while 'failure to identify, make clear, and engage the broad public about … potential trade-offs [both in terms of what is valued and how it is valued] will lead to the marginalization of those without power and influence, and lead to climate impacts that are 'morally unacceptable' and, so, unjust' (Schlosberg *et al.* 2017), there is to date scant evidence of what kinds of mechanisms or procedures can work to achieve just this outcome. The new wave of climate assemblies and public declarations of climate emergencies taking hold in cities over the past year may offer a promising step forward.

At the same time, there has been considerable attention paid to the ways in which climate action is addressing questions of the distribution of the burdens and benefits of climate change, and of the rights and responsibilities of those charged with responding to this issue. Much of the evidence suggests that for all of the talk of co-benefits, there has been little consideration of who it is that gains from those initiatives that generate additional economic, social, or environmental outcomes, and that persistent divides remain such that it is cities in the global North, and those with already significant resources, who tend to be taking most action on climate change and hence benefiting from any associated returns. There are indeed some very challen-ging waters to navigate here. On the one hand, given that cities in the global North continue to have the most responsibility for GHG emissions it would appear to be morally just for action to be focused in these places, yet on the

other hand if most of the benefits of climate action are accruing also through mitigation actions (e.g. through the cost savings involved, improvements in air quality or the potential to realise the monetary value of carbon savings in carbon markets) then cities without resources to access such interventions may continue to be excluded from much needed improvements to urban quality of life. At the same time, concerns persist that interventions aimed at adapting urban infrastructures and environments to climate change, or fostering resilience, continue to focus on those areas of highest value to the city and neglect the needs and rights of those most vulnerable and usually least able to advocate for their rights.

Stemming from this concern with climate justice in the city has been a second, increasingly vital, debate about where the battle lines around climate urbanism are and should be drawn. If most of the concerns around the justice implications of climate change have focused on the issue itself, more recent research in this domain has pointed to the potential and structurally embedded nature of injustices arising from interventions undertaken in the name of urban climate action. For example, whilst the phenomenon of gentrification and its associated implications in terms of socially and racially biased forms of exclusion is well understood, it has only been since the late 2000s that research has attended to the ways in which interventions aimed at bringing nature back into the city on sustainability or climate change grounds have been contributing to what is termed 'green gentrification' (Anguelovski *et al.* 2018). Evidence suggests that forms of exclusion in relation to urban nature emerge not only around high-profile urban developments, but even around more mundane sites and relate not only to questions about access to nature but to the very question of what counts as valuable nature in the first place (Tozer *et al.* 2020). Seeking to expand this concept, Long and Rice (2019) suggest that forms of 'carbon' gentrification can be observed as urban developers – whether in the form of public authorities or in their case through the role of large corporates – seek to undertake the redevelopment of urban neighbourhoods to generate compact, climate-friendly neighbourhoods. Not only might such interventions be displacing people, and doing so in ways that further disadvantage particular social and racialized groups in the city, but by focusing on some carbon emissions at the expense of those that come from consumption it could lead to perverse effects on the city's carbon footprint.

Elsewhere, research has identified an emerging form of 'climate gating', where the development of off-grid, decentralised water and energy infrastructures is leading to hotspots of privilege for those who can afford to develop this kind of local or self-reliance. In their analysis of the drought crisis in Cape Town in the late 2010s, Simpson *et al.* (2019) find that the widespread take up, by those who had the means to do so, of alternative forms of water provision had a profound effect on the city, not only

drastically changing patterns of water use and provision, but also radically impacting municipal budgets that are, in part, dependent on charges for utility provision. Further, such 'premium ecological enclaves' (Hodson and Marvin 2010) are increasingly designed not only to provide for infrastructural services, but for the very conditions of life itself. As Simpson *et al.* (2019, p. 6) argue, 'across the globe are state of the art facilities like the Biodome Office within Amazon's Seattle Spheres … the new indoor ecological complex at Singapore's Changi Airport … Dubai's 'Sustainable City' … and South Africa's 'Steyn City'' forming what might be termed 'Holocene climate pods' within which what is considered to constitute today's 'good life' can continue unabated. The inequities generated through climate responses are also visible in the ways in which they are financed. Recent analysis of the emergence of 'green bonds' in New York and Cape Town suggests that 'municipal debt, whether green or not, serves to aggravate entrenched inequality and displace environmental and financial risks onto those least able to bear them' (Bigger and Millington 2020, p. 16).

Navigating the landscape of climate urbanism has become increasingly complex as both climate change and responses to it serve to generate fundamental concerns about the uneven and unjust nature of city life. As the form and object of climate politics shifts once more, enrolling ever more various things in its train, it is likely that such debates will become ever more vexed. Now that urban climate politics can encompass questions of consumption – of meat, of flying, of domestic pets, or of financial products – a third battle line may be opening up around how we consider the relation between the public and the private in the urban realm. While environmental campaigns have long sought to target the decisions of private individuals, as our understanding of the climate problem shifts so too are new questions raised about where we should draw the line as to what is and is not the sphere of private or individual action. New debates are emerging concerning the relative responsibilities of public authorities and private actors in the financing of climate action, for example, or when it comes to the provision of nature-based solutions, infrastructure for electric vehicle charging, alternative forms of food provision, and so forth. It seems likely that these are the sites and dynamics that will come to dominate climate urbanism in the decade ahead.

Conclusions

Over the past decade, strategic urbanism has continued apace as cities have increasingly come to be involved in the politics of climate change. On the one hand, the strategic positioning of cities as essential to addressing the climate problem has led to the increasingly formal embedding of urban action within the climate regime. On the other hand, it has been accompanied by and

further accelerated forms of climate experimentation that are dispersed, fragmented, and often ephemeral. Climate urbanism at the beginning of the 2020s is then both more institutionalised and more disjointed as the power and authority to govern the urban through climate change and climate change through the urban come to be both more established and more contested (Castán Broto 2020, Gordon 2020).

While both municipal voluntarism and strategic urbanism remain alive and well in the realm of urban climate politics, new developments in terms of the form of climate politics, how it is conducted, and where the battle lines over what it means to act politically are being drawn raise important questions for this field. As climate has come to be regarded as a systemic issue we witness the emergence of a new form of climate connected politics, where a mass of related but previously distinct issues such as biodiversity, plastic waste, ocean pollution, obesity, and so on come to be linked to and enacted through a climate lens. This does not override of subsume other forms of climate politics, but it does suggest that we need to be aware of the continually shifting ground of what constitutes the politics of climate change and what this, in turn, implies for where the authority and capacity to govern climate change may lie. As a consequence, we should be wary of holding too narrow a view of the agents, entities, sites, and dynamics through which climate urbanism is being pursued, and address this in our analysis of what constitutes the success or otherwise of urban climate action.

At the same time, experimentation has come to play a crucial and arguably dominant role in climate urbanism. Arguments about the nature, scope, significance, and sufficiency of experimentation are certainly valid and will persist. Yet for all of this critique, what constitutes a viable alternative means through which to govern under conditions of fragmented authority and radical indeterminacy are not yet apparent. Experimentation is not so much a choice, but an emergent phenomenon that serves to respond to some of the limitations of ecologically modernist approaches to environmental governance, which tend to presume that knowledge precedes action, that public authorities hold the ultimate capacity to govern, that climate and other global problems are ones of a common goods nature (rather than systemic and structural), and that we can continue to have a faith in (technical) progress and market mechanisms as the means through which such issues can be resolved. In offering a means to act without knowing, to harness diverse forms of capacity, explore alternative heterotopic futures (Edwards and Bulkeley 2018), and to be incomplete, experimentation may promise an alternative means through which governing can be conducted in the condition of the Anthropocene city (Braun 2015; Derickson 2019). At the same time, experimentation is highly malleable for diverse interests who have a stake in confining what it might mean to do urbanism or climate politics differently.

And finally, as the form and means of climate urbanism shift, we see new battle lines emerging around which the environmental politics of the next 10 years are likely to congregate. Questions of climate justice in the city are now increasingly on the agenda and new research is demonstrating the importance of not assuming that all climate politics does good. Scrutinising questions of power and of how, and by and for whom, climate urbanism is being enacted and with what consequences seem to be the central questions for work in this field. And the scope and remit of such work will only increase and intensify as the matter of what climate politics involves is continually opened up to question. Yet the vast majority of urban studies continues to be pursued with concepts, ideas, and questions that appear untouched by climate urbanism. It is now apparent that fundamental aspects of urban life – from debt to water, justice to densification – are now inextricably linked to how climate governance is being conducted in the Anthropocene city. How we navigate this phenomenon, and its consequences, will be of central importance to the next decade of environmental politics.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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