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ORIGINAL ARTICLE

WILEY

Re-assembling climate change policy: Materialism, posthumanism, and the policy assemblage

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Abstract

National and international policy-makers have addressed threats to environmental sustainability from climate change and other environmental degradation for over 30 years. However, it is questionable whether current policies are socially, politically, economically, and scientifically capable of adequately resolving these threats to the planet and living organisms. In this paper we theorize and develop the concept of a "policy assemblage" from within a new materialist ontology, to interrogate critically four policy perspectives on climate change: "liberal environmentalism"; the United Nations policy statements on sustainable development; "green capitalism" (also known as "climate capitalism") and finally "no-growth economics." A materialist analysis of interactions between climate change and policies enables us to establish what each policy can do, what it ignores or omits, and consequently its adequacy to address environmental sustainability in the face of climate change. None, we conclude, is adequate or appropriate to address climate change successfully. We then use this conceptual tool to establish a "posthuman" policy on climate change. Humans, from this perspective, are *part of* the environment, not separate from or in opposition to it, but possess unique capacities that we suggest are now necessary to address climate change. This ontology supplies the starting point from which

to establish sociologically a scientifically, socially, and politically adequate posthuman climate change policy. We offer suggestions for the constituent elements of such a policy.

KEYWORDS
assemblage, environment, new materialism, policy assemblage, posthumanism, sustainability

1 | INTRODUCTION

With escalating global concern about environmental degradation and the effects of human activity on the planet's climate, policy discussions around environmental sustainability have been of growing importance over the past 30 years. A series of high-level international treaties have been signed to limit greenhouse gas emissions, while some countries have declared a "climate emergency." There is growing public activism over climate change, including school strikes worldwide and "Extinction Rebellion" protests in the UK and elsewhere.

The aims of this paper are to establish an innovative approach to policy analysis; to critically assess the principal contemporary policy positions that seek to address anthropogenic threats to climate change: and to develop a "posthuman policy" to address effectively this pressing issue. To achieve these outputs, we apply a "new materialist" (Braidotti, 2013; Coole & Frost, 2010; Fox & Alldred, 2017) framing, both to our understanding of "environment" and in the methodological approach to analyzing policy as assemblage. While our narrow concern in this paper is with climate change, this assemblage approach may be applied to other policy issues.

First, we use the new materialist commitment to relationality over essentialism (Deleuze, 1988, p. 125; Delanda, 2006, p. 3) and its concern with the capacities of both human and non-human matter (DeLanda, 2006, pp. 10–11), to establish a *posthuman* understanding of environment and environmental sustainability. Such a posthuman perspective de-privileges human interests in relation to those of other animate and inanimate matter, while not denying continuing human involvement in the Earth's ecosystem. In this view, the environment is an assemblage (Bennett, 2005, p. 445) or arrangement (Buchanan, 2017, p. 465) in which humans are an intrinsic element, rather than separate from or in opposition to it. We use this understanding as the starting point for our analysis of the complex physical, economic, social, and cultural production of anthropocentric climate change.

Second, we apply this ontology to further develop and theorize a recent cultural geography literature on the "policy assemblage" (McCann & Ward, 2012; Prince, 2010). We ask the Deleuzian/Spinozist question "what does a policy actually do?"—in other words: what are a policy's capacities to affect the event it addresses? To answer this question, we must explore the dialectical relationship between an assembled event such as climate change, and the policy assemblage that seeks to address it. This enables us to assess a policy's capture of the complexity of an event, and hence its adequacy and appropriateness to address it successfully.

Having established this framework for inquiry and the approach to policies as assemblages, we interrogate four very different policy assemblages that encompass the current breadth of climate change policy: "liberal environmentalism"; the United Nations policy on sustainable development; "green capitalism" (also known as "climate capitalism") and finally "no-growth economics." For each of these, we analyze what the policy aims to achieve, offer a critical assessment of how each engages with climate change events, and thereby assess its adequacy and appropriateness to address the current crisis of environmental sustainability.

However, we shall then suggest that this approach to policy analysis has a further advantage: in addition to assessing current policies, it also provides a foundation for *designing* policies that are adequate and appropriate for the task they address. To conclude the paper, we use this capacity to develop a comprehensive climate change policy that—unlike the policy positions reviewed earlier—is adequate and effective as a means to counter

anthropogenic climate change. We do not claim this as the final word on climate change policy, but as an opening effort in a policy-development process that will require input from across a wide range of disciplines in the social and physical sciences, and engagement with policy-makers and the public.

2 | SOCIAL SCIENCE AND ENVIRONMENT: A POSTHUMAN ONTOLOGY

The feminist biologist and social theorist Donna Haraway has suggested that nature has long been culture's "Other" (1992, p. 65). This dualism has on occasions constrained sociology's engagement with environment (Dunlap & Catton, 1994, pp. 19–20; Fox, 1991, p. 24; Walker, 2005, p. 78), elevating human culture and treating the environment as "conceptually subordinate to society" (Walker, 2005, p. 80, see also Dunlap & Catton, 1994; Jasanoff, 2010; Lidskog, Mol, & Oosterveer, 2015, p. 346).

The emergence of global concerns with anthropogenic climate change has led some to seek ways beyond nature/culture dualism (Benton, 1991; Murdoch, 2001; Urry, 2009). Stevens (2012, p. 579) has argued for an "ecosociology" that extends ideas of "the social" beyond the human. For Walker (2005) the solution lay in a synthesis between environmental sociology and cultural anthropology, to incorporate broader biological and environmental factors into an understanding of human life (2005, pp. 99–100). Social practice theorists have suggested that we must explore the constellation of human and non-human elements that produce harmful environmental practices (Hampton & Adams, 2018, pp. 215–216), while Lidskog and Waterton (2016, p. 399) suggest that in the "Anthropocene" both physical processes and human culture produce the "conditions of possibility for life on earth."

Our own efforts (Fox & Alldred, 2016, 2017, 2019) to move beyond environmental anthropocentrism have drawn upon the elision of human/environment dualism (Bazzul & Tolbert, 2017; van der Tuin & Dolphijn, 2010) in posthuman and "new" materialist approaches (Coole & Frost, 2010; Thrift, 2008). The feminist eco-philosopher Rosi Braidotti has promoted a "posthuman" synthesis of the opposing perspectives of humanism (a feature of Enlightenment thinking that elevated human reason over other authorities), and anti-humanism (which re-privileges the non-human) (Braidotti, 2013, pp. 13–25). The key feature of this posthuman project is a recognition that (post)humans are not separate from, but an intrinsic part of the material world, and that all matter—animate and inanimate—has vital, self-organizing capacities (Bennett, 2010; Braidotti, 2011, p. 16; 2019, p. 47).

For Braidotti—and previously Guattari (2000)—this supplies a foundation for an eco-philosophy that addresses the "intricate web of interrelations" linking (post)humans to the rest of the physical world (Braidotti, 2013, p. 104), both natural and technological (Braidotti, 2019, p. 46). Posthumanism is thus transversal (Braidotti, 2019, p. 46), cutting across the nature/culture dualism and countering what Dunlap and Catton (1994, p. 24) call "human exceptionalism": in which the "environment" is considered merely as the context for human agency and a resource to sustain human life.

New materialist ontology, meanwhile, shifts attention away from essentialist concerns with what entities such as bodies, animals, fossil fuels, atmospheric conditions and governments *are*, toward asking what they can *do* when engaging with other matter (Delanda, 2006, p. 3; Deleuze, 1988, p. 125). Events and interactions need to be understood as *assemblages* (Bennett, 2005, p. 445), arrangements or orderings (Buchanan, 2017, p. 465) of matter that are inherently fluid and continually in flux (Deleuze, 1988, p. 128; Lemke, 2015). In place of "agency," new materialism considers that all the disparate materialities within an assemblage are *affective*, meaning they manifest capacities to affect or be affected by other assembled relations (Deleuze, 1988, p. 101): human bodies are no longer the prime movers within events. The collective "economy" (Clough, 2004, p. 15) of these *affects* within an assemblage determines what it (and its constituent human and non-human components) can do.

Together, these ontological elements (relations, assemblage, affect and capacity) establish a posthuman ontology in which the entirety of the natural and social world *is* the environment, with nothing beyond it, and nothing (for instance, human societies and cultures) excluded from it (Fox & Alldred, 2017, p. 48; 2019). Significantly, when it comes to understanding the processes involved in climate change, it shifts from an essentialist model of human

and non-human matter with fixed attributes ("a rock is hard but brittle, a human can think and talk") to a relational ontology. In place of a human body/mind, the "posthuman" is an assemblage of biological, sociocultural, and environmental elements, whose capacities to affect and be affected are contingent upon setting and its relations with other matter (Barad, 2001, p. 96; DeLanda, 2006, pp. 10–11). Non-human matter similarly acquires its capacities when interacting with other matter.

This posthuman ontology has two important consequences for developing environmental policy. First, it recognizes the diverse capacities of matter. While (post)humans are part of the environment, this does not make them (or a rock or a tree or a dolphin) simply elements of an amorphous materiality. Matter of all kinds has capacities that emerge when they assemble with other matter. Indeed, (post)humans have been demonstrated to acquire capacities that are unusual (though not necessarily unique) for planet Earth: for instance, to act altruistically; to imagine and create technologies; and to use reason to theorize, predict, or anticipate future events (Fox & Alldred, 2019, see also Murdoch, 2001, p. 127; Schmidt, 2013, pp. 189–190). Some of these unusual capacities (not least the capacity to generate "policy") will be of specific utility when addressing climate change.

Second, that these capacities are not universal attributes of human bodies/minds, but are emergent and context specific. (Post)humans' capacities are contingent upon geography, income, race, gender, and other social stratifications. What is more, environmental changes intersect with these stratifications, such that climate change will not affect all (post)humans equally. Consequently, policies must acknowledge the uneven impact of anthropogenic climate change on global North and South, and incorporate a commitment to "climate justice" (Schlosberg & Collins, 2014). We take up these issues later in the paper when we seek to synthesize a posthuman climate change policy. However, as will be seen in the following section, posthuman and new materialist theory also supplies a toolkit of concepts for an innovative approach to policy analysis.

3 | POLICY-MAKING AND THE POLICY ASSEMBLAGE

Social policy is typically an initiative devised by a government, institution or organization to address issues bearing upon economic and political stability; continuity, security and cultural integrity, individual and collective safety; or liberty and rights to citizenship (Shore & Wright, 1997, pp. 30–31). It has been described as a material-semiotic engagement or intervention that addresses an issue, event or interaction, with the objective of improving or reforming the social or natural world (Taylor Webb & Gulson, 2012, pp. 87–88).

Climate policy has been the subject of a range of social analyses (Bulkeley, 2000; Owens & Rayner, 1999; Shove, 2010; Stevens, 2012), with discourse analysis (DA) used by some scholars to interrogate climate change and environmental policies (Hajer & Versteet, 2005; Sharp, 1999; Sharp & Richardson, 2001). Other researchers have questioned the capacity of a constructionist epistemology such as DA to address the materiality of environmental policy-making (Dunlap & Catton, 1994, p. 22). Perspectives such as actor network theory (which we recognize as one of the many new materialisms) have offered an alternative approach to analyzing climate change policy (Asdal, 2014, p. 2111; Rutland & Aylett, 2008, p. 628).

Here, we apply the new materialist ontology set out in the previous section to ask the question: what does a specific climate change policy actually *do*? In other words, what are its capacities to affect the material processes driving climate change? To this end, we assess *micropolitically* the dialectic between climate change policies and climate change itself, to address the affect economies of target events such as forest clearance or meat consumption, and the policy-making and policy implementation that aim to address these events (Patton, 2000, p. 68; Widder, 2012, p. 125).[1]

We operationalize this micropolitical focus by exploring policy-making and implementation in terms of a "policy assemblage" (McCann, 2011; McCann & Ward, 2012; Prince, 2010; Ureta, 2014). Policies may be seen as assembled from a variety of human and non-human agencies (Prince, 2010, p. 173) in ways that are inherently dynamic and unstable (McCann, 2011, p. 145; Ureta, 2014, p. 305). However, while the literature on policy assemblages has often referenced DeleuzoGuattarian and actor-network (ANT) theories, their conceptualization

remains largely descriptive (McCann & Ward, 2012, p. 43). Further development is required to turn the concept to analytical ends: to explore *how* policies assemble micropolitically, and what they can do. Key to this is recognition of the micropolitical interaction between two distinct elements: on one hand, the event (for instance, climate change); on the other, the policy that aims to engage and influence this event.

To illustrate how we may analyse this dynamic, an event such as anthropogenic climate change may be explored as a material *assemblage*. Later in the paper, we will fully develop such an assemblage; for now, we may consider it simply as an arrangement of at least the following relations (in no particular order):

> *oceans; atmosphere; greenhouse gases; the Sun; humans; human activities; industry; global economics*

Evidence from the natural and social sciences enable us to map the affect economy that assembles these relations. So, for example, physical science evidence has indicated that human use of fossil fuels has generated greenhouse gases and that these gases prevent the Sun's heat from escaping from the atmosphere. Social scientists have revealed how fossil fuels enabled an industrial revolution that has in turn massively increased human use of natural resources and thereby transformed the global economy. Together, these affects have led to the Sun's increased capacity to heat the Earth's land and oceans.[2]

Policy-making to address such an event (for instance, to reduce greenhouse gases in the atmosphere) may be understood as itself an event, and hence also amenable to analysis as a material-semiotic assemblage. The literature suggests that policy-making comprises a multiplicity of elements and actors from scientific evidence to a range of stakeholders (Baer, 2012, p. 267; Dror, 2017; Yearley, 2014). Consequently, a policy assemblage will organize material elements that include at least:

> *evidence of climate changes; relevant natural and social science theories; experts; policy-makers; stakeholders; money and economics; social and political processes; policy documents; audience*

Many other contextual relations may also be assembled (governments, energy producers, consumers), the media, previous policies, and—importantly—the ideological views or commitments concerning the event among policy-makers.

Like other assemblages, this policy assemblage is the outcome of the affects between its elements. So, for example, policy-makers will be affected by the evidence of climate changes from scientific studies or from expert witnesses, and by theories explaining climate change. They will also be affected by economic and political considerations, and by any underpinning perspectives or orientations (for instance, a commitment to protecting wildlife or an emphasis on North/South global equity). Sociological analysis to map these affects enables insight into the principles underpinning a policy, what it emphasizes and what is downplayed or missing from it. It also enables assessment of a policy's capacities to achieve its objectives (what it does, how it works, whether it is effective), by enabling insight into the affective interactions *between* a policy assemblage (PA) and the event-assemblage (EA) that it addresses. These latter interactions are illustrated in Figure 1.

First, the affects within a policy-making assemblage will determine its capacity to identify relevant affects in the EA. Continuing with the example, the PA must be capable of accurately identifying the affects producing anthropogenic climate change: the interactions between humans, fossil fuels, the atmosphere, and the Sun noted earlier. Prior to the emergence of scientific evidence that linked the warming effects of "greenhouse" gases such as carbon dioxide to human activity, a policy assemblage would not have considered such data as relevant to climatic events; contemporary climate change deniers continue to discount this evidence as irrelevant. Given that human knowledge is always imperfect, current policy assemblages will always be partial: missing as yet unknown affects that may be producing climate changes.

Second, when implemented, a policy assemblage must be capable of *adequately* and *appropriately* affecting the event it is targeting (as opposed to having little or no effect, or affecting other irrelevant processes) (Dror, 2017,
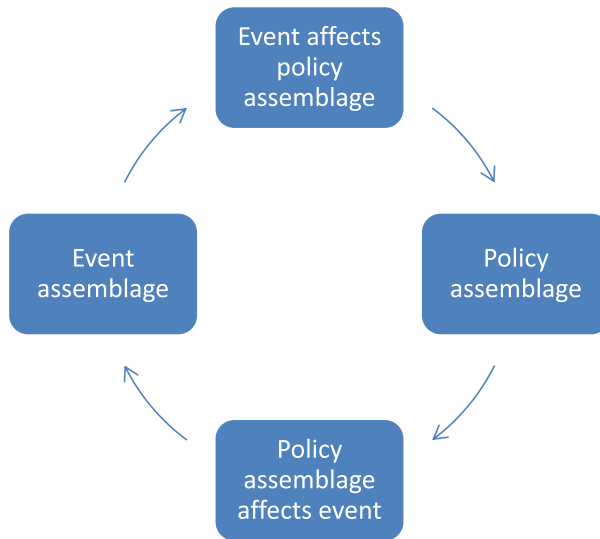
FIGURE 1 Affective interactions between event assemblage and policy assemblage [Colour figure can be viewed at wileyonlinelibrary.com]

pp. 34–35). For instance, a global policy to replace fossil fuels with renewable energy sources will—according to the theory of anthropogenic climate change—have a beneficial impact on limiting climate change. Policy propositions to ask citizens of the UK to drink less tea (boiling fewer kettles) or choose one brand over another will be respectively *inadequate* and *inappropriate* to affect greenhouse gas production. The capacity of a policy to affect an event will depend upon many aspects of a policy assemblage's affect economy. For instance, if a policy assemblage does not have adequate and appropriate resources (money, access to government, good public relations), it may have little influence on events.[3]

This assemblage approach to policy enables detailed analysis of the material-semiotic forces at work within both events and policy, and unpacks the dialectic between them, allowing meticulous assessment of a policy's adequacy to successfully address an event. It may be easily generalized to other policy topics, and translates into a straightforward methodology for policy analysis. However, it also facilitates a further opportunity: to use the dialectical relationship between event and policy as the starting point micropolitically to design better policy; that is, policy that comprehensively responds to the complexities of an event's (such as climate change's) affect economy. Later in the paper, we attempt precisely this task. First, we analyze the principal contemporary policy assemblages that seek to address climate change.

4 | CLIMATE CHANGE: FOUR POLICY ASSEMBLAGES

We analyze here four broad policy perspectives on climate change. Rather than assessing specific local or national policies, they address the principal foundational approaches to countering climate change. We begin by analyzing micropolitically a perspective known as liberal environmentalism, before turning to consider the United Nations policy approach; the perspective known as "green capitalism"; and finally, no-growth economic policy.

The analysis is based on the interactions between event-assemblage (EA) and policy-assemblage (PA) set out earlier in Figure 1. For each policy position, after a brief description, we undertake the following steps:

1. Analyse the elements and affect economy of the EA (in this case, anthropogenic climate change) that a policy aims to address, based on current natural and social scientific evidence.

2. Assess the PA in terms of which affects from the EA it addresses, and identify those EA affects not addressed.
3. From this, evaluate a policy's adequacy by assessing what it actually does—that is, what capacities to affect the EA it possesses, and what capacities it lacks.

4.1 | Liberal environmentalism

This "green consumerist" perspective focuses predominately upon changing individual human behavior such as consumption choices (Yearley, 2014, p. 98). It has underpinned many contemporary and historical "good citizen" policies, from anti-litter campaigns in the 1960s to current concerns about plastic waste (Dauverge, 2018); many charitable causes that aim to conserve an endangered species; and popular TV environmental documentaries. In contemporary climate change policy, liberal environmentalism is reflected in admonitions to the public to buy low energy household appliances, use public transport or bikes, and eat less meat. Significantly, however, liberal environmentalism formulates its policies and actions without critical assessment of the interactions between socio-economic relations and environmental degradation (Bernstein, 2001, p. 3; Talshir, 2012, p. 18; Whitehead, 2014).

Efforts to reduce meat consumption supplies a relevant issue for our analysis of liberal environmentalism. Research evidence suggests that globally meat production consumes vast quantities of resources (feed, land, fuel for tractors, etc.) while at the same time contributing significantly to greenhouse gas emissions (methane from animals' digestion; CO_2 from forest clearances to provide grazing, farm machinery, and transport to market) (McMichael, Powles, Butler, & Uauy, 2007). The loss of forests as CO_2 sinks and producer of oxygen has also been linked to climate changes (Lawrence and Vandecar, 2015). However, it has been argued that increased worldwide meat consumption is driven by powerful socioeconomic affects such as the global neoliberalization of food markets, food poverty in the global South and inequalities between rich and poor in the global North (Jarosz, 2009).

Micropolitical analysis of the liberal environmentalist policy to reduce meat consumption reveals which of these affects between animals, land, atmosphere, and humans in this complex meat production and consumption assemblage (the EA) are included, and which not addressed. This policy interacts with the following elements of the climate change EA (in no particular order):

> *animals; land; famers; feed; diesel; consumers; greenhouse gas emissions; atmosphere, Sun*

However, those EA affects concerning the broader socioeconomic forces driving the production of meat protein (such as poverty, agribusiness interests, a global shortage of grazing pastures, farming subsidies, population growth and the marketing of fast meat-based foods) are not included in the liberal environmentalist PA. Excluding these powerful forces raises questions over the capacities of this PA to adequately reduce meat consumption globally. At best, consumers' choices will have a marginal effect on reducing meat production and halting rainforest clearance without action to address the broader socioeconomic affects.

These limitations of the liberal environmentalist approach consequently undermine its adequacy and appropriateness as an environmental policy intervention, whether for meat consumption or anthropogenic climate change more generally.

4.2 | The UN "sustainable development" policy approach

United Nations (UN) policy approaches to climate change have been underpinned by its continued emphasis—since the Report of the World Commission on Environment and Development in the 1980s (Brundtland, Khalid, & Agnelli, 1987)—on its twin objectives of environmental sustainability and human socioeconomic development

(Whitehead, 2014, p. 259). Thus the 5th Assessment Report of the Intergovernmental Panel on Climate Change confirmed a need for economic, social, and environmental sustainability to go hand in hand (IPCC, 2014, p. 137): while non-human life depends only upon the latter, human well-being (this Report argues) relies on all three spheres (IPCC, 2014, p. 322).

Earlier in the paper we sketched out the bare bones of a climate change EA, and we will now briefly review its principal elements and affects. Based on research evidence, anthropogenic climate change from increased greenhouse gas emissions derives from human use of fossil fuels (IPCC, 2013, p. 17). This energy source fuelled industrial and agricultural revolutions, massively increasing both production and consumption, and establishing market capitalism as the globally predominant economic system (Clark & York, 2005; Giddens, 1982, p. 48), further fuelling production and consequently greenhouse gas emissions. Expanding industrialization of the world during the past two centuries has led to a steady rise in emissions with effects on global climate (IPCC, 2013, 2014, p. 365). The consequences of global warming will affect all life on Earth but will differentially affect the global South and exacerbate social inequalities everywhere (Klinsky et al., 2017).

A micropolitical analysis of the UN policy assemblage reveals that it engages much more comprehensively with the affect economy in the climate change EA than the liberal environmentalist position. The EA (according to this perspective) comprises at least the following (in no particular order):

> *Earth; material resources; biosphere (animals and plants); humans; the global economy; poverty and wealth inequalities; economic development; social and political development; nations and governments; global North; global South; pollution; energy; greenhouse gases; future human generations*

If the significance of economic and political aspects of climate change was missing from the liberal environmentalist policy assemblage considered previously, in the UN policy assemblage it is explicit. Human quality of life is to be achieved by assuring social, economic development and environmental protection, principally through top-down actions by policy-makers nationally and supra-nationally. This policy perspective emphasizes not only living humans and their social, economic and political well-being, but also future human generations.

However, this emphasis runs counter to the scientific evidence that it is human development that is the main driver behind the emission of greenhouse gases, and that capitalist economics and its emphasis on growth fuels energy use and hence greenhouse gas emissions (Clark & York, 2005; Rees, 2003; Wallis, 2010). The insistence upon economic development narrows the notion of environmental sustainability to an anthropocentric concern with human conditions of life. This gap in the United Nations PA leads us once again to question the adequacy of this policy perspective to effectively address climate change.

4.3 | Green capitalism

The liberal environmentalist position considered earlier gains a couple of additional twists in positions that we pull together under the rubric of "green capitalism" (or "climate capitalism"): a perspective that underpins the environmental policies of many right-of-centre political parties in the West. While the former was generally silent on the negative effects on the environment of a market economy, green capitalism treats the market as the means whereby the environment will be protected from human depredations, or even as its saviour (Lovins & Cohen, 2011, p. 7).

The approach has two manifestations. The first argues that climate change represents a catastrophic failure of markets. Producers of greenhouse gases (primarily nations in the North) avoid the full global consequences of climate change, while their pollution affects parts of the world not responsible for their production (Stern, 2007, p. 1). Carbon pricing/trading, technological innovation toward low carbon solutions, and use of incentives and disincentives to change market behavior by consumers and businesses, Stern argues (2007, pp. xviii–xxi), can reform the market economy so it becomes environment-friendly (see also Pearce, Markandya, & Barbier, 1989, pp. 153–171).

The second manifestation is more hubristic concerning market mechanisms. Advocates promote a "neoliberal environmentalism," in which technological innovation to support environmentalism becomes a new growth industry within a market economy (Lovins & Cohen, 2011; Prudham, 2009, p. 1596). While acknowledging anthropogenic impacts on the environment, they argue that a market economy holds the best hope of reversing these impacts through ingenuity and entrepreneurialism, while ensuring the continuity of the economic growth that they argue has been the engine of both national and individual prosperity since the industrial revolution (Zysman & Huberty, 2014, p. xiii).

In the previous analysis of the UN position, we set out the elements and affects within the climate change EA. Micropolitical analysis of this PA suggests that in both these framings of the green capitalist perspective there is a strong affect economy linking capitalist economics to the environment and to climate change. The green capitalist PA incorporates (and alters the emphasis of) various elements of the climate change EA, including (in no particular order):

> material resources ("the environment"); consumers; capital; industry; entrepreneurs; production; profit; growth; developing and developed nations and governments; energy; greenhouse gases; Sun; climate; technologies

However, this PA ignores the inherent wastefulness of competitive capitalist markets (Yearley, 2014, p. 106) and the endless drive for growth (Bosquet, 1977, p. 166): both of which are contributors to environmental degradation (Clark & York, 2005, p. 407). Inequalities in wealth and well-being, and the divides between global North and South associated with capitalist accumulation also remain unaddressed in this PA. These lacunae again force us to conclude that a green capitalist policy assemblage is inadequate and inappropriate to successfully address climate change.

4.4 | No growth policies

A growing number of activists and parties within the global Green movement have advocated policies that promote a zero-growth economic model, arguing that the quest for continual economic growth in a market economy has been the principal cause of the environmental challenges now confronting the planet (Daly & Cobb, 1994, p. 4; Fournier, 2008). This perspective originated in Club of Rome report *The Limits of Growth* (Meadows, Meadows, Randers, & Behrens, 1972), which concluded that humanity's ecological footprint would shortly overshoot the sustainable limits of the planet. Advocates of zero-growth or even negative growth economic models argue that growth must be managed downwards to protect anything like current standards of living and well-being (Meadows et al., 1972), and to avoid a disorderly collapse of capitalism into economic contraction, leading to further inequality between rich and poor (Bosquet, 1977, pp. 185–186).

Proponents of this policy perspective (Baer, 2012; Bernstein, 2001; Brand, 2012) argue that liberal environmentalist and "green capitalist" approaches sustain a market economy that has not only led to environmental crisis but also to social and economic inequalities between poor and wealthy, and an economic divide between global North and South (Foster & Clark, 2009, p. 187). A shift toward zero-growth economics would also entail shifts in social relations to achieve an equitable global redistribution of resources (Randers, 2012, p. 105), or a "sharing economy" (Heinrichs, 2013). For Baer (2012, p. 208), however, a shift to a sustainable no-growth economics would require a more radical move from capitalist production to "democratic eco-socialism."

Micropolitical analysis of the no-growth PA reveals how it has selectively incorporated elements and affects from the climate change EA developed earlier, including (in no particular order):

> human consumers; finite non-human environment; market economy; industrialization; production; profit; energy; waste; greenhouse gases; Sun; climate

Where liberal environmentalism and the UN policy positions are humanist in their orientations, the micropolitics of no-growth environmental policy assemblages are more markedly anti-humanist—privileging non-human environment over humanity. Economic development and the non-human environment are radically opposed, with the former out of control and wastefully plundering the Earth's finite resources, with disastrous consequences for the planet's climate. Only by reversing this polarity can anthropogenic climate change be halted.

However, this PA ignores the wider political contexts of market economies (for instance, the vested interests within capitalist economies, the military-industrial complex that ties production directly to national or regional ideologies, and the dependency of democratic societies upon taxation to fund welfare and a public sector). Proponents such as Baer (2012, p. 209) consider that the move to no-growth economics will require a global political realignment toward socialism. However, such a political shift shows no sign of emerging any time soon, and is unlikely to be readily embraced in the foreseeable political future by the world's major contributor to climate change: the US. Once again, we are forced to conclude that this PA is consequently inadequate to address the pressing issue of climate change.

5 | TOWARDS A POSTHUMAN POLICY ASSEMBLAGE

This materialist analysis has assessed what four disparate climate change policy perspectives actually do in terms of their capacities to affect the climate change assemblage effectively. It suggests that none supplies a comprehensive engagement with the complex assemblage producing both anthropogenic climate change and uneven effects of climate change on rich and poor, global North and South (Braidotti, 2019, p. 61; Schlosberg & Collins, 2014, p. 369). None, we may reasonably conclude, is consequently adequate to address the associated challenges of climate change and climate justice. However, this materialist assessment of the interactions between event and policy assemblages also offers the means by which to design a critical policy assemblage that *is* adequate and appropriate. We wish now to take some steps towards developing such a comprehensive climate change policy assemblage.

Micropolitical analysis indicates that each of the environmental policy assemblages has been founded on specific affective movements, privileging some aspects of the climate change assemblage and downplaying others. Earlier, in this paper, we described efforts to overcome anthropocentrism and environment/human opposition in social theory, and offered a posthuman ontology to dissolve this dualism. (Post)humans and their culture are ontologically part of "environment," to be valued accordingly without privilege or abjection. A posthuman perspective requires neither that we ascribe prior status to current or future (post)human needs, nor that we ignore the specific and unusual capacities that (post)humans—as part of the environment—supply. These features, we have argued elsewhere include the capacity to attribute meaning to events; to act altruistically; to imagine and create technologies; and to use reason to theorize, predict, or anticipate future events (Fox & Alldred, 2019, see also Murdoch, 2001, p. 127; Schmidt, 2013, pp. 189–190). Many of these abilities underpin a capacity to formulate and implement policy.

This ontology, we would suggest, supplies the means to design a posthuman policy assemblage that can overcome the partial engagements that each of the four existing policy positions reflect. In place of these partialities, we may conceptualize a climate change assemblage comprising:

> *Earth; Sun; atmosphere; oceans; resources; animals; plants; (post)humans; industry; consumption; greenhouse gases; market; capitalist economic model; profit; growth; nations; governments; global North; global South; ideologies; wealth and health inequalities*

A posthuman policy assemblage must have the capacity both to capture the complexities of the affective movements in this event assemblage *and* to formulate actions that will address adequately and appropriately both climate

change and climate justice. Such a policy assemblage may draw upon the actions suggested by the assemblages reviewed earlier, but must also articulate these policy outputs within a broader posthuman framing.

While we would expect such a policy to emerge over a lengthy period of discussion and collaboration among governments, scientific and social science experts and stakeholders global and national, it is possible here to at least sketch in some of the overarching affective movements that such a policy assemblage would need to incorporate. We are fully aware of the complexities of social, cultural, economic, and political consequences of such a policy and will discuss this in the final section.

From the *liberal environmentalist* policy assemblage: recognition of the myriad challenges from climate change directly affecting non-human life-forms and habitats, and the part that individual (post)human behavior can play in exacerbating or mitigating climate change and environmental degradation. Policy can use "nudges," legislation and fiscal measures to encourage climate-friendly behavior by individuals, groups, businesses, and even entire nations. For example, differential pricing of fossil fuels and electricity and pollution charges on diesel emissions can encourage the use of electric vehicles. Tax breaks for energy efficient house building or installation of solar panels can reduce both household energy bills and national electricity generation requirements. Taxation and regulatory mechanisms to capture the true environmental costs of goods and services (Pearce et al., 1989, pp. 156–167) can encourage recycling and reuse of resources rather than further extraction of mineral and other environmental resources.

From the *United Nations* policy assemblage: acknowledgement that climate change affects rich and poor differentially, and that poverty is one of the root causes of climate-unfriendly behaviour such as rainforest clearance for agriculture and continued use of fossil fuels as an energy source in the global South. Actions to mitigate climate change internationally must build in ways to support the global South to develop in ways that do not require ever-increasing production of greenhouse gases, while support for education and training can shift individuals and communities out of poverty. Actions to assure (post)human social and economic security will include reductions in wealth inequalities, for instance via universal basic income schemes, which would largely replace welfare and means-tested benefits, funded by higher rates of taxation of personal income, corporation tax on profits and penalties for environmental pollution.

From the *green capitalism* assemblage: a recognition of the part that technology and (post)human ingenuity can play in mitigating climate change. Technologies that replace polluting production processes need to be supported and encouraged through tax breaks and sharing of intellectual property globally. International collaborations to develop renewable energy sources, low energy appliances and carbon capture technologies can make these innovations competitive against existing climate-polluting technologies. Expertise and technology to maximize recycling and reuse of material resources, and replace non-reusable materials such as plastic with recyclable alternatives needs to be shared globally. While entrepreneurialism can play a part in this approach, alternative non-market models—such as social enterprises and not-for-profit companies supported by science and engineering expertise in universities—can contribute to the rapid development of these mitigations.

Finally, from the *no-growth economics* assemblage: an understanding that a market economy—with its primary objective of profit and its secondary objective of growth—is the real driver behind climate change and environmental exploitation. This is the most challenging, but also the most necessary area of policy implementation, requiring an about-turn in economic policy in most jurisdictions, to manage down growth and competition. It will entail intervention in markets through legislation, regulation, and taxation, for example to eliminate wasteful production processes and to encourage future-proofing and longevity of products. Key infrastructure such as transport and utilities should be removed from competition in the private sector and managed with the objective of mitigating climate change (for example, by providing free and reliable public transport). Global free trade, which tends to benefit rich nations—and the privileged within these rich nations (Daly & Cobb, 1994, p. 230), while also contributing to emissions as goods are shipped globally, may be replaced by initiatives to develop and support local and regional markets.

These affective movements provide the foundation for a policy of incremental actions—some very local, others national or global in scale—that address the breadth of natural, biological, social, economic, and political affects within the climate change assemblage. They are *not* a "pick and mix" collection of optional policy initiatives, but a mutually interdependent skein of actions that together can articulate successfully with the complexity of climate change. Furthermore, this is a long-term and global program that depends for its success on political will, incisive leadership and collaboration across stakeholder groups.

6 | DISCUSSION

The aim of this paper has been to develop and then apply an innovative materialist methodology for policy analysis, specifically in relation to climate change. We located our analysis of disparate policy perspectives within a new materialist perspective on environment, grounded in feminist and posthuman eco-philosophy, in which (post)humans are fully part of the environment (Bradiotti, 2019; Fox & Alldred, 2017, p. 47). This posthuman standpoint on environment and climate change, we have suggested, supplies the means to avoid human exceptionalism (Dunlap & Catton, 1994, p. 24)—a position in which the "environment" is treated merely as a resource to sustain human existence. Instead it acknowledges the diverse capacities of matter (non-human and (post)human) to affect and be affected, but that these capacities are not fixed attributes but relational and emergent. Finally, it recognizes that when (post)human and non-human matter assembles to produce climatic changes, these changes act differentially on (post)humans, contingent upon geography and social stratifications of wealth, race, and gender (Fox & Alldred, 2019; Klinsky et al., 2017). Any policy to address climate change must therefore incorporate concern with social justice.

We have also sought to develop and demonstrate how the concept of the "policy assemblage" can provide the foundation for a methodology to explore the material interactions that occur between an event such as climate change and a policy that seeks to address it. This interaction occurs both during policy development (where a policy must have a capacity to discern the material affects within the event), and during implementation (when the affects in the policy must be capable of effectively influencing the event in the desired direction. A materialist approach to policy, we would argue, supplies an innovative approach to policy analysis whose utility extends beyond the specific area of climate change, to social, political, or natural world problems. It supplies an alternative to analysis of the social construction of policy, based on analysis of the material interactions between event and policy.

Having used this materialist approach to policy to analyze four contemporary policy perspectives, we found all wanting in terms of their material articulation with the complexities of the climate change assemblage. We then reversed the approach, beginning with a "posthuman" understanding of anthropogenic climate change as an assemblage of both (post)human and non-human elements; then assembling a policy that has the capacity to engage this event comprehensively. In the previous section, we outlined a range of measures such a policy might incorporate. These extend across the breadth of policy interventions, from local initiatives by individuals or communities to reduce environmental impact, through to national and global actions to innovate technologically and to moderate the emphasis upon economic growth and development. While its overall content may not diverge greatly from that found in the manifesto of a green political party, the difference is that this programme is derived sociologically from detailed analysis of the micropolitics of climate change, rather than from a political ideology. What is revealed is the extent of the challenge, which necessarily cuts across natural science, engineering, and social science domains.

For this reason, we have intentionally cast the main themes of the posthuman policy in ways that reference the differing policy perspective that we evaluated earlier. It is not an outright rejection of the UN perspective (and the immense body of scholarship that has underpinned it), nor of aspects of green capitalism or no-growth economics. But at the same time it is not a pick and mix policy that can be adopted piecemeal. This methodology for policy analysis recognizes the complexity of climate change. Our aim has been to demonstrate that to address the

climate change emergency, actions must encompass the entirety of the phenomenon, not picking off the easy bits like buying energy-efficient household appliances or developing renewable energy technologies, while leaving the hard parts (economic growth, climate injustice) to one side. We see a continued and pivotal role for established bodies such as the United Nations and IPCC in implementing this posthuman policy, but also the necessary input of individuals, communities, businesses, and local and national governments.[4]

Our propositions here are no more than the opening move in what will be a long yet urgent programme: locally, regionally, and globally. It is one in which sociology must play its part, both to scrutinize the material effects of different policies, to develop effective programmes of action based on this material assessment, and to work with policy-makers, with scholars from across the range of science, social science, and humanities disciplines and with civil society organizations to deliver this program. On that basis, we commend the posthuman and materialist sociological analysis that we have established here—as a foundation for countering climate change adequately and effectively.

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NOTES

[1]By this we do not mean that we ignore "macro" forces associated with climate change such as economies, governments, and climate itself, but that we explore how these forces operate at the level of events such as droughts and storms, famine and climate-related migration, or policy interventions and climate protests. Micropolitical analysis maps the human and non-human material forces and the affect economies within such events.

[2]This climate change assemblage draws together elements often considered in social theory as operating at different scales—for instance, "humans" (micro), "industry" (meso), and global economy (macro). This disparity is not problematic within assemblage theory, however, as the affects assembling elements operate within "events," which may be very local (a factory worker consuming energy generated from fossil fuel) or global (greenhouse gases affecting the Earth's atmosphere). Such disparate events form the broader affect economy of the climate change assemblage.

[3]The intimate relationship between EA and PA suggests that in practice event and policy become elements within a larger "hybrid" event/policy assemblage (Fox and Alldred, 2017, p. 187). Figure 1 is thus a simplification, but one that illustrates simply how event and policy are mutually affective.

[4]For example, reuse, refund, and return approaches to packaging; scrappage schemes to replace cars and vans with electric vehicles; strategies by local councils to become carbon-neutral and ensure new builds are energy efficient; community green energy schemes (Clarke and Ordonez-Ponce, 2017; Lee and Painter, 2015).

REFERENCES

Asdal, K. (2014). From climate issue to oil issue: Offices of public administration, versions of economics, and the ordinary technologies of politics. *Environment and Planning A*, *46*(9), 2110–2124.

Baer, H. (2012). *Global capitalism and climate change*. Lanham, MD: AltaMira Press.

Barad, K. (2001). (Re)configuring space, time and matter. In M. Dekoven (Ed.), *Feminist locations* (pp. 75–109). New Brunswick, NJ: Rutgers University Press.

Bazzul, J., & Tolbert, S. E. (2017). Reassembling the natural and social commons. In A. J. Means, D. R. Ford, & G. B. Slater (Eds.), *Educational commons in theory and practice: Global pedagogy and politics* (pp. 55–73). London, UK: Palgrave Macmillan.

Bennett, J. (2005). The agency of assemblages and the North American blackout. *Public Culture*, *17*(3), 445–465.

Bennett, J. (2010). *Vibrant matter*. London: Duke University Press.

Benton, T. (1991). Biology and social science: Why the return of the repressed should be given a (cautious) welcome. *Sociology*, *25*(1), 1–29.

Bernstein, S. (2001). *The compromise of liberal environmentalism*. New York NY: Columbia University Press.

Bosquet, M. (1977). *Capitalism in crisis and everyday life*. Hassocks, UK: Harvester Press.

Braidotti, R. (2011). *Nomadic theory*. New York, NY: Columbia University Press.

Braidotti, R. (2013). *The posthuman*. Cambridge, UK: Polity Press.

Braidotti, R. (2019). *Posthuman knowledge*. Cambridge, UK: Polity Press.

Brand, U. (2012). Green economy—The next oxymoron? No lessons learned from failures of implementing sustainable development. *Gaia*, *21*(1), 28–32.

Brundtland, G., Khalid, M., Agnelli, S. et al. (1987). *Our common future (the Brundtland report)*. London, UK: Oxford University Press.

Buchanan, I. (2017). Assemblage theory, or, the future of an illusion. *Deleuze Studies*, *11*(3), 457–474.

Bulkeley, H. (2000). Discourse coalitions and the Australian climate change policy network. *Environment and Planning C: Government and Policy*, *18*(6), 727–748.

Clark, B., & York, R. (2005). Carbon metabolism: Global capitalism, climate change, and the biospheric rift. *Theory and Society*, *34*(4), 391–428.

Clarke, A., & Ordonez-Ponce, E. (2017). *City scale: Cross-sector partnerships for implementing local climate mitigation plans*. Public Administration Review Symposium (Climate Change and Public Administration). Retrieved from https://www.researchgate.net/profile/Eduardo_Ordonez-Ponce/publication/322087164

Clough, P. T. (2004). Future matters: Technoscience, global politics, and cultural criticism. *Social Text*, *22*(3), 1–23.

Coole, D. H., & Frost, S. (2010). Introducing the new materialisms. In D. H. Coole & S. Frost (Eds.), *New materialisms: Ontology, agency, and politics* (pp. 1–43). London, UK: Duke University Press.

Daly, H. E., & Cobb, J. B. (1994). *For the common good* (2nd ed.). Boston, MA: Beacon Press.

Dauvergne, P. (2018). The power of environmental norms: Marine plastic pollution and the politics of microbeads. *Environmental Politics*, *27*(4), 579–597.

DeLanda, M. (2006). *A new philosophy of society*. London, UK: Continuum.

Deleuze, G. (1988). *Spinoza: Practical philosophy*. San Francisco, CA: City Lights.

Dror, Y. (2017). *Public policymaking reexamined*. Abingdon, UK: Routledge.

Dunlap, R. E., & Catton, W. R. (1994). Struggling with human exemptionalism: The rise, decline and revitalization of environmental sociology. *The American Sociologist*, *25*(1), 5–30.

Foster, J. B., & Clark, B. (2009). Ecological imperialism: The curse of capitalism. *Socialist Register*, *40*, 186–201.

Fournier, V. (2008). Escaping from the economy: The politics of degrowth. *International Journal of Sociology and Social Policy*, *28*(11/12), 528–545.

Fox, N. J. (1991). Green sociology. *Network*, *50*(23), 4.

Fox, N. J., & Alldred, P. (2016). Sociology, environment and health: A materialist approach. *Public Health*, *141*, 287–293.

Fox, N. J., & Alldred, P. (2017). *Sociology and the new materialism*. London, UK: Sage.

Fox, N. J., & Alldred, P. (2019). Sustainability, feminist posthumanism and the unusual capacities of (post)humans. *Environmental Sociology*. https://doi.org/10.1080/23251042.2019.1704480

Giddens, A. (1982). *Sociology: A brief but critical introduction*. London, UK: Macmillan.

Guattari, F. (2000). *The three ecologies*. London: Athlone.

Hajer, M., & Versteeg, W. (2005). A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. *Journal of Environmental Policy & Planning*, *7*(3), 175–184.

Hampton, S., & Adams, R. (2018). Behavioural economics vs social practice theory: Perspectives from inside the United Kingdom government. *Energy Research & Social Science*, *46*, 214–224.

Haraway, D. (1992). Otherworldly conversations; terran topics; local terms. *Science as Culture*, *3*(1), 64–98.

Heinrichs, H. (2013). Sharing economy: A potential new pathway to sustainability. *Gaia*, *22*(4), 228–231.

IPCC. (2013). *Climate change 2013: The physical science basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

IPCC. (2014). *Climate change 2014: Mitigation of climate change*. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press.

Jarosz, L. (2009). Energy, climate change, meat, and markets: Mapping the coordinates of the current world food crisis. *Geography Compass*, *3*(6), 2065–2083.

Jasanoff, S. (2010). A new climate for society. *Theory, Culture & Society*, *27*(2–3), 233–253.

Klinsky, S., Roberts, T., Huq, S., Okereke, C., Newell, P., Dauvergne, P., … Keck, M. (2017). Why equity is fundamental in climate change policy research. *Global Environmental Change*, *44*, 170–173.

Lawrence, D., & Vandecar, K. (2015). Effects of tropical deforestation on climate and agriculture. *Nature Climate Change*, *5*(1), 27–36.

Lee, T., & Painter, M. (2015). Comprehensive local climate policy: The role of urban governance. *Urban Climate*, *14*, 566–577.

Lemke, T. (2015). New materialisms: Foucault and the "government of things". *Theory, Culture & Society*, *32*(4), 3–25.

Lidskog, R., Mol, A. P., & Oosterveer, P. (2015). Towards a global environmental sociology? Legacies, trends and future directions. *Current Sociology*, *63*(3), 339–368.

Lidskog, R., & Waterton, C. (2016). Anthropocene-a cautious welcome from environmental sociology?. *Environmental Sociology*, *2*(4), 395–406.

Lovins, L. H., & Cohen, B. (2011). *Climate capitalism: Capitalism in the age of climate change*. New York, NY: Hill and Wang.

McCann, E. (2011). Veritable inventions: Cities, policies and assemblage. *Area*, *43*(2), 143–147.

McCann, E., & Ward, K. (2012). Assembling urbanism: Following policies and "studying through" the sites and situations of policy making. *Environment and Planning A*, *44*(1), 42–51.

McMichael, A. J., Powles, J. W., Butler, C. D., & Uauy, R. (2007). Food, livestock production, energy, climate change, and health. *The Lancet*, *370*(9594), 1253–1263.

Meadows, D. H., Meadows, D. I., Randers, J., & Behrens, W. W. (1972). *The limits to growth*. Washington, DC: Potomac Associates.

Murdoch, J. (2001). Ecologising sociology: Actor-Network Theory, co-construction and the problem of human exemptionalism. *Sociology*, *35*(1), 111–133.

Owens, S., & Rayner, T. (1999). When knowledge matters: The role and influence of the Royal Commission on Environmental Pollution. *Journal of Environmental Policy & Planning*, *1*(1), 7–24.

Patton, P. (2000). *Deleuze and the political*. London, UK: Routledge.

Pearce, D., Markandya, A., & Barbier, E. B. (1989). *Blueprint for a green economy*. London: Earthscan.

Prince, R. (2010). Policy transfer as policy assemblage: Making policy for the creative industries in New Zealand. *Environment and Planning A*, *42*(1), 169–186.

Prudham, S. (2009). Pimping climate change: Richard Branson, global warming, and the performance of green capitalism. *Environment and Planning A*, *41*(7), 1594–1613.

Randers, J. (2012). The real message of the limits to growth. A plea for forward-looking global policy. *Gaia*, *21*(2), 102–105.

Rees, W. E. (2003). Economic development and environmental protection: An ecological economics perspective. *Environmental Monitoring and Assessment*, *86*(1), 29–45.

Rutland, T., & Aylett, A. (2008). The work of policy: Actor networks, governmentality, and local action on climate change in Portland, Oregon. *Environment and Planning D: Society and Space*, *26*(4), 627–646.

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: Climate change and the discourse of environmental justice. *Wiley Interdisciplinary Reviews: Climate Change*, *5*(3), 359–374.

Schmidt, J. (2013). The empirical falsity of the human subject: New materialism, climate change and the shared critique of artifice. *Resilience*, *1*(3), 174–192.

Sharp, L. (1999). Local policy for the global environment: In search of a new perspective. *Environmental Politics*, *8*(4), 137–159.

Sharp, L., & Richardson, T. (2001). Reflections on Foucauldian discourse analysis in planning and environmental policy research. *Journal of Environmental Policy & Planning*, *3*(3), 193–209.

Shore, C., & Wright, S. (1997). Policy: A new field of anthropology. In C. Shore, & S. Wright (Eds.), *Anthropology of policy* (pp. 3–36). London: Routledge.

Shove, E. (2010). Social theory and climate change. *Theory, Culture & Society*, *27*(2–3), 277–288.

Stern, N. (2007). *The economics of climate change: The Stern report*. Cambridge, UK: Cambridge University Press.

Stevens, P. (2012). Towards an ecosociology. *Sociology*, *46*(4), 579–595.

Talshir, G. (2012). The role of environmentalism. In Y. Levy & M. Wissenburg (Eds.), *Liberal democracy and environmentalism: The end of environmentalism?* (pp. 22–43). London, UK: Routledge.

Taylor Webb, P., & Gulson, K. N. (2012). Policy prolepsis in education: Encounters, becomings, and phantasms. *Discourse: Studies in the Cultural Politics of Education*, *33*(1), 87–99.

Thrift, N. (2008). *Non-representational theory: Space, politics, affect*. London, UK: Routledge.

Ureta, S. (2014). Policy assemblages: Proposing an alternative conceptual framework to study public action. *Policy Studies*, *35*(3), 303–318.

Urry, J. (2009). Sociology and climate change. *Sociological Review*, *57*(s2), 84–100.

van der Tuin, I., & Dolphijn, R. (2010). The transversality of new materialism. *Women: A Cultural Review*, *21*(2), 153–171.

Walker, G. (2005). Sociological theory and the natural environment. *History of the Human Sciences*, *18*(1), 77–106.

Wallis, V. (2010). Beyond "green capitalism". *Monthly Review, 61*(9), 32.

Whitehead, M. (2014). Sustainability. In C. Death (Ed.), *Critical environmental politics* (pp. 257–266). London, UK: Routledge.

Widder, N. (2012). *Political theory after Deleuze*. London, UK: Continuum.

Yearley, S. (2014). *The green case: A sociology of environmental issues, arguments and politics*. London, UK: Routledge.

Zysman, J., & Huberty, M. (2014). *Can green sustain growth? From the religion to the reality of sustainable prosperity*. Stanford, CA: Stanford University Press.