Capitalism and Earth System Governance: An Ecological Marxist Approach

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Abstract

Growing recognition of the Anthropocene era has led to a chorus of calls for Earth System Governance (ESG). Advocates argue that humanity's newfound sociotechnical powers require institutional transformations at all scales of governance to wield these powers with wisdom and foresight. Critics, on the other hand, fear that these initiatives embody a technocratic impulse that aims to subject the planet to expert management without addressing the political-economic roots of the earth system crisis. This article proposes a more affirmative engagement with existing approaches to ESG while also building on these critiques. While advocates of ESG typically ignore the capitalistic roots of the earth system crisis and propose tepid reforms that risk authoritarian expressions, their critics also have yet to systematically consider the potential for more democratic and postcapitalist forms of ESG. In response, I propose an ecological Marxist approach based on a structural analysis of capitalism as the primary driver of the earth system crisis and an "ecosocialist" vision of ESG that subordinates the market to democratic planning at multiple scales. I argue that an ecological Marxist perspective is needed to foreground the structural political-economic constraints on earth system stability, though existing approaches to ESG can in turn inform ecosocialist strategies for global institutional design and democratization.

Planetary governance is on the theoretical (if not yet policy) agenda, catalyzed by growing recognition of the emerging ontological condition of the "Anthropocene," in which human practices have become a force of planetary-scale transformation (Crutzen and Steffen 2003). Advocates argue that humanity's newfound sociotechnical powers require institutional transformations at all scales of governance to wield these powers of planetary transformation with wisdom and foresight (Biermann 2014; Galaz 2014; Rockström et al. 2009; Steffen et al. 2011; Crutzen et al. 2005). The concept of "planetary boundaries" has become particularly influential, along with the entwined project of Earth System

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Governance (ESG). These approaches posit the existence of an emergent earth system that is more than the sum of its parts: a self-regulating entity that possesses global-scale thresholds at which continuous quantitative changes may give way to a qualitative state shift that irreversibly transforms all its key subsystems across the planet. The purpose of ESG, from this view, is to regulate the global social-ecological systems driving planetary transformation in order to maintain the earth system within the planetary boundaries deemed hospitable for human development, while anticipating and warding off a state shift that may irreversibly degrade such conditions (Biermann 2014, 21–22).

While some critical scholars within the social sciences are sympathetic to emerging ESG initiatives (e.g., Angus 2016; Foster et al. 2011), most have approached them with suspicion. In particular, these scholars fear that these initiatives embody a technocratic impulse that aims to subject the planet to expert management without addressing the political-economic roots of the earth system crisis, thereby forging a depoliticized response that entrenches existing inequalities and risks legitimating authoritarian interventions (Lövbrand et al. 2015; Swyngedouw 2013; Baskin 2014; Mann and Wainwright 2018; Stirling 2014). In response, these critics tend to reject ESG initiatives as harbingers of a perpetual "neoliberal" and potentially authoritarian agenda, instead affirming the need for critical reflection and resistance from below.

This article will propose a more affirmative engagement with existing approaches to ESG while also building on these critiques. The critics are for the most part correct that these approaches lack a sophisticated analysis of political-economic power and focus on technocratic interventions from above that risk legitimizing authoritarian planetary governance. In particular, the vast majority of these approaches neglect the structure of global capitalism as the primary driver of (and constraint on resolving) the earth system crisis, which I will argue results in a contradiction between their stated aims of preventing transgression of planetary boundaries and the proposed means for doing so. However, their critics have yet to systematically consider the potential for more egalitarian and democratic forms of ESG capable of actualizing postcapitalist development trajectories.

In response, I will formulate an ecological Marxist approach that conceives ESG not as a technocratic intervention from above that retains existing relations of power and production but rather as a counterhegemonic movement of political-economic transition beyond capitalism. This approach will involve a structural analysis of global capitalism as the primary driver of the earth system crisis and an "ecosocialist" vision of ESG that subordinates the global market to democratic planning at multiple scales. I will suggest that while ecological Marxists provide vital political-economic analysis that is lacking in existing approaches to ESG, they are in turn limited by an underdeveloped vision of ecosocialism that remains primarily on the level of principles while being vague on questions of institutional design (particularly at the global scale). Therefore, by staging an engagement between ecological Marxism and ESG, we can deepen our

understanding of both the political-economic transformations needed to prevent transgression of planetary boundaries and the global institutional architectures this might entail.

I will begin with a brief overview of the planetary boundaries framework and its corresponding ESG initiatives and will then give an overview of their critics. Next, I will present the ecological Marxist case for why capitalism is fundamentally incompatible with earth system stability and why an "ecosocialist" approach to ESG is needed instead. Next, I will pursue a synthesis between ecological Marxism and ESG to address blind spots in both, which will suggest that global institutional reforms envisioned by ESG scholars can and should be rethought according to ecosocialist principles. Finally, I will conclude with some tentative speculations on how a transition to global ecosocialism might come about, which will show that this goal is not as utopian as it might appear at first glance.

The Incipient Earth System Governance Agenda

Environmental governance has been a staple of world politics for decades, but what differentiates ESG initiatives from earlier forms is their more holistic rather than sectoral approach (Biermann 2014, 16; Galaz 2014, 11). This new approach was made possible by the paradigm shift heralded by the rise of earth system science, which can be understood, in Clive Hamilton's words, as "the integrative meta-science of the whole planet as a unified, complex, evolving system beyond the sum of its parts" (Hamilton 2016, 94). In this sense, earth system science follows in the footsteps of Gaia theory by understanding the planet as a complex system with self-regulating properties that maintain its key parameters within conditions conducive to biological flourishing, though it has been shown in geological time to periodically shift between radically altered states (Hamilton 2016). The "Anthropocene" marks the beginning of such a state shift, which threatens to unleash a cascade of positive feedbacks that will push the earth system toward a "no analogue state" or one with no parallel in the history of human evolution (Crutzen and Steffen 2003).

Hence the emerging calls for new forms of Anthropocene governance, or "planetary stewardship," which can be read as attempts to actualize the collective capacities to regulate humanity's world-transforming powers to maintain the earth system within conditions that have historically been conducive to human development. In the words of Will Steffen and colleagues,

> The twenty-first century challenge is different from any other that humanity has faced. The planetary nature of the challenge is unique, and demands a global-scale solution that transcends national boundaries and cultural divides. (Steffen et al. 2011, 749)

One of the most productive approaches developed so far for grappling with the implications of earth system change is the planetary boundaries framework,

which has been endorsed by the UN High-Level Panel on Global Sustainability and embraced by NGOs like Oxfam and the World Wildlife Fund. As Johan Rockström and colleagues explain, planetary boundaries represent judgments on the value of key control parameters in the earth system deemed to be a "safe" distance from dangerous levels. Whereas *thresholds* refer to inflection or tipping points at which feedback mechanisms produce nonlinear transformations away from a previous state, *boundaries*, on the other hand, are more like "guard rails" set a distance from these estimated thresholds, which are judged based on an "ethical time horizon" such that political decisions could be taken in time to avoid the threshold after a boundary is crossed (Rockström et al. 2009). Rockström and colleagues identify nine boundaries that encompass key control variables in the earth's biogeochemical cycles, circulation systems, and biophysical features that contribute to the earth's overall self-regulating capacity. These include climate change, the rate of biodiversity loss, interference with the nitrogen and phosphorous cycles, stratospheric ozone depletion, ocean acidification, global freshwater use, changes in land use, chemical pollution, and atmospheric aerosol loading (Rockström et al. 2009). For each boundary, Rockström and colleagues quantitatively estimate values at which gradual changes may begin to accelerate through feedbacks based on historical data on similar nonlinear changes in the past.

The planetary boundaries framework has in turn been used as one of the primary conceptual underpinnings of the ESG project. In the words of Frank Biermann, the ESG project studies

> the sum of the formal and informal rule systems and actor networks at all levels of human society that are set up to steer societies toward preventing, mitigating, and adapting to environmental change and earth system transformation. (Biermann 2014, 9)

This encompasses both empirical and normative ambitions, in the sense that it investigates the emerging "architecture" of global environmental governance—"the overarching system of inter-governmental and non-state institutions operating in a governance domain" (Biermann 2014, 12–13)—while also prescribing institutional reforms deemed necessary to stabilize the earth system. Biermann calls his project a "realistic utopianism," in the sense that it envisions radical yet plausible global institutional transformations that would be needed to ward off a planetary state shift. He echoes long-standing concerns that global environmental governance overall remains weak and fragmented (Bernstein and Brunée 2011; Kanie et al. 2012), with lack of harmonization among multilateral environmental treaties as well as between the economic, environmental, and social pillars of "sustainable development" (Biermann 2014, 93–94). To address these weaknesses, Biermann and colleagues propose upgrading the UN Environmental Program into a World Environment Organization (WEO) with the capacity to harmonize existing agreements and draft legally binding treaties, creating a high-level UN Sustainable Development Council

(SDC) that would strengthen coordination between environmental and economic institutions and policies, and "mainstreaming" environmental goals into global trade and financial regimes (Biermann et al. 2012a, 2012b; Biermann 2014, 141; for similar proposals, see Rockström and Klum 2015, 142, 149).

Critiques of Planetary Boundaries and Earth System Governance Initiatives

The response to the planetary boundaries and ESG frameworks from critical social scientists has so far been predominantly marked by suspicion.[1] While the critiques are too numerous to provide an exhaustive survey, they could be roughly summarized as critiquing what are perceived to be "postpolitical" tendencies that (1) ignore the political-economic structures and relations of power fueling the contemporary earth system crisis, and thereby frame the problem as one of expert management rather than political-economic transformation, and (2) advocate potentially authoritarian governmental and geoengineering solutions based on the specter of "planetary emergency."

To start, the most common critique of ESG initiatives is that they lack an analysis of power, inequality, and political economy and thus fail to identify the sociopolitical roots of the earth system crisis or imagine alternative forms of political-economic organization. As Eva Lövbrand and colleagues argue, this impoverished social imaginary "runs the risk of producing a post-political narrative that invites techno-managerial planning and expert administration at the expense of democratic debate and contestation" (Lövbrand et al. 2015, 217). It produces what they call a "postpolitical ontology" in which, somewhat paradoxically, the need for fundamental change to counter an apocalyptic threat is recognized, though it can only be countered via the very same institutions that have created the problem in the first place (Lövbrand et al. 2015, 212). Eric Swyngedouw similarly contends that these approaches reduce the politics of environmental change to scientific consensus and consensual policy making, which marginalizes conflicting perspectives and visions for alternative political-economic worlds. It is thus recognized that "we have to change radically, but within the contours of the existing state of the situation … so that nothing really has to change" (Swyngedouw 2013, 4). In this way, deeper analyses of the

1. It is worth noting here that the ESG research agenda is internally diverse and stems from multiple disciplinary backgrounds. Critics typically focus on ESG and initiatives coming from natural scientists because these initiatives tend to ignore or simplify questions of political-economic power and inequality, while approaches like those of Biermann and Galaz have come under comparatively less scrutiny. Though they have different academic origins and don't all share the same set of policy prescriptions, I believe it is useful to include them all under the ESG umbrella, because they are all engaged in a common project of envisioning new global institutions to regulate human–nature relations on a planetary scale. Furthermore, they are united by a common earth system framework (including the terminology of planetary boundaries and thresholds), often share strikingly similar proposals for global institutional reform (Biermann 2014, 141; Rockström and Klum 2015, 142, 149), and are similarly quiescent on the political-economic roots of the earth system crisis.

problem are marginalized, and the underlying political-economic architecture of planetary crisis is repackaged as the "solution."

Second, critics of ESG initiatives fear not only that they feed into a paradoxical defense of the neoliberal status quo but also that they may promote more authoritarian interventions that use the specter of "planetary emergency" to cement new forms of hierarchical rule. Melissa Leach, for example, argues that the planetary boundaries framework "leads all too easily to new forms of environmental authoritarianism," since it aligns with "top-down approaches" that ignore political questions of justice, resource access, and the need for deeper transformations (Leach 2014). Jeremy Baskin similarly argues that calls for Anthropocene governance legitimate the "the need for exceptional rule and authoritarian responses," which emphasize the role of expert-based management reliant on technological innovation and geoengineering (Baskin 2014, 13). Geoff Mann and Joel Wainwright contend that these initiatives are pushing toward the creation of what they call "Climate Leviathan," or a planetary sovereign with the capacity to "seize command, declare an emergency, and bring order to the Earth, all in the name of saving life" (Mann and Wainwright 2018, 31). For them this would entail a world government with binding technical authority on scientific issues, a panopticon-like capacity to monitor and intervene within the planet's biogeochemical flows, and the rights to engage in geoengineering experiments and more generally to decide which populations and ways of life must live and which must be sacrificed for the good of biospheric life (Mann and Wainwright 2018, 30, 150). Thus, while many critics focus on the ostensibly "neoliberal" character of incipient ESG initiatives, others fear that they will actualize even greater authoritarian potential as the unfolding earth system crisis intensifies calls for emergency governance.

Toward an Alternative ESG Agenda

The critiques enumerated above undoubtedly illuminate problematic tendencies within the emerging literature on planetary boundaries and ESG, though they also tend to be based on strawman portraits of these approaches. For one, many ESG advocates are clearly aware of the need for far-reaching institutional transformations rather than incremental market-based reforms (e.g., Steffen et al. 2011, 13; Rockström and Klum 2015, 153). Second, many (if not most) of them are also highly critical of both the plausibility and desirability of technological and geoengineering solutions, instead advocating rapid decarbonization schemes and a just distribution of planetary resources (e.g., Steffen and Smith 2013; Biermann 2014, 28). Third, while there are certainly technocratic tendencies among many (if not most) ESG proponents, many also emphasize the need for new forms of democratic accountability, as well as a pluralistic approach to knowledge that doesn't fetishize scientific expertise, to ward off the authoritarian dangers discussed by their critics (e.g., Crutzen et al. 2005; Biermann 2014, 134).

However, as the critics show, it remains true that these approaches lack an adequate political-economic analysis of the roots of the contemporary earth system crisis or a vision of ESG that clearly breaks from these roots. For example, Johan Rockström and Mathias Klum emphasize the need for going "beyond GDP" to define new criteria for growth and progress (Rockström and Klum 2015, 142), yet they stop short of confronting the relations of political-economic power that reinforce the imperative of GDP growth. More problematically, they refuse to think beyond the "growth imperative" itself, instead believing that growth can instead be "decoupled" from environmental impact through exponential technologies, resource efficiency, and circular economic models (Rockström and Klum 2015, 133). Thus the solutions they offer remain handicapped by their reticence to challenge the core relations of power and structural imperatives of the global capitalist economy, instead putting faith in decoupling (a dangerous bet, as I'll discuss below) and ignoring the massive redistributions of wealth and ownership needed to institute an "equitable sharing of remaining biophysical space" (Rockström and Klum 2015, 142).

Relatedly, Biermann and colleagues call for useful global governance reforms that constitute steps in the right direction, though they don't address the political-economic roots of the present crisis by advocating a deep transformation of the organizing principles of the global economy, let alone a shift beyond capitalist social relations. They recognize that "global sustainability cannot be achieved without fundamental reforms in the global economic system," though they are ambiguous on what this means beyond "mainstreaming" environmental goals into the activities of global economic institutions and developing "multilaterally harmonized systems that allow for discriminating between products on the basis of production processes" (Biermann et al. 2012b, 53). Such moves *might* constitute genuine steps toward sustainability, yet they ignore the degree to which global institutions like the International Monetary Fund (IMF), World Bank, and World Trade Organization (WTO) would need to be radically transformed if such policies were to provide any significant check on (let alone reversal of) market-driven development priorities. Biermann's own work goes further in proposing the creation of a WEO with the capacity to draft treaties and counterbalance the WTO's investor dispute settlement mechanism, and his call for "global citizen assemblies" adds a much-needed mechanism for democratizing ESG (Biermann 2014, 99–100, 141). However, without more far-reaching transformations of the relations of power that drive the dynamics of global capitalism, Biermann's proposed WEO may be more likely to give birth to the sort of Climate Leviathan feared by Mann and Wainwright—one that does little to address existing inequalities and only mildly counterbalances the untrammeled rule of global capital (Mann and Wainwright 2018), whereas global citizen assemblies would likely be ineffectual unless accompanied by deeper restraints on capitalist power.

In short, despite increasing recognition of the need for deep structural reforms of the global economy, scholars of ESG remain reluctant to extend their

gaze beyond capitalist horizons, even as those horizons appear increasingly inadequate. The critics of ESG therefore make vital interventions to politicize and deepen these debates. However, they have to this point remained critical rather than constructive and have also yet to systematically consider the potential for more egalitarian and postcapitalist approaches to ESG.[2] The reluctance to propose alternative visions of ESG is likely due to the perception that the earth system perspective is *inherently* depoliticizing and technocratic, since it ostensibly subsumes all local specificity and multiplicity within a totalizing vantage point from which the earth and human societies can be controlled (e.g., Stirling 2014; Baskin 2014). However, this view simultaneously downplays the need for global-scale institutional regulation to rapidly transform global production systems (not to mention constrain the power of global capital) and exaggerates the technocratic impetus of the earth system perspective, which (at least in certain expressions) is less concerned with centralized control than with attunement to emergent global patterns and thresholds, multiscalar interactions, and the limits of human knowledge (Crutzen et al. 2005). In short, the earth system sciences alert us to the need to think holistically about our planetary life-support systems and to develop modes of political-economic analysis, struggle, and governance that are adequate to the scale of the problems we face, though this should not obviate the need for analysis, struggle, and creative autonomy at multiple scales (e.g., according to the principle of "subsidiarity"). In this sense, rather than downplaying the need for new forms of global governance or merely advocating local and pluralistic forms of resistance (e.g., Stirling 2014; Mann and Wainwright 2018), we can show that the insights of earth system science demonstrate the need for a postcapitalist project of ESG based on a structural analysis of global capitalism and a vision of political-economic and global institutional transformation that would break from these constraints. To develop the foundations of this approach, I turn now to ecological Marxism.

Ecological Marxism, the Structural Unsustainability of Capitalism, and the Imperative of Ecosocialism

The field of ecological Marxism has grown over the past three decades as scholars in the historical materialist tradition have rediscovered the ecological dimensions of Marx's thought, which were occluded by the "productivist" leanings of Marxist-Leninism in the early twentieth century (Foster 2000). While the field is itself diverse, with sometimes fractious debates between those favoring a "methodologically dualist" approach to nature-society relations (Foster et al. 2011; Malm 2018) and those promoting a more "hybridist" approach (Moore

2. This has also been the case in the field of global environmental politics, where even more critically minded GEP scholars stop short of systematically addressing the potential for postcapitalist forms of global environmental governance, despite recognizing the (possibly fatal) constraints imposed by global capitalism (e.g., Paterson 2000; Newell and Paterson 2010; Dauvergne 2018; Stevenson and Dryzek 2014).

2015; Smith 2008), they are united by a shared critique of the structural unsustainability of capitalist socioecological relations and emphasis on the need for an "ecosocialist" transition to resolve the earth system crisis in a socially just manner.

Ecological Marxism builds on Marx's concept of the "metabolic rift," which refers to the "material estrangement of human beings within capitalist society from the natural conditions which formed the basis for their existence," thereby disrupting the biogeochemical cycles through which ecological systems are reproduced (Foster 2000, 163). While metabolic rifts are not specific to capitalism, capitalism is nonetheless unique due to the particular system of "value" that drives its historical dynamics of expansion, crisis, and renewal. Simply stated, capitalism is a mode of production organized by the imperative of accumulating and circulating exchange-value rather than use-value; rather than producing with an eye toward the satisfaction of immediate needs, capitalism as a system organizes production for the purpose of creating commodities to be sold on the market for a profit, while the profits are then reinvested in production in an ever-expanding circuit (Foster et al. 2011, 39). Under the hegemony of exchange-value relations, which creates an emergent structure often referred to as the "law of value," producers are forced to orient the scale and intensity of production in accordance with market signals rather than natural rhythms, thereby creating a "rift" between production and ecological reproduction (Foster 2000, 164). Rather than being a sign of an ecologically deficient market system that simply needs to price ecosystem services more effectively, for ecological Marxists, this rift between production and ecological reproduction is a central feature of how capitalism has actually worked historically and which has enabled its dynamism and profitability. In the words of Jason Moore, "the great secret and great accomplishment of capitalist civilization has been to *not* pay its bills. … To call for capitalism to pay its way is to call for the abolition of capitalism" (Moore 2015, 87, 145).

The capitalist law of value creates not only selection pressures to externalize costs but also a *structural* reliance on continuous compound growth. Under constant pressure from the discipline of market competition, firms are structurally incentivized to reinvest their profits in productivity-enhancing innovations, new products, and finding new markets, while those that subordinate profit maximization to alternative goals risk being driven out of the market (Smith 2016, 15). While many view growth as an "ideology" or "fetish" that could be done away with while keeping capitalist social relations intact (e.g., Daly 1996), most economists agree with Schumpeter's view that "stationary capitalism is a contradiction in terms" (quoted in Tanuro 2014, 74). After all, a condition of low or no growth is a condition of "crisis" within a capitalist system, which leads to a reinforcing cycle of slowing investment, rising unemployment, weakened demand, and political instability (Smith 2016, 47). For the same reasons, capitalism cannot exist without rampant consumerism, which is not simply a bug but rather a fundamental feature that has been critical to its continuous

reproduction since the ascent of advertising in the post–World War II world (Foster et al. 2011, 379–380). Humanity thus finds itself in a double bind under capitalism, as starkly articulated by Richard Smith: "insatiable growth and consumption are destroying the planet and will doom humanity in the long run—but without ceaselessly growing production and insatiably rising consumption, we would have economic collapse in the short run" (Smith 2016, 23).

To escape this predicament, mainstream environmentalists (including planetary scientists like Johan Rockström) argue that growth can be "decoupled" from ecological impact via efficiency improvements and "green" technologies (Rockström and Klum 2015, 133). However, multiple studies demonstrate that decoupling is an illusion (made clear by focusing on the global economy as a whole instead of individual nation-states) and that efficiency improvements often lead to an *increase* in environmental impact by lowering costs and raising demand (the "rebound effect") (Wiedmann et al. 2015; Kallis and Hickel 2019). Some may point out that decoupling economic growth at least from *CO_2 emissions* appears achievable, since the global economy has grown faster than CO_2 emissions in recent years (Figueres 2017). However, this ignores both rising methane emissions (driven largely by the conversion from coal to natural gas plants) (Howarth 2019) and the fact that the estimated reductions likely needed to prevent 1.5°C of warming (7% annually, reaching net zero by 2050) are well beyond what current models estimate would be feasible in a context of compound growth (Intergovernmental Panel on Climate Change 2018, 15; Kallis and Hickel 2019). Thus even mainstream economists like Anil Markandya acknowledge that reducing emissions 50 percent by 2050, thereby stabilizing atmospheric CO_2 concentrations around 550 parts per million (PPM), is likely the "lowest credible target" in a context of continuous economic growth (Markandya 2009, 1145). Even though Rockström and colleagues estimate that 450 PPM constitutes the *upper end* of a likely threshold of runaway climate change (Rockström et al. 2009), Markandya notes that "no one seriously believes this [450 ppm] is possible" (Markandya 2009, 1145). Similarly, David Victor claims that "even a realistic crash program to cut emissions will blow through 2 degrees; 1.5 degrees is ridiculous" (Victor 2015).

Given mounting evidence that positive feedbacks in the earth system—including arctic ice loss, Amazon and boreal forest dieback, and permafrost carbon and methane release—may be activated at 1.5°C and especially 2°C (Lenton et al. 2019), these economists appear to be accepting catastrophic climate change as the necessary cost of capitalist survival. And if we include other planetary boundaries that may have already been overshot—including biodiversity loss, land conversion, and nitrogen/phosphorous loading—the prospect of genuine solutions to the earth system crisis in a context of compound growth recedes ever further into implausibility, given that these boundaries are primarily stressed by global market pressures for agricultural intensification, commercial expansion into formerly intact ecosystems, megainfrastructural development, and resulting

fragmentation of habitats (Kallis 2018, 100). It should thus be clear that any program of ESG that does not involve a system-wide assault on and eventual negation of the capitalist law of value, one that goes far beyond "mainstreaming" environmental goals into global trade, investment, and finance regimes (Biermann et al. 2012a, 1307) (which themselves rely on and exist to perpetuate continuous compound growth), would be radically insufficient.

A genuine solution, then, to the earth system crisis cannot lie within a capitalist system, no matter what global institutions are grafted onto it, but requires a transition toward "ecosocialism." As Ian Angus explains, ecosocialism

> will be based on collective ownership of the means of production, and it will work actively to eliminate exploitation, profit, and accumulation as the driving forces of our economy.… [It] will imply the limitation of growth and the transformation of needs by a profound shift away from quantitative and toward qualitative economic criteria. (Angus 2016, 202–203)

Whereas earlier forms of socialism followed capitalism's industrial model of development (due in large part due to the imperatives of competition and survival within a global capitalist system) and were responsible for comparable environmental horrors, *eco*-socialists revive the ecological dimensions of historical materialism to rethink socialism as the "rational regulation of human–nature relations by the associated producers in line with their needs and those of future generations" (Foster et al. 2011, 59–69). In practice, this would subordinate global markets to democratic planning to reorient production systems and enterprises away from profit maximization toward sustainably meeting basic needs (Baer 2018, 132). For example, Angus envisions "a democratically created and legally binding global plan" that would govern the transition to renewables and phase out wasteful industries (e.g., arms production, advertising, factory farming, and wasteful consumer goods) (Angus 2016, 191). Richard Smith similarly calls for "a comprehensive global plan, a number of national or regional plans, and a multitude of local plans—and we need to coordinate them all" (Smith 2016, 147). Most ecosocialists agree that such a plan must coordinate a transition to a "steady-state economy" in which the consumption of energy and raw materials remains constant, though this would need to be preceded by "managed degrowth" in the Global North to secure development space for populations in the Global South—a process of "contraction and convergence" (Smith 2016, 114; Tanuro 2014, 72; Wallis 2018, 79–80; Kallis 2018, 154).

Synthesizing Earth System Governance and Ecological Marxism

While ecological Marxism provides much-needed analysis of the structural political-economic constraints on genuine planetary stewardship, I do not claim that they have all the answers. Rather, they have much to learn from contemporary scholars of ESG regarding the problems of global institutional design and democratization. Thus, by combining ESG and ecological Marxism, we can

develop a framework for ecosocialist ESG that would simultaneously be more capable of preventing transgression of planetary boundaries and constraining the authoritarian dangers perceived by ESG critics.

First, the ESG literature offers more concrete proposals that can help ecological Marxists think through the problems of institutional design in a global ecosocialist system. In particular, advocates of global planning like Richard Smith and Ian Angus have yet to consider how such plans could be democratically designed and implemented on a global scale, and ESG scholars can help Marxists on this front. For example, proposals for a WEO to harmonize UN environmental programs and agreements (Biermann 2014, 74–75) and a UN SDC to integrate economic and environmental agencies (Biermann 2014, 102–103; Bernstein and Brunée 2011; Kanie et al. 2012) should be considered by ecological Marxists and others envisioning ways to supplant neoliberalized global institutions. More ambitiously, we should consider how these organizations could enable a global forum for democratic deliberation on crucial questions of economic-environmental planning—for example, those regarding the use of risky technologies like nuclear power and biotechnology, the sharing and distribution of "remaining biophysical space" (Rockström and Klum 2015, 142), and the level of risk populations are willing to accept vis-à-vis different planetary boundaries.

Building on these proposals, we could envision a global architecture of nested planning authorities at multiple scales that make use of market mechanisms while subordinating them to democratically determined ends,[3] thereby institutionalizing the dominance of use-value considerations over exchange-value. At the highest scale would be a reformed and empowered UN in which economic and environmental organs are integrated under a UN SDC, which would form an umbrella organization with the aim of setting, monitoring the progress of, and coordinating sectoral policies and programs to meet the Sustainable Development Goals (SDGs) (modified to exclude the goal of GDP growth) (Biermann 2014, 103; Hickel 2018).[4] A WEO would be created to coordinate the multitude of environmental agreements on climate change, biodiversity, land use, and ocean governance, while the WTO, IMF, and World Bank would be transformed beyond recognition to design policies for trade, finance, and investment that are

3. The precise relationship between planning and markets in an ecosocialist system is complex, though many ecosocialists agree that markets have an important coordinating role to play so long as they are constrained by a dominant public sector, nationalization of large firms, and the abolition (or at least radical transformation) of labor markets (Baer 2018, 132–136).
4. This vision of a UN Sustainable Development Council is more ambitious than the proposal described by Biermann, since it would constitute an umbrella organization that hierarchically constrains lower-level agencies rather than simply an independent organization that issues recommendations. It may thus be closer to the "umbrella organization for sustainable development" described by Bernstein and Brunée, though some proposals for a Sustainable Development Council take this form as well (see Bernstein and Brunée 2011, 33, 35).

in line with agreements established by the WEO and SDC.[5] The latter would in this way form something akin to a global planning agency that ensures coherence between economic and environmental policies to meet the SDGs, whose key tasks would include setting limits on global material-energetic throughput, distributing emissions and other resource allowances according to historic inequalities and urgent developmental needs, restructuring trade relations to relocalize economies where possible and ensure ecologically efficient trade where necessary, and supplanting GDP with alternative metrics for measuring economic health and well-being. This would ideally involve a global agreement for equitably sharing the world's remaining carbon, land, nitrogen, phosphorous, and freshwater budgets, as Rockström and Klum suggest (Rockström and Klum 2015, 142), though this would require drastic and imminent carbon emissions reductions and other consumption cuts in the Global North well beyond rates that would be compatible with compound economic growth (perhaps requiring 40–50% reductions in their biophysical footprints, according to Jason Hickel, 2018). It would also create "multilaterally harmonized systems that allow for discriminating between products on the basis of production processes," as Biermann and colleagues advocate (Biermann et al. 2012b, 53), though it would go well beyond market mechanisms like carbon pricing to involve democratic input on which technologies and production policies should be prioritized, which should be abolished, and when and where certain forms of trade should be allowed or curtailed.

More radically, transnational firms above a certain size would be nationalized—especially those in the fossil fuel, agribusiness, and financial sectors, which is needed to catalyze a rapid transition to renewable energy and carbon sequestering agroecology—but tightly regulated national and regional-scale markets composed of small and medium-sized firms would be allowed (Baer 2018, 132). New forms of democratized ownership of public utilities and businesses would not only be an end in themselves but may be necessary to enlist the support of working-class populations for the transition (Smith 2016, 140) and should thereby be encouraged and incentivized. Perfect "contraction and convergence" may be unrealistic, though such an ideal can at least be approached through moderate downscaling of production and consumption in the Global North combined with direct aid, technology transfers, and debt cancellation. But at least equally important as redistribution between rich and poor countries will be redistribution of resources from wasteful sectors of the economy (e.g., arms production, advertising, and luxuries), which would be gradually phased out, to the "caring" sectors aimed at sustainably meeting basic needs (Wallis 2018, 51).

5. As Walden Bello argues, this will at the very least require globally coordinated regulations to restrict capital mobility, close tax havens, set up a global fiat currency as reserve currency to replace the US dollar, and channel investment into socially and ecologically regenerative projects (Bello 2019, 260–261).

Second, the emerging literature on ESG can help ecological Marxists grapple with the problem of how to balance between the potentially competing dictates of ecological sustainability and democratization. This arguably constitutes the most difficult "governance puzzle" facing ESG initiatives (Galaz 2014, 34), one that cannot be pushed away simply through nebulous appeals to "democratic planning." After all, critics of ESG may be understandably wary of calls for a UN SDC to coordinate global planning and set limits on material energy throughput, and there is no guarantee that ecosocialism would be able to avoid authoritarian expressions (Mann and Wainwright 2018, 38). While trade-offs may to some extent be unavoidable, Biermann and Galaz suggest that "polycentric" governance can attenuate tendencies toward centralized control (Biermann 2014, 24–25; Galaz 2014, 62). In this model, states, cities, and local communities would retain decision-making control over the means of pursuing their development priorities (following the principle of "subsidiarity"), though these would need to be constrained by global plans for limiting material-energetic throughput and redistributing resources. Thus there may be risks that scientists, who would play a crucial role in defining the "safe operating space" within which global development unfolds, would acquire unchecked power in such a formation. However, the legitimacy and feasibility of such plans would be largely contingent on democratic mobilization from below to force governments to adopt pledges in line with SDC agreements. Furthermore, as Biermann suggests, deliberative global citizen assemblies, composed of individuals randomly selected across the global population, could be empowered to shape economic planning priorities, determine the level of risk populations are willing to accept, and debate policy alternatives within the SDC (Biermann 2014, 141). John Dryzek and Hayley Stevenson show that real-world examples of deliberative assembles—seen for example in the United Kingdom's 2007 Climate Change Citizens' Summit, the 2009 World Wide Views project, and the Alberta Climate Dialogue in Canada—usually agree to follow more precautionary principles and adopt stronger mitigation policies than their governments, demonstrating that democratization need not come at the expense of sustainability (Stevenson and Dryzek 2014, 18–19, 183). To make these models of deliberative planning more viable at the global scale, new forms of "crowdsourcing" that take advantage of digital technology could facilitate discussion and input from citizens around the world, similar to the way crowdsourcing processes were used to gather input for formulating the SDGs (Gellers 2016). In this way, a global plan to determine hard caps on the "risk threshold" populations are willing to tolerate vis-à-vis different planetary boundaries, distribute remaining biophysical space, and prioritize certain trajectories of technoscientific research and development could be arrived at through a dialectic of scientific expertise and democratic engagement.

However, risks will inevitably remain, in particular the risk that indigenous and other underprivileged groups will continue to be marginalized while inequalities persist, which will require continuous vigilance and struggle to

ensure democratic accountability and inclusion. But the risks should not obviate the importance of working toward more egalitarian and democratic forms of ESG; if anything, they should enhance the urgency of systematically thinking through its possible contours, challenges, and strategies for addressing them. As Hans Baer emphasizes, the point is not to design a perfect utopia but rather to make "the best possible world within existing constraints," which will continue to pose its own problems and demand new struggles (Baer 2018, 2).

Sheer Utopianism? The Problem of Transition

Those who I critique for failing to go beyond capitalist horizons may very well agree with the desirability of something like the ecosocialist ESG sketched herein, though they might argue that it is simply too remote and utopian of a prospect to merit serious scholarly investigation. From this view, the moderate reforms proposed by scholars like Biermann and Rockström may be the best we can hope for, while the urgency of the climate crisis calls for solutions that could be implemented under capitalist constraints. This is an understandable concern, and it is therefore necessary to move from "abstract" to "concrete" utopianism by providing a plausible scenario for an evolutionary transition to ecosocialism (Kallis 2018, 125). In this way, it is possible to show that the prospect of ecosocialism may be less utopian than many believe, though it would most likely need to be preceded by systemic reforms (e.g., a "Green New Deal"; GND) to begin immediately reducing emissions and buy time for a more far-reaching postcapitalist transformation.

To start, it is necessary to emphasize that global capitalism faces not only an earth system crisis but also a *structural political-economic crisis*—a contextual condition that has been ignored by ESG scholars—that will in turn be exacerbated by the intensifying earth system crisis. This structural crisis (often described as "secular stagnation" by mainstream economists) is driven by a combination of diminishing outlets for profitable productive investment, unprecedented inequality, and stagnant wages that limit effective demand while relying on credit-fueled consumerism, the depletion of "conventional" or easy-to-access oil, and the funneling of accumulated surpluses into financial speculation instead of production (Wolf 2014; Bello 2019; Robinson 2014; Moore 2015). Global growth remains precariously reliant on historically low interest rates and burgeoning corporate and household debt (with total global debt reaching 318% of GDP in 2018) (Oguh and Tanzi 2019), and the IMF warns that easy credit has "encouraged more financial risk-taking and a further buildup of financial vulnerabilities" (International Monetary Fund 2019, viii). Many economists across the spectrum therefore believe that the underlying weaknesses that contributed to the 2007–2008 financial crisis have yet to be resolved, leaving global capitalism stuck in an unsustainable growth trajectory that will be punctured by subsequent crises (Wolf 2014; Bello 2019).

When we consider how capitalist stagnation and financial systemic risk will converge with intensifying climate impacts, it becomes clear that global economic turmoil in the coming years is very likely, and it is even possible that capitalism may be facing an "irreversible decline in [its] capacity to restructure its way out of great crises" (Moore 2015, 27). In this context, initiatives for system change will be able to garner widespread appeal and enhance their agency. But this would not in itself, of course, enable the emergence of ecosocialism. It is likely that anything like ecosocialist ESG would need to be preceded by a global GND, or a globally coordinated response to economic and ecological crises that combines state-led investment in "green" technologies with massive job creation and infrastructure programs (Lawrence 2019). However, it is possible that a GND would succeed neither in sustaining "healthy" growth rates—given the potentially debilitating consequences of possible energy constraints,[6] increasing public debt, and "internalizing" ecological costs for an already precarious and over-indebted global economy (Moore 2015, 145)—nor in catalyzing the rapid emissions reductions needed to meet the 1.5°–2°C target (let alone preventing transgression of other planetary boundaries). In a context of persistent low growth (particularly if promises of abundant "green jobs" turn out to be oversold[7]), worsening climate impacts, and evidence that even a global GND is unable to reduce emissions with the necessary speed, a strong enough network of socioecological movements across the globe *might* succeed in pushing governments to radicalize the GND in the direction of planning, contraction of wasteful consumerism (especially in the Global North), and radical redistribution as a substitute for economic growth.

Of course, there are many ifs here. It is possible that a global GND *would* generate a sustainable trajectory of inclusive "green growth" and climate stabilization, as Newell and Paterson envision in their "Climate Keynesianism" scenario (Newell and Paterson 2010, 172–173). More likely, persistent stagnation and crisis in a global GND regime may precipitate nationalist backlash and reversion to "growth at all costs" ("green" or otherwise), leading to ecological breakdown and conflicts over dwindling resources. Nonetheless, it is plausible, as William Robinson contends, that something like ecosocialism could "snowball out of efforts to bring about a reform of the [global capitalist] system" (Robinson 2014, 233). But rather than unfolding naturally from the socioecological contradictions of a global GND, it could only emerge through counterhegemonic struggle at multiple scales. The question of how counterhegemonic

6. This will be contingent on future technological advance, though studies suggest there will be less energy available to the global economy as it transitions to renewable energy. This is primarily due to the limited "energy return on investment" of renewables once full life cycle costs of mining, transporting, and constructing renewable energy grids and battery systems are taken into account (Kallis 2018, 80–81).
7. Optimistic assessments of "green job" creation typically focus solely on net gains within the energy sector, which may downplay the massive disruptions that would be triggered by decarbonizing the rest of the economy—from manufacturing and petrochemicals to aviation and shipping (Smith 2016, 112).

movements will simultaneously be able to overcome entrenched capitalist resistance and right-wing reaction is a difficult one, and, given the current balance of class and social forces, this is admittedly not the most probable outcome. Yet the combination of capitalist stagnation, intensifying earth system crisis, growing discontent with capitalism and increasing support for socialism in core states (particularly in the United States and United Kingdom),[8] and strengthening movements for climate justice shows that the preconditions for such a transition may be coming into place. And as Nafeez Ahmed suggests, "by 2030, and even more so by 2050—as the manifestations of global capitalism's self-catabolic trajectory become more obvious—it will appear increasingly realistic" (Ahmed 2017, 91). It is thus necessary to develop postcapitalist visions that may capture collective imagination and inspire transformative action as the crises of global capitalism and the earth system create windows of opportunity for system transformation, rather than focusing *solely* on short-term reforms that will almost certainly be inadequate for addressing these crises.

Conclusions

In this article, I have argued for an ecological Marxist approach to rethinking ESG, one that addresses the blind spots identified by critics while contributing toward a more transformative alternative. It agrees with Biermann and colleagues that we need a "roadmap for institutional change" that can achieve the "fundamental reform of sustainability governance" required to prevent transgression of planetary boundaries (Biermann et al. 2012b, 52), though it suggests that such discussions need to expand their horizons by considering postcapitalist approaches. Marxist perspectives are needed to foreground the structural political-economic constraints on earth system stability, though existing approaches to ESG can in turn inform Marxist strategies for global institutional design and democratization.

As we plunge deeper into an era of profound disruption to business-as-usual, one likely comparable to the mid-twentieth-century crises that gave birth to the UN system (Kanie et al. 2012), it is important that scholars grapple with the range of political-economic and global governmental transformations that may emerge, while envisioning and evaluating strategies for enabling more egalitarian and democratic transition scenarios. The field of global environmental politics has much to offer such discussions, and it is my hope that more scholars will go beyond description and critique of existing governance arrangements to contribute toward a collective project of ESG that adequately grasps

8. Recent polls show that 40 percent of Americans (and 60 percent under the age of thirty years) claim to prefer socialism to capitalism (Younis 2019). And in the United Kingdom, the Labour Party has adopted a radical GND proposal—which includes nationalizing the largest energy companies, expanding universal basic services, repealing anti–trade union laws, and transferring resources to the Global South—thereby moving itself closer toward ecosocialist principles (Saltmarsh 2019).

the deep transformations needed to stabilize and heal the earth system, while also furthering the ends of environmental justice.

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References

Ahmed, Nafeez. 2017. *Failing States, Collapsing Systems: Biophysical Triggers of Violence*. Cham, Switzerland: Springer.

Angus, Ian. 2016. *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System*. New York, NY: Monthly Review Press.

Baer, Hans. 2018. *Democratic Ecosocialism as a Real Utopia: Transitioning to an Alternative World-System*. New York, NY: Berghahn Books.

Baskin, Jeremy. 2014. Ideology of the Anthropocene? Research Paper 3. Melbourne Sustainable Society Institute, Melbourne, Australia.

Bello, Walden. 2019. *Paper Dragons: China and the Next Crash*. London, UK: Zed Books.

Bernstein, Steven, and Jutta Brunée. 2011. *Consultants' Report on Options for Broader Reform of the Institutional Framework for Sustainable Development (IFSD): Structural, Legal, and Financial Aspects*. New York, NY: UN Department of Economic and Social Affairs.

Biermann, Frank. 2014. *Earth System Governance: World Politics in the Anthropocene*. Cambridge, MA: MIT Press.

Biermann, Frank, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michelle M. Betsill, Harriet Bulkeley, et al. 2012a. Navigating the Anthropocene: Improving Earth System Governance. *Science* 335: 1306–1307.

Biermann, Frank, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michele M. Betsill, Harriet Bulkeley, et al. 2012b. Transforming Governance and Institutions for Sustainability: Key Insights from the Earth System Governance Project. *Current Opinion in Environmental Sustainability* 4: 51–60.

Crutzen, Paul, William Clark, and Hans Schellnhuber. 2005. Science for Global Sustainability: Toward a New Paradigm. Working Paper 120, Center for International Development: Harvard University. Available at https://www.hks.harvard.edu/centers/cid/publications/faculty-working-papers/cid-working-paper-no.-120, last accessed April 7, 2020.

Crutzen, Paul, and Will Steffen. 2003. How Long Have We Been in the Anthropocene? *Climatic Change* 61: 251–257.

Daly, Herman. 1996. *Beyond Growth: The Economics of Sustainable Development*. Boston, MA: Beacon Press.

Dauvergne, Peter. 2018. *Will Big Business Destroy Our Planet?* Cambridge, UK: Polity.

Figueres, Christiana. 2017. Three Years to Safeguard Our Climate. *Nature* 546: 593–595.

Foster, John Bellamy. 2000. *Marx's Ecology: Materialism and Nature*. New York, NY: Monthly Review Press.

Foster, John Bellamy, Brett Clark, and Richard York. 2011. *Ecological Rift: Capitalism's War on the Earth*. New York, NY: Monthly Review Press.

Galaz, Victor. 2014. *Global Environmental Governance, Technology and Politics: The Anthropocene Gap*. Cheltenham, UK: Edward Elgar.

Gellers, Joshua. 2016. Crowdsourcing Global Governance: Sustainable Development Goals, Civil Society, and the Pursuit of Democratic Legitimacy. *International Environmental Agreements* 16: 415–432.

Hamilton, Clive. 2016. The Anthropocene as Rupture. *The Anthropocene Review* 3 (2): 93–106.

Hickel, Jason. 2018. Is It Possible to Achieve a Good Life for All Within Planetary Boundaries? *Third World Quarterly* 40: 18–35.

Howarth, Robert. 2019. Ideas and Perspectives: Is Shale Gas a Major Driver of Recent Increase in Global Atmospheric Methane? *Biogeosciences* 16: 3033–3046.

Intergovernmental Panel on Climate Change. 2018. Global Warming of 1.5 C: Summary for Policymakers. Available at: https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/ , last accessed April 6, 2020.

International Monetary Fund. 2019. *Global Financial Stability Report: Lower for Longer*. Washington, DC: IMF.

Kallis, Giorgos. 2018. *Degrowth*. New York, NY: Columbia University Press.

Kallis, Giorgos, and Jason Hickel. 2019. Is Green Growth Possible? *New Political Economy*. Advance online publication. https://doi.org/10.1080/13563467.2019.1598964.

Kanie, Norichika, et al. 2012. A Charter Moment: Restructuring Governance for Sustainability. *Public Administration and Development* 32: 292–304.

Lawrence, Matthew. 2019. Road Map to a Green New Deal: From Extraction to Stewardship. *Common Wealth*. Available at: https://common-wealth.co.uk/Road-Map-to-a-Green-New-Deal-From-Extraction-to-Stewardship.html, last accessed March 18, 2020.

Leach, Melissa. 2014. Resilience 2014: Limits Revisited? Planetary Boundaries, Justice and Power. Steps Centre. Available at: https://steps-centre.org/blog/resilience2014-leach/, last accessed March 18, 2020.

Lenton, Tim, et al. 2019. Climate Tipping Points—Too Risky to Bet Against. *Nature* 575: 592–595.

Lövbrand, Eva, Tim Forsyth, Mike Hulme, et al. 2015. Who Speaks for the Future of Earth? How Critical Social Science Can Extend the Conversation on the Anthropocene. *Global Environmental Change* 32: 211–218.

Malm, Andreas. 2018. *The Progress of This Storm: Nature and Society in a Warming World*. New York, NY: Verso.

Mann, Geoff, and Joel Wainwright. 2018. *Climate Leviathan: A Political Theory of Our Planetary Future*. New York, NY: Verso.

Markandya, Anil. 2009. Can Climate Change Be Reversed under Capitalism? *Development and Change* 40 (6): 1139–1152.

Moore, Jason. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York, NY: Verso.

Newell, Peter, and Matthew Paterson. 2010. *Climate Capitalism: Global Warming and the Transformation of the Global Economy*. Cambridge, UK: Cambridge University Press.
Oguh, Chibuike, and Alexandre Tanzi. 2019. Global Debt of $240 Trillion Nears Record Despite Faster Growth. *Bloomberg*, January 15. Available at: https://www.bloomberg.com/news/articles/2019-01-15/global-debt-of-244-trillion-nears-record-despite-faster-growth, last accessed March 18, 2020.
Paterson, Matthew. 2000. *Understanding Global Environmental Politics: Domination, Accumulation, Resistance*. London, UK: Macmillan.
Robinson, William. 2014. *Global Capitalism and the Crisis of Humanity*. New York, NY: Cambridge University Press.
Rockström, Johan, and Mathias Klum. 2015. *Big World, Small Planet: Abundance Within Planetary Limits*. New Haven, CT: Yale University Press.
Rockström, Johan, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart III Chapin, Eric Lambin, Timothy M. Lenton, et al. 2009. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14 (2): Article 32.
Saltmarsh, Chris. 2019. How to Win a Socialist Green New Deal. *The Ecologist*, September 27. Available at: https://theecologist.org/2019/sep/27/how-win-socialist-green-new-deal, last accessed March 18, 2020.
Smith, Neil. 2008. *Uneven Development: Nature, Capital, and the Production of Space*. Athens, GA: University of Georgia Press.
Smith, Richard. 2016. *Green Capitalism: The God That Failed*. London, UK: College.
Steffen, Will, Åsa Persson, Lisa Deutsch, Jan Zalasiewicz, Mark Williams, Katherine Richardson, Carole Crumley, et al. 2011. The Anthropocene: From Global Change to Planetary Stewardship. *Ambio* 40 (7): 739–761.
Steffen, Will, and Mark Smith. 2013. Planetary Boundaries, Equity and Global Sustainability. *Current Opinion in Environmental Sustainability* 5: 403–408.
Stevenson, Hayley, and John Dryzek. 2014. *Democratizing Global Climate Governance*. Cambridge, UK: Cambridge University Press.
Stirling, Andy. 2014. Emancipating Transformations: From Controlling "the Transition" to Culturing Plural Radical Progress. Working Paper 64, STEPS Centre, Brighton, UK.
Swyngedouw, Erik. 2013. The Non-political Politics of Climate Change. *ACME* 12(1): 1–8.
Tanuro, Daniel. 2014. *Green Capitalism: Why It Can't Work*. Nova Scotia, Canada: Fernwood.
Victor, David. 2015. Why Paris Worked: A Different Approach to Climate Diplomacy. *Yale Environment 360*. Available at: https://e360.yale.edu/features/why_paris_worked_a_different_approach_to_climate_diplomacy, last accessed March 18, 2020.
Wallis, Victor. 2018. *Red-Green Revolution: The Politics and Technology of Ecosocialism*. Toronto, ON, Canada: Political Animal Press.
Wiedmann, Thomas, et al. 2015. The Material Footprint of Nations. *Proceedings of the National Academy of Sciences of the United States of America* 112 (20): 6271–6276.
Wolf, Martin. 2014. *The Shifts and the Shocks: What We've Learned—and Have Still to Learn—About the Financial Crisis*. New York, NY: Penguin.
Younis, Mohamed. 2019. Four in 10 Americans Embrace Some Form of Socialism. *Gallup News*. Available at: https://news.gallup.com/poll/257639/four-americans-embrace-form-socialism.aspx, last accessed March 18, 2020.