

Taking a wider view on climate governance: moving beyond the 'iceberg', the 'elephant' and the 'forest'

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Abstract

Attention in the literature on global climate politics has recently turned from a focus on intergovernmental negotiations to conceptualizing climate governance 'beyond' or 'outside' the UN regime. However, this literature differs on three key aspects: the underlying research paradigms, what is identified as the heart of the problem, and proposed solutions. One group of scholars calls for an attention shift from the 'tip of the iceberg' of climate governance to its much larger 'hidden parts,' conceptualized through notions such as the 'climate change regime complex,' a 'fragmented climate governance architecture,' and 'transnational climate governance.' A second set of authors points to the 'elephant in the room,' namely underlying power structures and material configurations in the international system that block effective responses to the climate crisis. A third group has argued that instead of looking at the individual 'trees' of climate negotiations, research should focus on the 'forest' of climate governance, made up of framings, norms, and emerging 'climate governmentalities.' The article proposes the concept of a 'schism of reality' as a means to overcome this fragmentation of the literature. This notion offers a new way of understanding interactions between the climate regime and its wider environment by focusing on discrepancies and contradictions. It accommodates different theoretical perspectives and provides common ground for future research: on how paradoxes and contradictions are dealt with in climate governance; how they can be overcome; how current developments in climate governance reduce the schism; and where and why aspects of the schism persist.

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Introduction

Our understanding of what is at stake in the climate problem has considerably deepened over time, and an unprecedented governance process, whose most recent outcome has been the Paris agreement adopted in December 2015, has been set up to respond to it. The results of this process, however, have been far from convincing. With negotiations on a global treaty assigning legally binding emission reduction targets to countries having failed at the UN climate conference in Copenhagen (2009), the Paris agreement has established a 'bottom-up approach,' based on nationally determined mitigation and adaptation proposals, to global climate governance. In the meantime, global emissions have surpassed 40 Gigatons of CO₂ in 2013, and the goal of remaining below 2°C of global warming seems to be moving ever further out of reach.¹ Attempts to identify reasons for this failure—but arguably also for hope, as in the form of sub-state action and transnational initiatives—have resulted in a shift of focus in the literature on international climate governance. From accounts of the intergovernmental negotiation process under the Climate Convention (UNFCCC), its dynamics, phases, and main actors, scholars have moved toward studying climate governance 'beyond' the UN regime.²⁻⁴ However, the fragmentation of this literature into different research paradigms has prevented the emergence of a common understanding of the current governance gridlock. I argue that the notion of a 'schism of reality' provides such a common ground, through a focus on discrepancies and contradictions between UN climate governance and its broader institutional, economic, and geopolitical environment.

The literature on the early climate change regime⁵⁻⁷ was characterized by three features: a linear vision of the relationship between science and politics; the centrality of states in climate governance; and the critical importance of the UN climate arena. Today, these assumptions are under challenge, as the field has diversified and the focus of scholarship has widened. The highly varied literature that emerged as a result can broadly be grouped into three ideal-type clusters, using three proverbial metaphors. A first group of scholars shifts attention from the 'tip of the iceberg' of climate governance to unveiling its much larger 'hidden parts': that is, neighboring international organizations and regimes, along with a growing number of transnational climate initiatives. A second set of authors urges us to turn to the 'elephant in the room,' namely, underlying power structures and material configurations in the international system that block effective responses to the climate crisis. And a third group has argued that instead of looking at the individual 'trees' of climate negotiations, research should focus on the larger 'forest' of climate governance, made up of overarching framings embedded in discourses and scientific knowledge, along with emerging 'climate governmentalities.' This article attempts to clarify differences between these the underlying research paradigms, as well as in what different authors regard as the heart of the problem and the solutions they propose. The final section introduces the concept of a 'schism of reality,'⁸ which offers a new way of viewing interactions between the climate regime and the wider world, accounting for insufficiencies in current climate governance, and identifying possible ways forward.]

CONNECTED GEOGRAPHIES: REGIMES, ARCHITECTURES, AND LANDSCAPES

At the end of the 1990s, as the density of international treaties and organizations grew, international relations scholars gave increasing attention to the issues of 'regime overlap' and 'institutional interplay.'⁹ Spurred by the growing *de facto* complexity of the climate governance

‘architecture,’ this new research paradigm inspired a series of studies on interactions between the climate regime and other complexes, such as the biodiversity, ozone, and trade regimes,¹⁰ as well as with other initiatives focusing directly on climate and energy, such as the Major Economies Process on Energy Security and Climate Change (later MEF).¹¹ Research thus came to be organized around conceptual innovations such as the climate change ‘regime complex,’ ‘fragmentation,’ and ‘transnational climate governance.’

‘Regime complexes’ and ‘fragmentation’

Following the classic definition of Raustiala and Victor, the study of regime complexes starts from the observation that many issue areas in international relations are co-governed by an ‘array of partially overlapping and non-hierarchical institutions’ [Ref. 12, p.279]. Keohane and Victor¹³ apply this framework to the ‘climate change regime complex,’ in which they include ‘clubs’ such as the G20 and the MEF, but also subnational initiatives, financial market rules, and other international regimes. They argue that factors such as the distribution of major countries’ interests and the inherent complexities and uncertainties of the climate problem have prevented (and will continue to prevent) the formation of a comprehensive, integrated climate regime. If ‘managed’ properly, they contend, a regime complex has advantages, as it enhances flexibility and adaptability over time.

The notion of ‘fragmentation’ further shifts the analytical focus, from stable institutional structures to loosely connected governance architectures.^{14, 15} Zelli¹⁶ and Biermann et al.¹⁷ find that climate governance is highly fragmented. The latter presents a visualization wherein the UN climate regime occupies the centermost of a set of concentric circles, followed (moving outward) by multilateral forums on climate and energy, other environmental institutions, and finally international non-environmental institutions and organizations [Ref 17, p.270]. Zürn and Faude¹⁸ add that functional differentiation, and thus fragmentation, is a response to society’s increasing complexity, and in fact a fundamental characteristic of modernity. On this view fragmentation is not a negative development in itself. It can, however, produce undesirable outcomes such as ‘forum shopping’ and the exclusion of weaker actors. While ‘decentralized interplay management’ seems to dominate global environmental governance more generally,¹⁹ forms of ‘division of labor’²⁰ between institutions may evolve when actors come to accept their respective roles and responsibilities. Interactions between the WTO regime and a range of multilateral environmental agreements are cited as an example.^{20,19}

Transnational climate governance

While debates on regime complexes and fragmentation have remained predominantly state-centric, an emerging field of research on ‘transnational climate governance’ has focused on networked private and hybrid forms of climate governance.^{21, 22} This builds on earlier research on non-state actor agency, where interest gradually shifted from the influence of non-state actors on the negotiation process²³ to the formation of autonomous transnational networks of sub-state actors²⁴ as well as public-private partnerships in the design of carbon markets, standards, and certification schemes.²⁵ Such transnational or ‘polycentric’ forms of governance have been conceptualized either as a response to ‘governance gaps’²⁶ or as a more effective response to complex problems than centralized regimes.^{3, 27} Three distinct patterns in the relationship of transnational initiatives to the UNFCCC have been distinguished. At one end of the spectrum, ‘delegation’²⁸ refers to cases that follow a principal-agent model, where some issues are ‘outsourced’ and treated by subordinate

institutions. At the other end, 'entrepreneurship'²⁹ describes situations where private and sub-national actors initiate partnerships independently of multilateral institutions. Between the two extremes, 'orchestration'³⁰ refers to cases where multilateral institutions attempt to shape and catalyze transnational initiatives. This echoes debates in the literature about 'private authority'³¹ in international relations, where a former focus on 'self-regulation' and its delegitimizing effect on public authority has been supplanted by research on 'co-regulation'³² and public-private partnerships, raising new questions about accountability and legitimacy.³³

The image that emerges from this literature on regime complexes, fragmentation, and transnational initiatives, is that of a broad 'global climate governance landscape'³⁴ consisting of different international institutions and 'new forms of transnational governance that cut across public-private divides' [Ref 22, p.1]. The literature shares a conception of climate governance as somehow much 'larger' than previous accounts suggest, but continues to support a central role for the UNFCCC. Keohane and Victor propose viewing the UNFCCC as an 'umbrella under which many different efforts proceed' [Ref 13, p.19]; van Asselt and Zelli³⁵ identify 'coordination' as an essential future task for the Climate Convention; and Bulkeley and colleagues suggest that efforts should be targeted at finding ways to link transnational initiatives and UN-led multilateralism [Ref 22, p.186]. The main research questions then involve assessing the types and quality of interconnections between the different parts of this institutional geography, as suggested by notions such as 'interplay,' 'coordination,' 'orchestration,' and 'linkage.'^{10,31} It may be added that the analytical focus has evolved in line with the transformation of climate governance itself. From centralized 'architectures' and 'design' at a time when top-down climate governance seemed within reach, the dominant imaginaries in this area have progressively 'flattened' along with the recent turn toward a bottom-up approach within the UN climate regime. This mainstream line of research has provided a very comprehensive picture of climate governance in diverse institutional settings. However, it focuses on functionalist and interest-based explanations for fragmentation and its 'management,' giving relatively little attention to material, ideological, and other structural factors behind fragmentation and governance failure.

PACHYDERMS: POWER AND MATERIALITY IN THE GLOBAL ECONOMY

Beginning in the late 1990s, scholars began to investigate the role of non-state business actors, especially fossil fuel corporations, in climate governance.³⁶⁻³⁸ Challenging basic assumptions of the literature on 'international regimes' from an international political economy perspective, these authors refuse to see states as unitary rational actors or markets and states as two separate spheres of human activity. Opening up the black box of state interests, Newell and Paterson³⁷ argue that the centrality of fossil energy in contemporary capital accumulation helps to explain the difficulty of climate negotiations, as well as the failure of ecological tax reform initiatives in Europe and the United States. Levy and Egan³⁶ focus on 'capital contests' on the international level, where business coalitions like the World Coal Institute and the Global Climate Coalition have joined forces to combat climate regulations. They find, however, that corporate power is less well organized at the international than at the national level, where its traditional channels of influence in administrations and parliaments enable it to weigh on the positions of individual governments.

From 'carbon lock-in' to 'historical blocs'

Unruh³⁹ introduces the notion of 'carbon lock-in', which combines research on 'path dependence' in technological development with insights from studies on the reproduction of social and political institutions. It describes a situation where a combination of technological, economic, and institutional factors perpetuates fossil fuel-based systems despite the existence of affordable alternatives. He argues that 'techno-institutional complexes' composed of large technological systems and the social and political institutions that govern them, as in electricity generation, can become self-referential and develop positive feedback loops, creating strong path dependencies. Research in the neo-Gramscian tradition adds a discursive dimension to this analysis. Levy and Newell argue that 'historical blocs'⁴⁰ emerge when alliances between corporate power and policymakers succeed in gaining consensual legitimacy in civil society. In climate change governance, they argue, a 'war of position'⁴¹ for discursive hegemony has opposed the environmental movement and its allies to the 'fossil fuel historical bloc'⁴² or simply 'carbon capital.'⁴³ The preferred strategy of the latter has been to oppose climate change regulation by discrediting its scientific foundations. While this strategy yielded only limited success at the international level, it has proven extremely effective in blocking sustainability transitions at the national level.⁴⁴ Corporate coalitions have also succeeded in shaping international climate institutions in important ways, mostly in promoting a managerial eco-modernist discourse that advocates market-based solutions to environmental problems.³⁶ On a more positive note, some authors identify the possibility of new progressive alliances. These involve either a shift in parts of the industry toward accepting limited targets and modest investments in low-carbon technologies⁴¹ or a re-evaluation of self-interest on the part of financial actors,³⁷ and might in the medium term favor the emergence of a 'new historical bloc.'

Bringing the material back in

In addition to neo-Gramscian approaches, another line of research has stressed the need to 'bring the material back in'⁴⁵ and proposed a 'resource-turn' in the sociology of climate change.⁴³ Fisher⁴⁵ reconsiders the difficulty of fostering an ambitious American climate policy from a viewpoint that focuses not on ideological differences but on the geographical distribution of energy resources. Citing the examples of the 1997 Byrd-Hagel resolution and the Climate Stewardship Act of 2003, she shows that Senators' opposition to climate legislation is better explained by the presence of oil and coal interests in a state than by partisan politics. Mitchell⁴⁶ analyzes the material constraints imposed on social and political organization by the extraction, transport, and combustion of energy resources. The shift from coal to oil in the middle of the 20th century, he points out, favored the emergence of a dollar-based global economy. He adds that it also had a profound impact on Western democracies, which evolved from coal-based welfare states with strong trade unions into oil-based neoliberal economies, as abundant oil reserves fueled a new conception of 'the economy' as an autonomous, self-regulating system unconstrained by resource availability. Urry⁴⁷ also highlights the links between resource use and forms of political and social order. Using the example of the car, he shows that 'high carbon lives' in the global North are embedded in and sustained by a range of social processes. These can only be understood by complementing analyses of national and international climate policies with research on the practices that compose and structure energy consumption patterns.⁴⁸

In sum, this literature suggests that 'decarbonization' is not only an environmental and economic problem, but a question with profound implications for political and social order. It holds that in looking at UN climate negotiations while ignoring the uneven distribution of power in the global

economy and the social and material processes that underlie it, research on the climate regime has failed to identify the deeper reasons for governance failure. Fragmentation, for example, is presented not as a consequence of processes like functional differentiation or division of labor, but as the result of 'strategic selectivities'⁴⁹ that shape the functioning of global institutions and perpetuate power relations and current unsustainable lifestyles. On this view, the Kyoto approach is tantamount to formalizing the existence of two separate energy regimes, since its discussions and regulatory measures are organized around questions of 'outputs' (CO₂ and other greenhouse gases) but not 'inputs' (resource extraction and combustion). Maintaining the established 'firewalls'⁵⁰ between the climate regime and other international regimes transforms climate politics into a mere 'politics of simulation'⁵¹ and contributes to 'sustaining the unsustainable.'⁵² These scholars' proposal to re-embed greenhouse gas emissions in their material, social, and political environment opens new research perspectives and contributes to deepening our understanding of the difficulties of climate governance. This very orientation toward structural explanations, however, may also explain the dearth of concrete proposals in this literature on how to move forward. For example, how can proponents of ambitious climate policies exploit contradictions that appear as some countries engage in energy transitions and as new alliances confront incumbent economic-political 'complexes' or 'blocs'? How can 'frictions'—i.e., tensions resulting from inconsistencies—between international regimes be used productively to favor institutional change toward sustainability?

FORESTS: DISCOURSES, IDEAS, AND CO-PRODUCTION

A third line of research has concentrated on more indirect, discursive, and normalizing practices, and on the pivotal role that ideas, norms, and scientific knowledge play in setting the stage for and establishing the rules of global climate politics. In his highly influential research on 'epistemic communities,' Haas⁵³ stressed the key role of scientific actors in shaping environmental governance by providing common knowledge bases and creating shared understandings of a problem. Hajer⁵⁴ pointed to the importance of 'discourse coalitions' in framing issues and suggesting possible solutions. Building on these accounts, and more generally on the 'cognitive turn' in policy research, the regime literature began to acknowledge the role of knowledge, norms, and ideas as overarching principles that can aid in understanding processes of coordination and fragmentation of international institutions.⁵⁵ A broader take on the subject identifies these as parts of 'climate governmentalities' that govern everyday practices and are embodied in technologies and material artefacts.⁵⁶ Finally, overarching principles and framings can be conceived of as products of scientific and political 'coproduction,' whereby they come to 'perform' political and scientific climate orders in a way that inextricably links these two domains of human activity.⁵⁷ Research in these directions has grown substantially as climate change has increasingly come to be understood not as a problem to be solved or fixed, but as a lasting human condition whose cultural dimensions are key to addressing current blockages.⁵⁸

Norms, discourses, and 'climate governmentalities'

Constructivist and cognitivist traditions in international relations have long stressed the importance of discourses, norms, and scientific knowledge in shaping global governance. In the case of climate governance, research has identified the norm of 'liberal environmentalism' as a central⁵⁹ but increasingly contested^{60, 61} coordinating principle. Pettenger and colleagues take this further in a collective volume on 'the social construction of climate change.'⁶² Drawing on both norm-centered

and discourse-analytic perspectives, contributions in the book show how the different meanings taken by climate change in national and international contexts influence policy-making and shape climate negotiations. In their chapter, Bäckstrand and Lövbrand⁵⁷ identify three overarching discourses—green governmentality, ecological modernization and civic environmentalism—and show how these have proliferated in different phases of the climate negotiations. Ongoing debates about post-2012 governance options appear in this reading as discursive struggles over the very meaning of climate change. Stripple and Bulkeley⁵⁶ add depth to such claims in another edited volume that looks at climate governance ‘beyond the state,’ from the point of view of governmentality studies. Exploring climate change policies in different national and international settings, the authors show that ‘governing the climate’ relates neither to a single activity nor to one particular political arena, but to various forms of human conduct and social activity. Emerging ‘climate governmentalities’ are nevertheless closely connected to new ways of measuring and controlling behavior and consumption patterns, and therefore contribute to the creation of new forms of social order.

From science-first multilateralism to ‘coproduction’

Another body of work that introduced new issues and questions emerged from the field of science and technology studies (STS), questioning dominant views in the international relations literature on the role of scientific knowledge. Reversing the dominant vision that presents scientific consensus as a precondition for political action, STS scholars emphasize the role of social interactions and institution-building in creating trust in scientific knowledge in the first place.^{63,64} Studies in this line point to the co-construction of global scientific networks, global climate modeling, and the institutions of the UN climate regime,^{65,66} as well as to the power effects of a globalizing scientific discourse.^{67,68} Through in-depth studies on central objects of climate expertise and climate policy, they uncover the mutual construction of the science-policy domain on climate change⁵⁷ and call attention to the pitfalls of climate reductionism.^{69,70} As scientific expertise is crucial in processes of political agenda-setting and issue framing, Lahsen states that ‘science in many cases *is* the politics of climate change’ [Ref^{71, p.190}]. Scientific assessments and expert bodies thus appear as political spaces in their own right that should be analyzed as such by scholars of climate governance. This raises questions of how and why certain forms of knowledge acquire credibility and authority, and of how inclusion and participation in scientific assessments and expert bodies can be promoted.

The otherwise very heterogeneous literature on norms, knowledge, and discourses shares an interest in the broader patterns that emerge from examining not individual negotiations, but the larger ‘forest’ of meanings and normativities through which climate change is governed and climate governmentalities unfold. Unsurprisingly given the embedded and complex nature of such logics and governmentalities, this literature offers only few concrete proposals for responses to the current governance stalemate. An exception is Stevenson and Dryzek’s account from the viewpoint of normative deliberative theory, calling for a ‘democratization’ of global climate governance to give more space to alternative framings and discourses.⁷² STS scholars have also taken part in recent debates about a reform of the IPCC.^{73,74} They argue that enhanced transparency and participation of scientists from the global South are preconditions for a more equitable climate governance, especially since adaptation issues and bottom-up mitigation action have become central to climate negotiations. Jasanoff adds the necessity of building bridges between abstract scientific knowledge and the smaller scales of social meaning.⁷⁵ Because climate knowledge is mainly produced in the modeling centers of the industrialized world, it fails to respond to the specific needs of developing

countries and to culturally rooted traditions regarding the legitimacy of scientific knowledge. Such questions of meaning and legitimacy are closely related, Jasanoff argues, to the limited degree of popular mobilization around the climate question.

CONNECTING THE DOTS: CLIMATE GOVERNANCE AS A 'SCHISM OF REALITY'

There seems to be increasing acknowledgment of the need to concentrate on climate governance 'outside' the UNFCCC. However, the justifications offered in these literatures for *why* such research matters for better understanding the current governance gridlock and finding possible ways forward vary greatly, depending on the authors' theoretical backgrounds. Such differences also determine which arenas, forums, and social processes are investigated. Aykut and Dahan^{8, 76} propose a framework based on history and sociology that can accommodate different theoretical perspectives because it places the focus on *interactions* between institutional, material, and discursive dimensions of climate politics. This raises the possibility of overcoming the fragmentation in the field described above. The first step is to re-embed climate governance in time—through a *longue durée* perspective^a on the evolution of climate negotiations—and in wider geopolitical and social realities.

Historical development and dimensions of the schism

The omission of events and developments outside the climate change regime from most climate governance research [for notable exceptions, see Refs ^{77,78}] mirrors the functioning of the climate regime itself, with treatments of the problem explicitly or implicitly excluding important parts of its causes. Aykut and Dahan use the term 'reality schism' to describe this feature of global climate governance. Borrowed from political sociology [Ref ^{79, p.20-28}], the term refers to situations that precede major institutional crises, when arenas of democratic legitimacy and loci of *de facto* political power, based on the occupation of streets and public spaces, begin to split apart. Similarly, the climate regime was characterized, between the signing of the Climate Convention in 1992 and the failure of the Copenhagen summit in 2009, by a growing gap between two spheres. The first is a sphere of UN climate governance built on the imaginary of centralized global action and consensual 'management' of a global problem. The other is an external reality characterized by the globalization of resource-intensive Western lifestyles, unbridled exploitation of fossil fuel resources, fierce economic competition between states, and a remilitarization of international relations.

The schismatic character of global climate governance has at least four dimensions. First, climate change has been framed as a *global collective action problem*. Correspondingly, a binding international treaty was long seen as the only workable way to mitigate climate change while avoiding free-riding. This globalism has led to the exclusion of sub-national initiatives and transnational networks which are willing to take climate action. Second, following the cases of ozone and acid rain, climate change has been institutionalized according to the *pollution paradigm*. However, an approach that aims to control GHG emissions is impotent, as it is kept from confronting crucial issues such as infrastructural and institutional lock-in. Third, the climate problem is *compartmentalized* at the international level, meaning that the climate regime is kept separate from international organizations that regulate trade, financial globalization, and energy supply. Finally, the schism is reinforced by the *discrepancy* between extremely ambitious global long-term objectives that have their origins in scientific expertise, such as the 2°C threshold and emission reduction targets for 2050, and the obvious fact that their fulfillment is already compromised without a radical and highly improbable change of direction.

Two key dynamics explain the progressive deepening of this schism. The first is the loss of credibility of the process after the American withdrawal from the Kyoto protocol, leading to an internalization of the external schism within the negotiations, as the so-called ‘two-track approach’ added a further layer to an already highly complex process: conducted under the umbrella of the Kyoto protocol, the first negotiation ‘track’ (AWG-KP) was concerned with reduction commitments from developed countries and other short-term issues, while options for long-term climate action were discussed under the umbrella of the Convention (AWG-LCA). The United States, a member of AWG-LCA, only had observer status in the Kyoto ‘track.’ The second dynamic is the inability of an increasingly slow and path-dependent UN process to take into account a series of unanticipated accelerations, such as China’s economic growth and the shale gas and oil revolution in the US, which radically changed the geopolitical landscape of global climate politics.

Conclusion

Scholarly attention in the study of global climate governance has recently turned to understanding the interactions between the UN climate regime and its wider environment. The notion of a ‘schism’ puts discrepancies and contradictions at the core of such analysis and accommodates different theoretical perspectives. This is in line with proposals by scholars to focus research on ‘paradoxes,’⁵¹ ‘implicit [as opposed to explicit] climate policies’ [Ref. ^{37, p.688}], and ‘governance dilemmas.’⁷⁸ If such a schism exists, then questions of how it is dealt with and how it can be overcome should be of urgent interest to scholars. Further research is also needed to assess current developments in climate governance, in order to identify cases where contradictions are addressed, and where and why aspects of the schism persist. Notably, institutional change is underway in important international organizations like the World Bank [Ref 13, p.12] and the International Energy Agency [Ref 8, p.474-475], and these institutions seem increasingly torn between new ecological imperatives and their institutional legacies. Further research could help to understand why the world trade regime and institutions regulating global finance have been (even) more resistant to addressing climate issues. The UN climate regime itself has also recently undergone changes: first, the Durban Platform for Enhanced Action (2011) put an end to the two-track approach and established a joint process in which developed and developing countries are invited to submit mitigation actions (‘Intended Nationally Determined Contributions’, INDCs) that are to strengthen over time. This new and inclusive approach has been confirmed in the Paris agreement adopted at COP21 (2015). While this addresses parts of the schism, research is needed to understand whether the gap between INDCs and the long-term stabilization target is a temporary phenomenon, or whether it is part of an ‘economy of promise’⁸⁰ that is constitutive of the process. Second, initiatives like the ‘Agenda of Solutions’ launched at the New York Climate Summit in September 2014 and the ‘Lima-Paris Action Agenda’, a joint undertaking of the Peruvian and French COP presidencies, point to greater consideration of non-state actor agency, as well as of material aspects and ‘co-benefits’ of climate policies. Little is known, however, about the impact of these initiatives on the legitimacy of the UN process,⁸¹ or about their relationship to ongoing sustainability transitions.⁸² More generally, how does UN climate governance relate to, and how could it favor, developments like the recent rise in renewable energy production worldwide? How can the persistent focus of negotiations on ‘emissions’, and not on fossil fuels (subsidies, extraction) or renewables, be explained—and possibly overcome? Reorienting research in these directions would echo Ulrich Beck’s call for a ‘greening of modernity,’⁸³ which shifts attention from the formal output of climate governance, such as decisions and treaties, to its tangible impacts on the institutions of industrialized modernity.

References

1. Friedlingstein P, Andrew RM, Rogelj J, Peters GP, Canadell JG, Knutti R, Luderer G, Raupach MR, Schaeffer M, van Vuuren DP, et al. Persistent growth of CO₂ emissions and implications for reaching climate targets. *Nature Geosci* 2014, 7:709-715.
2. Okereke C, Bulkeley H, Schroeder H. Conceptualizing climate governance beyond the international regime. *Global Environmental Politics* 2009, 9:58-78.
3. Ostrom E. Beyond markets and states: polycentric governance of complex economic systems. *The American Economic Review* 2010:641-672.
4. Moncel R, van Asselt H. All Hands on Deck! Mobilizing Climate Change Action beyond the UNFCCC. *Review of European Community & International Environmental Law* 2012, 21:163-176.
5. Bodansky D. The Emerging Climate Change Regime. *Annual Review of Energy and Environment* 1995, 20:425-461.
6. Mintzer IM, Leonard JA, eds. *Negotiating Climate Change. The Inside Story of the Rio Convention*. Cambridge: Cambridge University Press; 1994.
7. Oberthür S, Ott HE. *The Kyoto Protocol: International climate policy for the 21st century*. Berlin: Springer; 1999.
8. Aykut SC, Dahan A. *Gouverner le climat? 20 ans de négociations internationales*. Paris: Presses de Sciences Po; 2015.
9. Young OR. Institutional Linkages in International Society: Polar Perspectives. *Global Governance* 1996, 2:1-24.
10. van Asselt H, Gupta J, Biermann F. Advancing the climate agenda: exploiting material and institutional linkages to develop a menu of policy options. *Review of European Community & International Environmental Law* 2005, 14:255-264.
11. Kellow A. Is the Asia-Pacific Partnership a viable alternative to Kyoto? *Wiley Interdisciplinary Reviews: Climate Change* 2010, 1:10-15.
12. Raustiala K, Victor DG. The regime complex for plant genetic resources. *International organization* 2004, 58:277-309.
13. Keohane RO, Victor DG. The regime complex for climate change. *Perspectives on politics* 2011, 9:7-23.
14. Zelli F, van Asselt H. The Institutional Fragmentation of Global Environmental Governance: Causes, Consequences, and Responses. *Global Environmental Politics* 2013, 13:1-14.
15. Biermann F, Pattberg P, Van Asselt H, Zelli F. The fragmentation of global governance architectures: A framework for analysis. *Global Environmental Politics* 2009, 9:14-40.
16. Zelli F. The fragmentation of the global climate governance architecture. *WIREs Climate Change* 2011, 2:255-270.
17. Biermann F, Pattberg P, Zelli F, van Asselt H, Boas I, Flachsland C, Goel N, Hof A, Jerneck A, Massey E, et al. Global Climate Governance after 2012: Architecture, Agency and Adaptation. In: Hulme M, Neufeldt H, eds. *Making Climate Change Work for Us: European Perspectives on Adaptation and Mitigation Strategies*. Cambridge, UK: Cambridge University Press; 2010, 263-290.
18. Zürn M, Faude B. Commentary: On fragmentation, differentiation, and coordination. *Global Environmental Politics* 2013, 13:119-130.
19. Oberthür S, Stokke OS. Conclusion: Decentralized Interplay Management in an Evolving Interinstitutional Order. In: Oberthür S, Stokke OS, eds. *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*. Cambridge, MA: MIT Press; 2011, 313-341.
20. Gehring T. The Emerging Governance Structure on Trade and the Environment: From Disruption to Division of Labor. In: Oberthür S, Stokke OS, eds. *Institutional Interaction and*

- Global Environmental Change: Interplay Management and Institutional Complexes*. Cambridge, MA: MIT Press; 2011, 227-244.
21. Held D, Theros M, Fane-Hervey A, eds. *The Governance of Climate Change*. Cambridge, UK: Cambridge University Press; 2011.
 22. Bulkeley H, Andonova L, Betsill MM, Compagnon D, Hale T, Hoffmann M, Newell P, Paterson M, Roger C, VanDeveer SD. *Transnational Climate Change Governance*. Cambridge, UK: Cambridge University Press; 2014.
 23. Betsill MM, Corell E. NGO Influence in International Environmental Negotiations: A Framework for Analysis. *Global Environmental Politics* 2001, 1:65-85.
 24. Betsill MM, Bulkeley H. Transnational Networks and Global Environmental Governance: The Cities for Climate Protection Program. *International Studies Quarterly* 2004, 48:471-493.
 25. Pattberg P. Public-private partnerships in global climate governance. *Wiley Interdisciplinary Reviews: Climate Change* 2010, 1:279-287.
 26. Rosenau JN. Governance in the 21st century. *Global Governance* 1995, 1:13-43.
 27. Cole DH. Advantages of a polycentric approach to climate change policy. *Nature Climate Change* 2015, 5:114-118.
 28. Hawkins DG, Lake DA, Nielson DL, Tierney MJ, eds. *Delegation and agency in international organizations*. Cambridge, UK: Cambridge University Press; 2006.
 29. Green JF. Private standards in the climate regime: the greenhouse gas protocol. *Business and Politics* 2010, 12:Article 3.
 30. Abbott KW, Snidal D. Strengthening International Regulation Through Transnational New Governance: Overcoming the Orchestration Deficit. *Vanderbilt Journal of Transnational Law* 2009, 42:501-578.
 31. Hall RB, Biersteker TJ. *The Emergence of Private Authority in Global Governance*. Cambridge, UK: Cambridge University Press; 2002.
 32. Pattberg P. The Institutionalization of Private Governance: How Business and Nonprofit Organizations Agree on Transnational Rules. *Governance* 2005, 18:589-610.
 33. Bäckstrand K. Accountability of Networked Climate Governance: The Rise of Transnational Climate Partnerships. *Global Environmental Politics* 2008, 6:50-75.
 34. Betsill MM, Dubash NK, Paterson M, Asselt Hv, Vihma A, Winkler H. Building Productive Links between the UNFCCC and the Broader Global Climate Governance Landscape. *Global Environmental Politics* 2015, 15:1-10.
 35. van Asselt H, Zelli F. Connect the dots: managing the fragmentation of global climate governance. *Environmental Economics and Policy Studies* 2014, 16:137-155.
 36. Levy D, Egan D. Capital contests: National and transnational channels of corporate influence on the climate change negotiations. *Politics & Society* 1998, 26:337-361.
 37. Newell P, Paterson M. A Climate for Business: Global Warming, the State, and Capital. *Review of International Political Economy* 1998, 5:679-703.
 38. Kessler P, Paterson M. *Energy Exporters and Climate Change*. London: Royal Institute of International Affairs; 1997.
 39. Unruh GC. Understanding carbon lock-in. *Energy Policy* 2000, 28:817-830.
 40. Levy DL, Newell PJ. Business strategy and international environmental governance: Toward a neo-Gramscian synthesis. *Global Environmental Politics* 2002, 2:84-101.
 41. Levy DL, Egan D. A Neo-Gramscian Approach to Corporate Political Strategy: Conflict and Accommodation in the Climate Change Negotiations. *Journal of Management Studies* 2003, 40:803-829.
 42. Phelan L, Henderson-Sellers A, Taplin R. The political economy of addressing the climate crisis in the earth system: Undermining perverse resilience. *New Political Economy* 2013, 18:198-226.
 43. Urry J. *Societies Beyond Oil. Oil Dregs and Social Futures*. London: Zed Books; 2013.

44. Geels FW. Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective. *Theory, Culture & Society* 2014, 0263276414531627.
45. Fisher DR. Bringing the Material Back in: Understanding the U.S. Position on Climate Change. *Sociological Forum* 2006, 21:467-494.
46. Mitchell T. *Carbon Democracy: Political Power in the Age of Oil*. New York: Verso Books; 2011.
47. Urry J. *Climate Change and Society*. Cambridge, UK: Polity Press; 2011.
48. Shove E, Walker G. Governing transitions in the sustainability of everyday life. *Research Policy* 2010, 39:471-476.
49. Brunnengräber A. Multi-Level Climate Governance: Strategic Selectivities in International Politics. In: Knieling J, Leal Filho W, eds. *Climate Change Governance*. Heidelberg, New York: Springer; 2013, 67-83.
50. Altvater E. The social and natural environment of fossil capitalism. *Socialist register* 2007, 2007:37.
51. Blühdorn I. The politics of unsustainability: COP15, post-ecologism, and the ecological paradox. *Organization & Environment* 2011, 24:34-53.
52. Blühdorn I. Sustaining the Unsustainable: Symbolic Politics and the Politics of Simulation. *Environmental Politics* 2007, 16:251-275.
53. Haas PM. Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control. *International Organization* 1989, 43:377-403.
54. Hajer M. *The Politics of Environmental Discourse: Ecological Modernisation and the Policy Process*. Oxford: Clarendon Press; 1995.
55. Zelli F. Regime Conflict and Interplay Management in Global Environmental Governance. In: Oberthür S, Stokke OS, eds. *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*. Cambridge, MA: MIT Press; 2011, 199-226.
56. Stripple J, Bulkeley H, eds. *Governing the climate. New Approaches to Rationality, Power and Politics*. Cambridge, UK: Cambridge University Press; 2014.
57. Shackley S, Wynne B. Global Climate Change: The mutual construction of an emergent science-policy domain. *Science and Public Policy* 1995, 22:218-230.
58. Hulme M. *Why we disagree about climate change*. Cambridge, UK: Cambridge University Press; 2009.
59. Zelli F, Gupta A, van Asselt H. Institutional Interactions at the Crossroads of Trade and Environment: The Dominance of Liberal Environmentalism? *Global Governance* 2013, 19:105-118.
60. Bäckstrand K, Lövbrand E. Climate governance beyond 2012: competing discourses of green governmentality, ecological modernization and civic environmentalism. In: Pettenger ME, ed. *The social construction of climate change: Power, knowledge, norms, discourses*. Aldershot, UK: Ashgate Publishing; 2007, 123-147.
61. Eckersley R. Understanding the Interplay Between the Climate and Trade Regimes. In: Simmons B, van Asselt H, Zelli F, eds. *Climate and Trade Policies in a Post-2012 World*. Geneva: UNEP; 2009, 11-18.
62. Pettenger ME, ed. *The Social Construction of Climate Change. Power, Knowledge, Norms and Discourses*. Burlington, VT: Ashgate; 2007.
63. Miller CA. Challenges in the application of science to global affairs: Contingency, Trust and Moral Order. In: Miller CA, Edwards PN, eds. *Changing the Atmosphere: Expert Knowledge and Environmental Governance*. Cambridge, MA: MIT Press; 2001.
64. Sarewitz D. Does climate change knowledge really matter? *Wiley Interdisciplinary Reviews: Climate Change* 2011, 2:475-481.
65. Edwards PN. *A vast Machine. Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, MA: The MIT Press; 2010.

66. Dahan A. Climate Expertise: between scientific credibility and geopolitical imperatives. *Interdisciplinary Science Reviews* 2008, 33:71-81.
67. Fogel C. The Local, the Global and the Kyoto Protocol. In: Long-Martello M, Jasanoff S, eds. *Earthly Politics, Worldly Knowledge. Local and Global in Environmental Governance*. Cambridge, MA: MIT Press; 2004.
68. Jasanoff S. Image and Imagination: The Formation of Global Environmental Consciousness. In: Miller CA, Edwards PN, eds. *Changing the Atmosphere*: MIT Press; 2001.
69. Demeritt D. The Construction of Global Warming and the Politics of Science. *Annals of the Association of American Geographers* 2001, 91:307-337.
70. Hulme M. Reducing the Future to Climate: A Story of Climate Determinism and Reductionism. *Osiris* 2011, 26:245-266.
71. Lahsen M. Trust Through Participation? Problems of Knowledge in Climate Decision Making. In: Pettenger ME, ed. *The social construction of climate change: Power, knowledge, norms, discourses*. Aldershot, UK: Ashgate Publishing; 2007, 173-196.
72. Stevenson H, Dryzek JS. *Democratizing Global Climate Governance*. Cambridge, UK: Cambridge University Press; 2014.
73. Beck S, Borie M, Chilvers J, Esguerra A, Heubach K, Hulme M, Lidskog R, Lövbrand E, Marquard E, Miller C, et al. Towards a Reflexive Turn in the Governance of Global Environmental Expertise. The Cases of the IPCC and the IPBES. *Gaia* 2014, 23:80-87.
74. Dahan A, Guillemot H. Les relations entre science et politique dans le régime climatique : à la recherche d'un nouveau modèle d'expertise ? *Nat. Sci. Soc.* 2015, 23:S6-S18.
75. Jasanoff S. A New Climate for Society. *Theory, Culture & Society* 2010, 27:233-253.
76. Aykut SC, Dahan A. La Gouvernance du Changement Climatique : Anatomie d'un Schisme de Réalité. In: Pestre D, ed. *Gouverner le Progrès et ses dégâts*. Paris: La Découverte; 2014, 97-132.
77. Giddens A. *The Politics of Climate Change*. Cambridge, UK: Polity Press; 2009.
78. Jordan A, Huitema D, van Asselt H, Rayner T, Berkhout F, eds. *Climate Change Policy in the European Union: Confronting the Dilemmas of Mitigation and Adaptation?* Cambridge, UK: Cambridge University Press; 2011.
79. Negt O. *Der politische Mensch. Demokratie als Lebensform*. Göttingen: Steidl Verlag; 2010.
80. Joly P-B. On the Economics of Techno-scientific Promises. In: Akrich M, Barthe Y, Muniesa F, Mustar P, eds. *Débordements. Mélanges offerts à Michel Callon*. Paris: Presse des Mines; 2010, 203-222.
81. Widerberg O, Pattberg P. International Cooperative Initiatives in Global Climate Governance: Raising the Ambition Level or Delegitimizing the UNFCCC? *Global Policy* 2015, 1:45-56.
82. Happaerts S. Sustainable development and subnational governments: Going beyond symbolic politics? *Environmental Development* 2012, 4:2-17.
83. Beck U. Climate for Change, or How to create a Green Modernity? *Theory, Culture & Society* 2010, 27:254-266.

^a Such a *longue durée* perspective has been proposed by authors suggesting a need for a 'Great Transformation' (Refs. 77 and 78) or a 'Third Industrial Revolution' (Ref. 79). However, these accounts suffer from a focus on technological solutions, while political and social dimensions of sustainability transitions receive less attention.