Coming to GRIPs With NETs Discourse: Implications of Discursive Structures for Emerging Governance of Negative Emissions Technologies in the UK

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As the international community rallies around Net-Zero emissions targets, there is increasing interest in the development of governance for Negative Emissions Technologies (NETs), a range of proposed approaches which involve removing greenhouse gases from the atmosphere. It has been pointed out that the governance development process should include "opening up" the discussion of NETs governance, moving the debate beyond the bounds of technocratic, neoliberal discourse and thereby paving the way for more responsible, inclusive governance of technologies. The implication is that there is a constitutive and qualitative link between discourse and governance – that governance development is shaped by discourse. However, so far there has been limited work done to link empirical mapping of the discursive structures in different spheres of the NETs debate to theoretically-informed anticipation of how these structures may influence governance development. This paper presents a sociology-of-knowledge (SKAD) discourse analysis of a series of interviews with UK representatives from the industry/policy interface about what they consider to be appropriate governance instruments for NETs. Linking discursive structures to governance development using the concept of governmentality, the paper critically discusses how a set of political, economic and ethical discursive structures currently underpinning the industry and policy spheres of the UK NETs debate may be shaping governance development. The paper shows what types of discourse/knowledge and social actors are being privileged/excluded within the structure of the UK NETs debate, and highlights ways in which discursive mapping can play a key emancipatory role in "opening up" governance development processes.

Keywords: discourse analysis, anticipatory governance, governmentality, negative emissions, climate change, sociology of knowledge

INTRODUCTION

As the international community rallies around Net-Zero Emissions Targets, there is increasing interest in the development of governance for Negative Emissions Technologies (NETs) – a range of proposed approaches for removing greenhouse gases, such as carbon dioxide, from the atmosphere (Honegger and Reiner, 2018)[1]. Some argue NETs will be an essential part of future climate response strategies, and that enabling governance is needed to incentivize development. Others emphasize the need for regulatory governance to anticipate and mitigate the potential environmental and socio-political risks of NETs research, development, demonstration and deployment (RDD&D) (Bellamy, 2018; McLaren et al., 2019). However, as the need for near-term governance of NETs RDD&D becomes clearer, calls for the integration of wider societal perspectives into the development of responsible, reflexive governance have become louder on both ends of this spectrum. Prominent proposals for responsible NETs governance are based on the assumption that "opening up" governance debates will move discussions beyond the bounds of technocratic, neoliberal discourse, thereby paving the way for more inclusive, responsible governance of technologies (Stilgoe et al., 2013; Bellamy, 2018; Low and Buck, 2020). The implication is that there is a constitutive and qualitative link between discourse and governance – that governance development is shaped by discourse. However, so far there has been limited work done to link empirical mapping of the discursive structures in different spheres of the NETs debate to theoretically-informed anticipation of how these structures may influence governance development.

In this paper I contribute to filling this gap by presenting a sociology-of-knowledge discourse analysis (SKAD) of a series of interviews – conducted as part of the Greenhouse Gas Removal Instruments & Policies (GRIP) project – with UK representatives from the industry/policy interface about what they consider to be appropriate governance instruments for NETs. Linking discursive structures to governance using the concept of governmentality, I critically discuss how a set of political, economic and discourse ethical structures currently underpinning the industry/policy sphere of the UK NETs debate may shape governance development.

The following section outlines my analytical framework, and illustrates how it can complement existing understandings of the role of discursive diversity in governance development. The subsequent sections present my methodological approach and detail the results of my analysis, showing how discursive structures are bounding and shaping the why (rationales), what (objects), who (subjects and speakers) and how (modes and instruments) of NETs governance in the UK, and highlighting three potentially emergent systems of thinking about the nature of governance, or "governmentalities."

The final section concludes by reflecting upon how coming to "grips" with the structuring role of discourse can contribute to the development of responsible NETs governance by; (1) anticipating and critically reflecting upon how given discursive structures may be making certain types of governance more/less thinkable and practicable, (2) emancipating those engaging in the NETs debate to recognize and (potentially expand the bounds of) the discursive power/knowledge structures they are reproducing, (3) identifying what types of knowledge may be missing in the current debate, and (4) informing the design of deliberative processes to further "open up" discursive diversity in NETs governance development.

ANALYTICAL FRAMEWORK: MAPPING DISCURSIVE STRUCTURES TO ANTICIPATE GOVERNMENTALITIES

The role of discourse in governance development has been increasingly recognized. However, the concept of "discourse" has various theoretical origins, and understandings of the exact nature of its role in political and societal processes are correspondingly diverse (cf. Leipold et al., 2019). A school of thought driven by the work of Jürgen Habermas has often been (implicitly or explicitly) taken up by those who emphasize the need for new modes of responsible and reflexive governance development. The Habermasean theory of discursive ethics puts forward an agency-focused understanding of "discourse," as an debate carried out by strategic actors behaving according to the logic of "communicative rationality." Based on the idea that social actors will argue rationally and equally within an egalitarian "discursive space," this understanding of discourse posits that bringing a range of perspectives and arguments into play will lead to more collectively acceptable, procedurally and substantively "better" governance outcomes (Habermas, 1987, 1996; Kerchner and Schneider, 2006, 2010).

This understanding of the role of discourse has increasingly found resonance within the field of environmental governance, in what some have termed "the deliberative turn [...] an increased attention in environmental politics to procedural qualities such as participation, dialogue, transparency and accountability" (Bäckstrand et al., 2010, p. 3) As others have pointed out, calls for new modes of environmental governance which aim to "open up" politics and make environmental governance development more inclusive and reflexive rest upon this underlying assumption about the nature and role of discourse – that broad participation by public and private actors in (carefully designed) collective discursive processes can "bring about both more legitimate and effective policy outcomes" (Bäckstrand et al., 2010, p. 4). This school of thought has also been taken up within the literature on Responsible Research and Innovation (RRI) of NETs (and climate engineering more broadly), which discusses the potential for egalitarian-consensual deliberative processes to "open up" NETs governance development (for a comprehensive overview of this literature, see: Low and Buck, 2020). However, deliberative engagements on governance development are often far from Habermas' ideal egalitarian discursive space. On the contrary,

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[1]Hereafter, NETs. Also known as Carbon Dioxide Removal (CDR) and Greenhouse Gas Removal (GGR). Often included under the umbrella term "climate engineering" (CE), which designates a set of heterogeneous proposals for intentionally intervening into the global climate system to reduce the risks of climate change (Shepherd, 2009).

such deliberative processes are more commonly "underpinned by large asymmetries of power and voice" which privilege certain types of knowledge, shaping what can be authoritatively said, and by whom (Young, 1996; Bäckstrand et al., 2010, p. 18).

I posit that a structural understanding of discourse can help to illuminate these underpinning power/knowledge asymmetries and how they may shape ongoing NETs governance development. In following with the Foucauldian-inspired Sociology of Knowledge Approach to Discourse (SKAD), I conceptualize a "discourse" as an often unrecognized power/knowledge structure – an interrelated system of ideas, concepts and categories – that shapes what it is possible to (legitimately, truthfully, authoritatively) know and say within a given debate. While not completely negating the agency of those engaged in debates, the SKAD approach posits that there is a difference between utterances made by individuals and the underpinning structures that shape such utterances. Rather than being completely free agents, this approach assumes that "in performing their articulations, social actors draw upon the rules and resources that are available via the present state of a given discursive structuration" (Keller, 2018, p. 20), and thus that specific utterances by individuals are (re)producing pre-existing discursive structures[2]. A SKAD analysis therefore aims to reverse-engineer such underlying structures from a pool of individual utterances, and to highlight the role they play in shaping social reality.

This understanding of the shaping function of discursive structures has twofold implications for how to conceptualize and analyze the role of discourse in environmental governance development. First, as discourses constrain how societal and political entities understand social and physical phenomena that are at stake in environmental governance, bringing more voices into deliberative processes may not change or "open up" the debate if all are operating within the bounds of same discursive structures. Rather, these privileged power/knowledge structures may continue to shape all new contributions to the debate, unless they are elucidated. Exposing such discursive structures may result in emancipating participants in a given debate to be more reflexive about the structures we/they are reproducing, and to potentially expand them. A structural understanding of discourse can therefore highlight the need for a different kind of "opening up" in governance development processes: There is a need to find the existing bounds of the discursive "blueprints" before the appropriate knowledge "walls" can be torn down. This is the main aim of mapping discursive structures underpinning governance debates: To assess what knowledge(s) and what truths about governance are influential and predominant, to explore the respective relationships of knowledge and power, and to subject them to criticism (Kerchner and Schneider, 2010; Bäckstrand and Lövbrand, 2016; Stielike, 2017).

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[2]Although resilient, a given discursive structuration is not set in stone: by (re)producing selective elements of a given structure, social actors may in turn alter the structure over time. This is aided by the elucidation of the contingency of such structures.

Secondly, a structural understanding of discourse posits a constitutive link between discourse and governance development, emphasizing that "social objects, subjects and relations […] are contingent and co-constituted through discursive practices that render some […] knowable and governable and others not" (Leipold et al., 2019, p. 446). By limiting what knowledges and truths about a given issue can be imagined and debated, discursive structures shape the formation of socially meaningful governance rationales, objects, and subjects, and can manifest themselves in the development of corresponding governance modes and instruments (Boettcher, 2019).

The concept of governmentality has been shown to be a useful analytical lens for exploring this constitutive link between discourse and environmental governance development (Stripple and Bulkeley, 2014; Bäckstrand and Lövbrand, 2016). The concept of governmentality was originally introduced by Michel Foucault as "analytical framework" to identify a "concrete historical assemble of elements (objects of knowledge, technologies of governing, practices and fields of the exercise of power)" involved in governing society (Kerchner and Schneider, 2010, p. 15, author's translation). Foucault used this analytical tool to investigate how historically contingent power/knowledge structures shaped differing objects, subjects and practices of governing in western Europe from the 16th to the 20th centuries (Foucault, 2008, p.1978; Kerchner and Schneider, 2010). The concept has since been taken up by the field of Governmentality Studies and further defined as "a system of thinking about the nature of the practice of government (who can govern; what governing is; what and who is governed), capable of making some form of that activity thinkable and practicable to both its practitioners and to those upon whom it is practiced" (Gordon, 1991, p. 3).

The governmentality concept offers a lens which "problematizes the collective and often taken for granted systems of thought that make governing strategies appear natural and given at certain times in history" (Stripple and Bulkeley, 2014, p. 10). Governmentalities "define both the objects (what should be governed) and nature (how they should be governed) of governing, in effect rendering reality governable through the collecting and framing of knowledge" (Bulkeley et al., 2007, p. 2736). As discursive power/knowledge structures are conceptualized as (one of the) constitutive preconditions of governance practices and infrastructures, mapping these structures is aimed at "the making visible […] of the different ways in which an activity or an art called government has been [is being] made thinkable and practicable" (Burchell et al., 1991, p. ix).

For my analysis, I conceptualize a governmentality as a system of thinking about the nature and practice of governing which (a) is underpinned by a principle form of knowledge, (b) is linked to a particular governance rationale (why), (c) shapes particular governance objects and subjects (what and who), and (d) makes the development of specific governance modes and instruments (how) thinkable and practicable (Burchell et al., 1991; Gordon,

1991; Foucault, 2008, p. 1978; Kerchner, 2010; Kerchner and Schneider, 2010; compare Stripple and Bulkeley, 2014; Stielike, 2017 for discussions of both the Foucauldian original and the recent iterations of the concept)[3].

I use this concept as a heuristic lens to structure and discuss the results of my SKAD analysis. The discursive mapping of the emergence of governmentalities is often done retroactively – tracing the "history of the present" to see how past discursive structures have manifested into current institutions, practices, policies and technologies of governing (Kerchner, 2011; Stripple and Bulkeley, 2014). However, based on the SKAD understanding that the *ongoing* social construction of reality can be discursively traced (Hornridge et al., 2018), I use the concept in an anticipatory manner – by mapping how current discursive structures underpinning the UK NETs governance debate may be forming the "discursive blueprints" for three emerging governmentalities, and critically discussing how they may shape the development of future governance arrangements. Before I present and discuss the results of the analysis, the following section outlines my methodological approach.

METHODOLOGICAL APPROACH: BREAKING DOWN DISCOURSES TO OPEN THEM UP

Data Collection: Interviews

The data pool for my analysis was a series of 25 transcripts of interviews carried out with representatives from the intersection of the UK industrial and policy spheres[4], as discursive structures at the policy/industry interface have previously been shown to be particularly influential in shaping climate and technology governance (Litfin, 1994; Hajer, 1995, 2005; Stripple and Bulkeley, 2014). Sourcing the interviewees was based on two criteria: (1) an active role at the industry/policy interface in the UK, and (2) prior knowledge about NETs[5]. The initial interviewees were asked to suggest further relevant interview partners who fulfilled the above criteria. The resulting pool of interviewees included parliamentarians, ministerial employees, policy advisors, investment advisors, industrial advocacy group members, and industrial organization representatives. The UK was selected for this analysis as it was one of the first major economies to commit itself to achieving a Net-Zero emissions, and as such is one of the few countries with a relatively well-developed debate on the complex issues related to the

development and governance of NETs (Daggash et al., 2019; Cox et al., 2020). However, although the interviewees were sourced to be representative of the industry/policy sphere in the UK, the discursive structures identified in this paper are certainly not the only ones being reproduced in the broader NETs governance debate. Rather, this analysis outlines one set of discursive structures at play within what is considered to be one key sphere of the NETs governance debate. Other analyses have shown the importance of assessing discourses and their potential effects on the development of NETs governance in a range of countries, and among diverse stakeholder groups (see e.g., Biermann and Möller, 2019; Cox et al., 2020; Möller, 2020). Mapping discursive structures in wider spheres (i.e., science and civil society) and countries (i.e., other leaders in NETs research such as Germany and the USA, as well as countries of the Global South) to allow for critical comparison with the results presented here is therefore the focus of ongoing research (see e.g., Boettcher, 2019).

The interviews were conducted as part of a larger NETs governance project, entitled the Greenhouse Gas Removal Instruments & Policies (GRIP) project[6]. The stated primary purpose of the interviews was to understand the policy instruments and policy pathways that could help encourage (or if necessary constrain) the research, development, demonstration and deployment (RDD&D) of NETs. Each interview was semi-structured around a series of fifteen questions eliciting the interviewees' opinions on (1) what sorts of NETs approaches should (not) be the focus of policy instruments, (2) why, and (3) how such instruments might be implemented in the UK context. The semi-structured nature of the interviews was designed to encourage further questions to arise as the interviews progressed, to allow responses to be fully probed and explored, and to allow the interviewers to follow up on relevant issues raised spontaneously by the interviewees (cf. Yeo et al., 2013).

Methods: Open Coding and Iterative Structural Mapping

The SKAD discourse analysis approach employed in this study is designed to systematically reverse-engineer discursive structures underpinning a pool of individual utterances: it is an empirical deconstruction and interpretative reconstruction of discursive power/knowledge structures, with the aim to map these structures and to make visible the contingencies in the work they do (Keller, 2018, p. 29). Following the SKAD approach, I first created a data pool of discursive products which contained a range of individual utterances related to a specific topic (in this case a series of interview transcripts about NETs governance), and a set of heuristic questions to guide the search for discursive elements and structuring rules. Reflecting the above elements of governmentality as a heuristic lens, these questions included: *What types of governance rationales are underpinning calls for NETs governance? What is being constructed as the object(s) of NETs governance? What speaker and subject positions are*

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[3]I am using a limited governmentality concept which focuses on the discursive elements of emerging governmentality ensembles (which I call discursive 'blueprints'). Other elements of mature governmentality ensembles (i.e. infrastructures, practices, policies, technologies) are not yet able to be assessed because they are in the process of being formed.

[4]This sample size in line with the standard practice in qualitative interview-based research of including between 15 and 30 interviews in case-studies such as this. This ensures that data saturation can be achieved, but does not result in a data pool too large to permit detailed in-depth qualitative analysis. (cf. Guest et al., 2006; Baker and Edwards, 2012).

[5]The initial interviewees had all previously attended workshops, conferences and engagement events on NETs and Climate Engineering more broadly and thus were known to be well-informed on the topic.

[6]The interviews were carried out by a two-person team (a social scientists and a natural scientist) with extensive background knowledge on proposed NETs technologies and policies.

available within the structure of the UK NETs governance debate? What knowledge types are linking these discursive elements into emerging systems of thinking about the practices of governing (governmentalities) in which certain governance modes and instruments are thinkable and practicable?

I undertook a preliminary analysis of the material to identify how the discursive elements "rationales" (why) "governance objects" (what), "speaker/subject positions" (who), and "governance modes/instruments" (how) appeared in the transcripts. I then systematized the transcribed interview data for analysis through a process known as "open coding," which involved inductively organizing the elements identified in the transcripts into categories with the help of the qualitative text analysis program MAXQDA (Hardy et al., 2004). The next step involved identifying recurring rules with which discursive elements were related. These included patterns of classification and differentiation, relationships of equivalence and contrariety between elements of the discourse. This was a recursive process in which preliminary findings were checked against further empirical material from the data pool. My iterative analytical approach is outlined in **Figure 1** and has been described in more detail elsewhere (Boettcher, 2019). The result of this analysis was a map of discursive structures shaping governance rationales, objects, subjects, speakers, modes and instruments in this sphere of the NETs governance debate, and the identification of the types of knowledge linking them into systems for thinking about the nature and practice of governing. The results and their potential implications for NETs governance development are detailed and discussed in the following section.

FIGURE 1 | Iterative analytical approach (Boettcher, 2019).
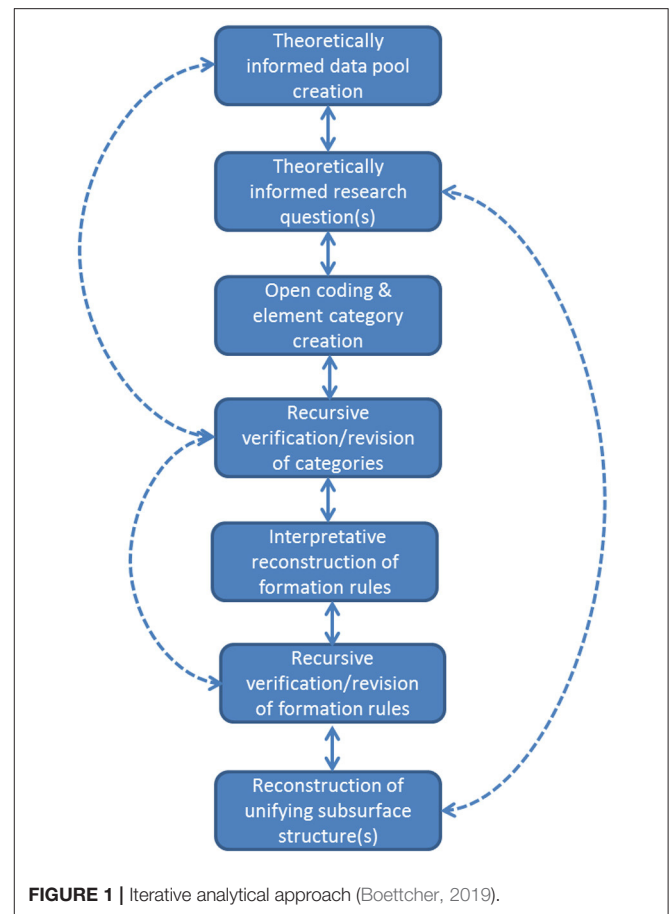
RESULTS AND DISCUSSION: THREE EMERGENT GOVERNMENTALITIES LINKING THE WHY, WHAT, WHO AND HOW OF NETs GOVERNANCE

Results

My analysis showed that the individual discursive elements structuring this sphere of the NETs governance debate are bound by distinct types of political, economic and discourse ethical knowledge, in what may be three "discursive blueprints" for emergent NETs governmentalities (**Table 1**). The following section describes individual elements of these three emergent governmentalities, showing how each (a) is underpinned by a principle form of knowledge, (b) linked to a particular governance rationale (why), (c) shapes particular governance objects (what), provides certain speaker and subject positions (who), and (d) makes the development of specific governance modes and instruments (how) thinkable and practicable.

Governmentality 1: "Keeping It Real"

Key discursive elements of emergent governmentalities are rationales for why governance is needed. Such rationales provide a narrative basis for the formation of the what, who and how of governance. Among the range of rationales (re)produced by interviewees for why they considered the governance of

NETs necessary, three categorization patterns based on differing knowledge types emerged (**Table 2**).

The discursive governmentality template G1 is underpinned by a form of realist political knowledge which focuses on power balancing. This is reflected in the strategic governance rationales which provide the "why" within this emerging system of thinking about the nature of governing, positing that the purpose of NETs governance is relative power and responsibility balancing, and strategically positioning the UK within a wider system (i.e., of international climate politics) (cf. Jinnah, 2018; Boettcher, 2019). According to these strategic rationales, governance is deemed necessary for planning of NETs to ensure that the UK is able to meet its agreed political climate targets and establish/solidify its leading position relative to other nations as this new branch of climate policy accelerates, as the following example illustrates: "So our current Conservative government could press ahead with this, with relatively little opposition and a lot of political agreement from Lib Dem and Labor opposition. So if we have that consensus in Britain, why not carry on with this political pretense that the UK is a world leader in tackling climate change, showing how to decarbonise our economy?"(I21)

The interviewees discussed a wide range of proposed NETs approaches, including, peat bog enhancement, biochar, enhanced weathering, ocean alkalinity enhancement, ocean

TABLE 1 | Discusive "blueprints" for emergent NETs governmentalties in the UK industry/policy sphere.

	Knowledge type	Rationales (Why)	Objects (What)	Speakers & *subjects* (Who)	Mode (How)	Instruments (How)
G1 "Keeping it real"	Political realism	Strategic: governance as relative power & responsibility balancing, strategic positioning	External differentiation Approaches suited to achieving strategic aims/political targets	Ambitious leader Conflicted strategist	Coercion: Punishment and control within a hierarchical structure	Regulation, enforcement of technology standards, MRV, icensing/certification procedures
				Uninformed optimist		
G2 "Winners come out on top"	Utilitarian economics	Functional: governance as problem solving, risk management, cost-benefit implementation	Internal specification I.e., approaches with best cost/benefit rating	Innovation catalyser: Responsible information provider Profit-maximizer	Incentive: Competition within an egalitarian marketplace	Financial incentives, tax rebates, subsidies, prizes, government expenditure
				Unconstructive agitator		
G3 "Let's talk about it"	Discourse ethics	Normative: governance to strengthen existing norms or create new ones, to ensure/increase justice and equality	Internal specification I.e., approaches which are the most societally acceptable, just, equitable	Principled gatekeeper Wise policy demander	Persuasion: Arguing & bargaining, strategies of communication within a "flat" deliberative space	Education, public deliberation, moral persuasion, political signaling
				Passive policy recipient		

TABLE 2 | Rationales and knowledge types structing calls for governance.

Governance rationales	Examples	Rationales & knowledge types
NETs governance is need for long-term strategic planning to meet political targets	We need a strategy for developing options to remove greenhouse gases from the atmosphere because they will be vital for the kinds of deep de-carbonization targets. We already have 80 per cent by 2050, but also on the path to Net-Zero emissions and possibly beyond (I2)	G1: Strategic/political: Governance as relative power & responsibility balancing, strategic positionig
NETs governance is needed for the UK to keep up, get ahead: China, America, Germany and other nations are moving ahead on NETs RDD&D.	There are questions around whether the UK wants to – the UK government wants to be a world leader, as it were, in CCS, or whether it would prefer to allow a sort of technology transfer from abroad (I6)	
Mitigation is not enough to mitigate climate risks. Governance should also incentivize development of deployable NETs approaches.	We're not going to make it by mitigation alone, we're failing on mitigation anyway, and that there are these potentially cost-effective win/win solutions that are not being explored (I19)	G2: Functional/economic: Governance involves efforts toward rational problem solving, driven by utilitarian cost-benefit calculations and risk management concepts
Governance policy should not pick winners, but support development of everything that might be useful	My interest I guess is in maintaining a broad sweep of solutions in as far as they are solutions and providing policy to support them (I11)	
The role of governance is to provide market security to ensure investment into NETs development	I think there's enough unused innovation that you could use price signals to unleash some of that (I12)	
Governance is needed to build trust in and understanding of NETs.	That's why I talked about trying to build trust, because at the moment there is very little. And if we could generate that and get people to understand, get governments to commit themselves; […] I think could generate some more trust, and maybe a sense of contracting and converging at the same time (I22)	G3: Discourse ethical/normative Governance to strengthen norms such as justice and equality through the promotion of participation, transparency, legitimacy and responsibility
Governance should ensure broad perspectives are taken into consideration to make decision-making on NETs RDD&D legitimate and robust	If you can actually get to those true constructive multi-stakeholder dialogues you can design really cool policies that are genuinely win-win, internalizing all of that external complexity, have a lot of momentum and support behind them because everyone was involved in their creation, be less likely to fall foul to nature in the real world because you've got more perspectives feeding into it before it needs to go out there and get tested in the real world (I23)	

TABLE 3 | Governnace objects shaped by discusive stuctures.

Categorization structures	Classification criteria	Examples	Rationales & knowledge types
External differentiation: Lumping NETs for governance purposes based on intent	All techniques that help achieve political climate targets by removing CO_2 from the atmosphere	Potentially all negative emissions, one day, will be playing a pivotal role as well, in order to achieve the temperature cap (I5) Well, in the context of the Paris Agreement I suppose it's the concept of Net-Zero that's the key thing, so yes we probably will need GGRs to offset the hard-to-treat sectors to reach net-zero (I8)	G1:Strategic/political: governance as relative power & responsibility balancing, strategic positioning
Internal specification: Splitting NETs for governance purposes based on specific criteria according to underpinning knowledge type	Cost-effectiveness	Cost per ton of carbon removed is an obvious metric. It's a kind of bread and butter metric that's used and there is guidance for policy appraisal on what the value of carbon should be in thinking about whether a strategy is sensible to pursue or not (I2)	G2:Functional/economic: governance as problem solving, risk management, cost-benefit implementation
	Verifiability	From a policy perspective if our reporting and the inventory shows no change but we're deploying all these technologies then it might be good for the atmosphere and the greenhouse gases but it means we can't actually demonstrate that we deliver it. So there is a need to develop the methodologies of how we actually acknowledge the reductions, well the capture (I4)	
	Permanence	But in terms of the interventions required in the carbon cycle, probably 100 years is the target time line. If it isn't going to stay locked up and somehow repurposed for 100 years then it's not going to deliver the climate stability that we need (I21)	
	Scalability	It's the scalability and the impact that we're going to get at the end, isn't it? So how much of this could actually be done really matters, because we're short of capacity to get the job done (I12)	
	Co-benefits	At the other end, it has to be that this is big business. You run the co-benefits properly, you get big numbers (I12)	
	Social acceptability	In terms of public engagement and how the very necessary conversation with the public or involved actors more generally would be, be they individuals or some companies or farmers, whatever, my sense is a more useful engagement for all involved may hang on discussing specific technologies and their range of characteristics going beyond climate change than it would by having a discussion about greenhouse gas removal technologies and how that specific technology fits into the greenhouse gas removal picture (I5)	G3: Discourse ethical/normative: governance to strengthen existing norms or create new ones, ensure/increase justice and equality

fertilization, bioenergy and carbon capture at source (BECCS), ocean afforestation, direct air capture and storage of carbon dioxide (DACS), and methods for enhancing carbon drawdown through agricultural and forestry management practices. As is to be expected when governance for an as-yet nascent set of technologies is being discussed, there was little agreement among interviewees on what specific set of criteria should make a certain NETs technique an object (what) of (enabling or restrictive) governance. However, the cross-cutting analysis revealed two shared structures underpinning the multitude of ways in which interviewees referred to the "what" of NETs governance: The categorization and classification of NETs approaches drew upon patterns of external differentiation - what counts as an a NETs governance object and what does not - and internal specification of specific types of NETs as the objects of enabling or restrictive governance, based on differing types of knowledge (**Table 3**).

The object - the "what" of governmentality G1 - is in keeping with the underpinning political knowledge type: NETs is conceptualized according to the structuring rule of external differentiation as a unified governance object. External differentiation refers to the ways in which objects are defined

in contrast to what they are not. As the examples in **Table 3** exemplify, external differentiation of NETs for governance purposes focused on the technologies' intent: According to this broad categorization structure, all proposals with the intent to remove CO_2 from the atmosphere to achieve climate targets (temperature or emissions targets) can be lumped together for governance purposes. Those proposals that do not intend to remove CO_2 from the atmosphere for the purpose of achieving climate targets would not be categorized as NETs for governance purposes (for example CO_2 capture and utilization for enhanced oil recovery). Likewise, measures that aim to achieve climate targets through other means (i.e., emissions reductions or altering the earth's solar radiation balance) are externally differentiated as not falling within the bounds of a broad NETs governance object. External differentiation based on intent is therefore linked to strategic rationales and the associated political logic of G1 which posits NETs governance should enable strategic planning to achieve political ends.

The discursive structures underpinning a given debate offer a range of active speaker positions and passive subject positions to social actors who engage with the topic. Whereas, active speaker

TABLE 4 | Speaker positions (active) offered by discsive structures.

Speaker position	Roles in governance	Examples	Social actors	Knowledge types
Conflicted strategist	Strategically balancing planning long-term policy to prevent dangerous climate change, and acting reactively short-term to maintain political power	Politicians have become less interested in development of ideological thinking that they sell to their constituents, and actually just want power now (I24) If there is a sort of deeper strategic reasoning behind that for how to still actually get to the end goal of 1.5 degrees and saving the future of humankind and back to stable climate and healthy oceans, I've not yet see that manifest within that strategic reasoning. I think it is often thinking one move ahead (I23)	Policymakers, government leaders	G1: Political
Ambitious leader	Taking the lead on NETs, setting an example, developing governance standards for the world	[…] people are saying the UK is one of the more forward thinking countries on GGR against a very sparse background of competitors (I2)	Policymakers, government leaders	
Responsible information provider	Providing unbiased information on risk/benefits of NETs to inform the development of governance	[…] understanding of climate science and the requirement of what needs to be done and then set the challenges around what needs to be done and demonstrate the practicality of achieving some of those challenges (I13)	Scientists, civil society	G2: Economic
Innovation catalyst	Bridging the policy gap to catalyze innovation through investment, thinking long-term, acting rationally to incentivize NETs	I do think the sort of private sector groupings be it within their own industries or with charitable organizations is very important in giving government sometimes a catalyst for action I would say (I1)	Philanthropists, investors	
Self-benefit maximizer	Calling for/supporting NETs polices which maximize their own (financial) benefit/profit	We think regulatory certainty around carbon price is a very good thing, but needs careful thought. In terms of what the money is used for I think there will be lots of people saying it should be used for me, me, me please and Net-Zero technology should be one of a number of things (I15)	Industry	
Wise policy demander	Calling for action in the form of long-term NETs/climate policy for the common good	We think the wider climate change discussion at the moment is about sacrifice and it's about altruism, but it's really taking direct sacrifice and taking a direct hit to your stakeholder group to benefit another stakeholder group (I23)	Publics, civil society	G3: Discourse ethical

positions provide access points for social actors to actively contribute by reproducing certain power/knowledge structures, passive subject positions are discursive "templates" for roles which are commonly associated with silent "others" (Keller, 2018: 36). My analysis revealed a relatively wide range of discursive templates for governance roles available within the structure of the UK NETs debate, as outlined in **Tables 4**, **5**. Six of these are active speaker positions ("conflicted strategist," "ambitious leader," "wise policy demander," "responsible information provider," "innovation catalyst" and "self-benefit maximizer"). Three are passive subject positions ("passive policy recipient," "unconstructive agitator" and "uninformed optimist")[7].

The configuration of speaker and subject positions ("who") available within governmentality G1 privileges political knowledge: If the "what" of governance consists of all NETs approaches that help the UK achieve strategic political goals, and the "why" is relative power balancing by the UK in international (climate) politics, a limited spectrum of active speaker positions are available to social actors who (re)produce this type of

political knowledge, while relegating other societal actors to passive subject positions. For example, the "conflicted strategist" speaker position provides a discursive template for social actors strategically balancing long-term NETs policy planning and acting in the short-term to maintain political power. On the one hand, this speaker position is associated with enabling strategic NETs planning to achieve long-term climate targets; on the other, there is also a focus on short term gains, associated with office-seeking policy-makers. An example of an interviewee assigning this speaker position is: "Governments with their short-term views and so forth will wriggle as much as they can and seize on anything instead of tackling the really difficult issues of reducing our energy consumption and emissions" (I22).

Likewise, the "ambitious leader" speaker position offered within G1 involves taking the lead on NETs by setting an example and establishing governance standards for the world, and is associated with policymakers and government leaders, as reflected in the following example: "So both in terms of […] scale up within the UK but also potential where UK has a natural leadership or expertise which it can become a market leader in really. I think that's something it is always quite keen on" (I1).

Also in accordance with the privileging of political knowledge, the "uniformed optimist" subject position available within

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[7]Speaker and subject positions are not mutually exclusive. They can be adopted by different types of social actors, and social actors can adopt or be assigned a range of speaker and subject positions, as indicated in **Tables 4**, **5**.

TABLE 5 | Subject positions (passive) offered by discursive structures.

Subject position	Roles in governance	Examples	Social actors	Knowledge types
Uninformed optimist	Optimistic about climate governance, without understanding what needs to be done to achieve political climate targets	There's this huge gap between what people believe is possible and what is actually needed to address the two degree target" (I25) So I would say most people would say you need GGRs in the 2050's without understanding that […] the Committee on Climate Change has set it out as they see I think 48 million tons of […] CO_2 being removed by BECCS by 2050 and that's just there in the model without any understanding of that's a lot and also how […] do we get to that position? (I1)	Civil society, publics	G1: Political
Unconstructive agitator	Raising (unjustified) concerns which risk putting undue restrictions on development of (cost) effective (NETs) solutions to address climate risk	The NGOs [are] all screaming about how this is watering down efforts to invest [in] the things that they want to see delivered (I11) […] but were very clear cut that green groups were being unhelpful and being essentially a blocker to CCS (I14).	Civil society, publics	G2:Economic
Passive policy recipient	Passively waiting to be persuaded, placated, convinced that a given NETs policy is in their best interests	Again, in fields where you could have strong benefits that people get behind, but I feel like you'd need to convince people, you'd need to get the information strategies right (I9) Just giving meaning to the greenhouse gas removal so that people understand it better, and then are able to align the values with what these effectively technical solutions might bring. It just needs to soften them up a bit (I24)	Civil society, publics	G3: Discourse ethical

this governmentality provides a template for a governance subject who does not fully understand the seriousness of the (climate) situation and what needs to be done, but trusts that political actors will be able to solve the problem. This subject position implies elements of technological optimism and a lack of understanding of the socio-political complexity of dealing with climate change. This subject position locates non-political actors (i.e., publics, industries) at the end of the governance development pipeline, where they can only wait to be informed why a policy is in their best interests (see **Table 5** for examples).

My analysis of the shared structures underpinning the multitude of ways in which the interviewees categorized the "how" of NETs governance, and revealed three categorization patterns of coercive, incentivizing and persuasive governance modes and corresponding instruments (**Table 6**).

The "how" of NETs governance within G1 is linked by the realist political logic to the coercive mode of governance which focuses on punishment and control within a top-down, hierarchical structure. This could translate into governance instruments such as bans and moratoria for those types of NETs deemed unsuitable to help achieve strategic political aims, and the enforcement of regulatory control over the development of those that are deemed suitable (**Table 6**). Concretely, this mode of governance can be linked to instruments, including regulations to restrict certain types of NETs activities, the establishment of NETs technology standards and licensing/certification procedures, the enforcement of monitoring, reporting and verification (MRV) procedures, and the development of policy frameworks forcing polluters to finance and/or implement the development of NETs.

Governmentality 2: "Winners Come Out on Top"

This potential governmentality is structured around utilitarian economic knowledge that focuses on the pragmatic weighing of overall costs against overall benefits. As **Table 2** shows, this system for thinking about the nature of governance incorporates functional governance rationales ("why"), positing that NETs governance is primarily about problem solving, risk management, and cost-benefit implementation (cf. Jinnah, 2018; Boettcher, 2019). Economic rationales emphasize that governance policy should not pick NETs winners, but rather allow free competition between alternative options, and that the primary the role of governance is to provide market security to ensure investment into NETs development, as the examples in **Table 2** illustrate.

As shown in **Table 3**, in contrast to the "lumping" categorization of NETs based on external differentiation evident in G1, the economic logic of G2 underpins patterns of internal specification which split NETs into specific objects of governance ("what") based on a range of cost-benefit criteria, for example by specifying governance for more vs. less cost-effective NETs techniques, as the following passage illustrates, "I think anything in the UK context, in the current context, at least, everything is within the current sort of financial – the tone of finances at the minute. Everything must be cost-effective, there's very much a policy focus on making sure that we get the most cost-effective solutions for everything. And I think that would apply to GGR as a whole" (I6).

Within this emergent governmentality, active speaker positions ("who") are offered to those social actors who (re)produce economic knowledge, while passive subject positions are associated with those who do not conform to the utilitarian logic, as illustrated in **Tables 4**, **5**. For example, the "self-benefit maximizer" speaker position provides a template for social actors to push for governance which maximizes their own (financial) benefit and is associated with industrial actors, as the following quote illustrates; "Well, strategy and governance,

TABLE 6 | Governance modes and instruments shaped by discusive structures.

Governance mode	Governance instruments	Examples	Knowledge types
Coercion: Prohibition and punishment within a hierarchical structure	Regulations to restrict certain types of NETs activities, and/or require polluters to implement NETs to comply with emissions limits Enforcement of NETs technology standards, licensing, monitoring, reporting and verification (MRV)	I think that ought to be regulation […] I think with financial incentives, you could create, very quickly, false incentives which you haven't really foreseen (I5) Something else which I think is important is enforcement. […] If you are operating any of these systems and offering any incentives to them, you've got to have a system for monitoring whether or not they are doing what they said they would do, because mostly they don't do it. (I12) I suppose technology standards - we could think about emissions limits. Which would essentially mean that some embitters would require [NETs] in order to comply with those (I14)	G1:Political
Incentive: Competition within an egalitarian marketplace	Financial incentives to conduct certain types of NETs RDD&D, carbon pricing, tax rebates, subsidies, prizes, government expenditure	So you want to get it down to something that's cost effective in a market, which has a sensible carbon price. […] To get there you probably need some kind of tax break or prize and then a little bit more support. And ideally you would bring down that support at the right rate, that you don't spend too much of tax payer's money, but you'd get it into a position where, where there is a carbon tax or a carbon price of some sort, it can compete on its own two feet (I2) [..] effectively a subsidy or a prize for people who are building units of kit, whether it's BECCS or direct air capture or something along those lines. Because then you show that there is financing in here and that the government is serious about trying to make a route to a market of some sort. And also you can flush out what price people think they need to get their stuff to run (I2) It's about incentivising a change in land management which is perceived to have a negative impact on the income of land owners and land managers, so they are looking for some sort of compensatory payment so payment for ecosystem services we think is the most likely way of doing that (I4) I would see the way forward in the financial incentives, and that is the push via the research support and that, potentially, the pull via carbon price (I5)	G2:Economic
Persuasion: Arguing & bargaining within a "flat" deliberative space	Education, moral persuasion, political signaling, public deliberation & dialogue on the potential advantages/disadvantages of NETs	It's really important that if we're going to do big things, like making some interventions in the balance of land use around the planet, in order to help stabilize our planetary system for future generations, there needs to be a dialogue to explain to the people who can be bothered to read about it why this is necessary and why on balance it's the right thing to do (I4) And then the other kind of model that's coming out of this discussion is one where communities feature in some kind of sense […] because they have a certain interest in preserving a certain kind of environment or a certain kind of livelihood, and that therefore they have to be the arbiters of what works (I22)	G3:Discourse ethical

I mean I would have thought you'd be looking at the fit with our existing economic pressures, so the potential for this to be of benefit to us given market opportunities etc. would be influential" (I16).

The utilitarian logic likewise underpins the "responsible information provider" speaker position available within G2. Social actors adopting this speaker position are offered a privileged role in providing unbiased information to help weigh up the risks and benefits of NETs and thus inform the development of governance. This speaker position is associated primarily with scientific experts, as can be seen in this example, "You need simplification and clarity around the regulation. So you need a scientific consensus over what is the lifecycle of the various kinds of materials that might be used in this way" (I12).

The "innovation catalyst" speaker position available within G2 likewise reproduces an economic logic, providing a template for governance roles: acting (economically) rationally to incentivize NETs RDD&D, and bridging the policy gap by driving innovation through investment. This speaker position is associated with both private and public financial investors. An example of an interviewee reproducing this speaker position is: "Another way

to this has got to be the institutional investors. If you can convince the institutional investors that they need to take this more seriously, that is as powerful as BlackRock – [as the] top 10 largest countries in terms of the size of their funds. If you can get them to start paying, I think that's just as powerful as the government coming out with strategies. It's never going to be great, but the institutional investors are highly rational, they think long-term" (I25).

Conversely, the "unconstructive agitator" subject position within this governmentality assigns a discursive template for social actors raising (unconstructive and unjustified) non-utilitarian concerns about NETs governance which risk putting undue restrictions on the development of potential (cost-effective) solutions to address climate risks. Rational economic actors are thus posited as being confronted with "the wrath of the highly polarized argumentation that the NGO and advocacy movement has around greenhouse gas removal" (I25).

The constellation of economically informed rationales, objects and subjects within this governmentality has consequences for the "how" of NETs governance: The economic logic translates into the governance mode of incentivisation to promote

competition among different types of NETs activities within an open market place, and could materialize into governance instruments such as direct government expenditure or subsidies for NETs development, as outlined in **Table 6**. Concretely, this can be related to the establishment of instruments which provide financial incentives to conduct certain types of NETs RDD&D, including carbon pricing, tax rebates, subsidies, prizes, and direct government expenditure.

Governmentality 3: "Let's Talk About It"

The elements that make up the discursive blueprint for this potentially emergent governmentality are organized around a form of discourse ethical knowledge that focuses on consensus-building around the "common good" and the persuasive powers of communication in deliberative democratic processes. This governmentality incorporates normative governance rationales ("why"), which advance that governance should strengthen norms such as justice, equality, transparency, legitimacy and responsibility through, inter alia, the promotion of stakeholder participation in deliberative democratic practices (**Table 2**).

The governance objects ("what") within the nascent governmentality G3 are shaped by patterns of internal specification based around ethical criteria in line with its underpinning knowledge type, primarily resulting in a split between more (potentially) socially acceptable vs. less socially acceptable NETs approaches as potential governance objects, as the following example shows: "So some of these techniques are actually quite radical and will require some strange things to happen, so understanding how the public perception would be on this, especially as you're looking at something which needs to be approved by ministers and MPs and they reflect the public opinion of their constituents. So if it's something that's going to engender a lot of negative public reaction you've got to be aware of that quite early on" (I4).

The configuration of speaker and subject positions ("who") within G3 offers the "wise policy demander" as an active speaker position to publics to participate in calling for long-term NETs policy for the common good. This stands in contrast to the passive subject positions assigned to publics in the other governmentalities (**Table 4**), and is associated with publics and civil society actors. An example of an interviewee reproducing this speaker position is: "And so I think the public […] can be very wise on these subjects and worth consulting; and I think that is a policy option is for governments at many levels […], to consider proper public consultation […] Then they will very likely come out with a wise suggestion" (I22).

The discourse ethical knowledge that links governance rationales, objects and subjects in this "system of thinking about the nature and practice of governing" also has implications for the types of governance modes and instruments ("how") which may emerge if this governmentality manifested: In accordance with the discourse ethical assumption that persuasive communication with an egalitarian deliberative space will lead to a consensus around the most collectively acceptable governance options, the governance mode "persuasion" is key: facilitating societal decision-making on NETs RDD&D through communication, education, moral persuasion, political signaling,

public deliberation and dialogue on the potential advantages and disadvantages of individual NETs approaches (**Table 6**). This could, in turn, materialize in NETs governance instruments that focus on education, moral persuasion and political signaling, with increased emphasis on deliberative and participatory governance processes.

Discussion

These three discursive blueprints for emerging governmentalities are not to be taken as firmly established, mutually exclusive, or exhaustive. As pointed out in the methods section, the selection of interviewees from the UK policy/industry sphere means that the results outlined here only represent discursive structures underpinning one *sphere* of a larger NETs debate within the UK, which is in turn part of a much larger transnational discussion. This means that the discursive blueprints detailed above and outlined in **Table 1** are ideal types, elements of which are being reproduced by those engaged in this specific sphere of the UK NETs debate. Using these ideal types as a reference, we can inquire if similar systems of thinking about the nature and practice of governance may also be underpinning broader discussions of NETs and climate policy, and help to identify what types of knowledge present in the wider debate may be marginalized in the UK industry/policy sphere.

In their review of multilevel policies with potential relevance for NETs in Sweden, Fridahl and Bellamy identified a similar set of incentivisation, coercion, and persuasion governance modes as those outlined above, which – building on a categorization of policy instruments introduced by Bemelmans-Videc et al., – they call "carrots, sticks, and sermons" (Bemelmans-Videc et al., 2010; Fridahl and Bellamy, 2018). Their mapping exercise showed that the majority of current policy instruments with relevance for NETs in Sweden fell into the "carrots" or economic incentivisation category, underpinned by an economic logic analogous to the one I identified as being key to G2. Similarly, in their exploration of potential policy levers for negative emissions technologies, Cox and Edwards highlight the predominance of economic incentivisation logics in policy proposals based on carbon taxation in the NETs literature (Cox and Edwards, 2019). Further recent examples of NETs policy proposals which similarly reflect an economic logic include: Direct governmental payments to land managers and farmers for the provision of ecosystem services through carbon sequestration in soil and the biosphere (Lal, 2020), including bioenergy with carbon capture and storage (BECCS) in the Swedish carbon tax incentive mechanism (Karlsson et al., 2017), an international market mechanism to link financing of NETs to sustainable development (Honegger and Reiner, 2018) and the proposed introduction of negative emissions credit mechanism in the UK (Platt et al., 2018).

The literature also contains NETs policy proposals reflecting coercive, political logic similar to the one I identified underpinning G1. Fridahl and Bellamy call policies which reflect a coercive governance mode "sticks," and the examples they highlight in the Swedish case include regulatory instruments to provide "clarity on rules and responsibilities related to prospecting, building, and operating transport and storage

facilities" for captured CO_2 (Fridahl and Bellamy, 2018, p. 66). Other authors have similarly highlighted proposals for the enforcement of top-down regulatory control over NETs RDD&D processes, for example via Environmental Impact Assessment procedures (EIAs) and the establishment of legal authorization processes for (surface and subsurface) land use (Hubert and Reichwein, 2015; Hester, 2018). Others have called for the establishment of centralized monitoring, reporting and verification (MRV) procedures to hold companies, industries and states accountable for their NETs achievements, identify "leaders and laggards" and ensure that those who lag behind politically prescribed Net-Zero targets can held (financially) responsible (Geden and Schenuit, 2020). Some have also suggested direct coercive measures which place an obligation on emitters to implement NETs – for example by "requiring new and/or existing fossil fuel power plants to be converted to biomass and fitted with a CCS [carbon capture & storage] facility" (Bellamy, 2018, p. 533).

In contrast to the economic and political logics, the discourse ethical knowledge type I identified underpinning G3 seems less well represented in the wider NETs policy literature. In their abovementioned review, Fridahl and Bellamy noted there was a "dearth" of NETs policy instruments in line with the persuasive governance mode in the Swedish case (Fridahl and Bellamy, 2018, p. 67). Similarly, in an international comparison of emerging policy perspectives on climate engineering more broadly, Huttunen et al. noted a dominance of techno-economic logics in policy documents which may preclude the participatory integration of wider societal and political perspectives in policy development (Huttunen et al., 2015). In one of the first reviews of the international peer-reviewed literature on the social and political dimensions of large-scale NETs, Waller et al. also show that techno-economic framings of NETs feasibility remain predominant, but that a "responsible development" framing is emerging which focuses on "opening up" NETs governance to include perspectives, reflecting a similar discursive logic to that outlined in G3 (Waller et al., 2020). Some concrete suggestions have been brought forward from within the Responsible Research and Innovation (RRI) community on how to develop policy for NETs in ways which adhere to the discourse ethical logic (Stilgoe et al., 2013). Proposals in this vein include deliberative workshops with both experts and members of the public designed to elicit diverse understandings of NETs experiments and their governance (Bellamy et al., 2017) and deliberative mapping processes with citizen panels to "open up" socio-technical appraisals of NETs for governance purposes (Bellamy, 2016; Bellamy et al., 2016, 2017).

Zooming out even further, the above results – outlining what may be discursive precursors to future "systems for thinking about the nature of NETs governance" – also allow comparison with established governmentalities which have been shown to structure climate change and environmental governance more broadly. Historical analyses of climate governance by Bäckstrand and Lövbrand have identified three competing "meta discourses" underpinning climate governance in the last 20 years: "green governmentality" which is based on a hierarchical, administrative logic, "ecological modernization," which reflects a neoliberal

market logic, and "civic environmentalism," which is built upon a logic of democratic participation (Bäckstrand and Lövbrand, 2006, 2016). The political knowledge system of G1 outlined above shares the top-down logic of green governmentality. G2 and ecological modernization are both based on economic knowledge. The discursive structures which make up G3 share much with what Bäckstrand and Lövbrand term the "reformist" strand of civil environmentalism, which calls for "opening up" decision-making processes to deliberation by a wider range of stakeholders (ibid). These governance meta-discourses, in turn, can be tied to a longer arc of liberal and neoliberal governmentalities outlined by historical Foucauldian analyses of western democracies (Foucault, 2008; Kerchner, 2010; Kerchner and Schneider, 2010). Governing logics which have historically underpinned climate and carbon governance (and western democratic governance *per se*) are therefore seemingly being reproduced within NETs governance discourse, highlighting the persistent shaping function of existing power/knowledge structures on the emergence of new objects, subjects and instruments of governance (Carton et al., 2020; Low and Boettcher, 2020; McLaren and Markusson, 2020).

Comparing the discursive structures I identified in my analysis with those present in wider NETs and climate governance literatures can also help point out what types of knowledge may be being marginalized in UK industry/policy sphere of the debate. Multiple authors have shown that principles of distributive and intergenerational justice and equity will be key to developing responsible governance of NETs and other global climate response strategies, and have correspondingly called for the integration of relevant knowledge types into policy development processes (Clingerman and O'Brien, 2014; Jenkins, 2016; Clingerman and Gardner, 2018; Cox et al., 2018; Lenzi, 2018; Lenzi et al., 2018; McLaren, 2018; Schneider, 2019). Although governmentality G3 is based on the rationale that deliberative democratic practices are needed to strengthen norms such as equality, transparency, legitimacy and responsibility in governance development processes, the discourse ethical logic that underpins it focuses on issues of procedural justice. Rationales, objects and speaker positions focusing on issues of distributive and intergenerational justice and equity were not integral to this emergent governmentality. The discursive structures I identified only offered one active speaker position to social actors who may reproduce a limited kind of (discourse) ethical knowledge ("wise policy demander"), as compared to much wider range of active speaker positions available to political and economic social actors in this sphere of the UK NETs governance debate (see **Table 4**).

Similarly, the "system critical discourse of climate justice" identified as having emerged in wider discussions of climate change governance in recent years, which calls for fundamental power/knowledge shifts to give marginalized groups democratic control over climate governance, was not directly reflected in my findings (Bäckstrand and Lövbrand, 2016). Indeed, the presence of the negative "unconstructive agitator" subject position being assigned to non-utilitarian "others," and the way in which it is juxtaposed with economic and political speaker positions, indicates that this type of system critical discourse *is* present, but

is being constituted as external to the discursive structure that shapes what it is possible to (legitimately, authoritatively) know and say within the industry/policy sphere of the NETs debate (Torfing, 1999; Hajer, 2005).

The triad of political, economic and discourse ethical power/knowledge types I identified at the UK industry/policy interface may therefore be marginalizing ethics and justice-based knowledge types that have been posited as having relevance for the governance of NETs specifically and climate governance more broadly.

CONCLUSION: COMING TO GRIPs WITH THE SHAPING EFFECTS OF DISCOURSE ON EMERGING GOVERNANCE

As the above results highlight, a structural discourse analytical approach can illuminate discursive power/knowledge relations at work within governance debates. I have shown that three types of knowledge are currently present at the industry/policy interface of the UK NETs governance debate; one political, one economic, and one discourse ethical. Each of these knowledge types links a particular governance rationale (why), certain governance objects (what), particular speakers and subjects (who), and specific governance modes and instruments (how) into a system of thinking about the nature and practice of governing.

Correspondingly, I have shown that three "discursive blueprints" for political, economic and discourse ethical governmentalities may be emerging in this sphere of the NETs governance debate: The political governmentality "Keeping it real" is based on a strategic governance rationale, lumps NETs approaches together for governance purposes based on their suitability in achieving political climate targets, privileges political actors in the development of top-down NETs governance, and is linked to coercive, hierarchical governance instruments. The economic governmentality "Winners come out on top" is based on a functional governance rationale, splits NETS approaches for governances purposes based on their relative costs and benefits, privileges utilitarian actors in a competitive governance development space, and is linked to instruments of incentivisation. The discourse ethical governmentality "Let's talk about it" is based on a normative governance rationale, splits NETs approaches for governance purposes based on their relative social acceptability, privileges rationally arguing actors in a deliberative governance development process, and is linked to persuasive governance instruments (**Table 1**). My analysis has shown that these three discursive blueprints for systems of thinking about the nature of NETs governance may also be present in wider discussions of NETs policy instruments, and be further reproducing elements of green governmentality, ecological modernization and civic environmentalism which have historically shaped wider climate governance. This raises the question as to whether NETs governance may end up being shaped by the same power/knowledge structures that have been criticized for producing climate governance arrangements which delay the decarbonization of the global economy, and how this could

be circumvented (Low and Boettcher, 2020; McLaren and Markusson, 2020).

In this vein, my findings have implications for recognizing, reflecting and acting to overcome the power dynamics both between and within different knowledge systems in the NETs governance debate. First of all, contrary to expectations sometimes put forward by those who call for the NETs governance debate to be "opened up," my analysis has shown that the technocratic, utilitarian, neoliberal knowledge system is not the only one currently underpinning NETs discussions at the policy/industry interface in the UK (cf. Bellamy et al., 2012; Low and Buck, 2020). While the "Winners come out on top" governmentality (G2) adheres to this type of knowledge system, the other two are based on different types of knowledge (political and discourse ethical). Interestingly, the deliberative democratic approach to governance often advocated by those calling for more perspectives to be integrated into NETs governance development is already present in the debate in the form of the discourse ethics governmentality (G3).

Second, although it highlighted that there is more than one type of discourse/knowledge system at play within this sphere of the NETs governance debate, my analysis has shown that the range of knowledge(s) being systematically reproduced is still limited. Comparing my findings with the wider literature has shown that the discursive structures I have identified in this sphere of the NETs debate reflect western, liberal-democratic and anthropocentric dynamics that have been shown to be dominant in broader climate governance (Bäckstrand and Lövbrand, 2016; Hamilton, 2018; McLaren and Markusson, 2020). Climate ethics and justice knowledge is seemingly being constituted as largely external to the discursive structure that shapes what it is possible to (legitimately, authoritatively) know and say within the industry/policy sphere of the NETs debate.

Third, my analysis has shown that "publics" in this sphere of the NETs debate are often constructed within systems of knowledge that perpetuate external control and decision-making structures in which they are constituted as passive governance *subjects* rather than active governance *speakers*. As **Table 3** shows, the range of active speaker positions offers multiple access points for political and economic social actors to actively contribute to the UK NETs governance debate, but only one speaker position ("wise policy demander") is associated with publics. Conversely, as **Table 4** illustrates, passive subject positions provided by the structure of this sphere of the NETs governance debate were all associated with publics and civil society actors. These are the "passive policy recipient": A governance subject who is passively waiting to be persuaded, placated, convinced that a given NETs policy is in their best interests; the "unconstructive agitator": A governance subject who is counter-productive, raising (unjustified) concerns which risk putting undue restrictions on the development of potential (cost-effective) solutions to address climate risks; and the "uninformed optimist": A governance subject who does not fully understand the seriousness of the (climate) situation and what needs to be done. This imbalance in the distribution of active speaker positions and passive subject positions may give social

actors who reproduce political and economic knowledge more privileged positions in this sphere of the NETs governance debate.

These findings emphasize the continued need for increased recognition of the shaping effects of discursive power/knowledge structures on governance development, and improved strategies for those engaged in these processes to reflect upon and expand them. In this vein, those attempting to "open up" the NETs governance debate should ensure that they (and those they are encouraging to enter the debate) are able to recognize and critically reflect upon of the discursive power/knowledge structures within which they are operating (and may end up reproducing), and how these may solidify into governance instruments and infrastructures. Herein lies the emancipatory function: By mapping how certain types of governance are discursively being rendered thinkable and practicable, my analytical framework exposes the contingent nature of emerging NETs governance, and enables critical reflection of seemingly self-evident or necessary governance developments (Lövbrand and Stripple, 2011, p. 188). Such critical reflection may help anticipate how NETs governance can avoid the pitfalls of previous climate governance (Low and Boettcher, 2020).

In addition to this emancipatory function, my structural analytical approach can have some practical value when designing and facilitating future deliberative processes which aim to increase discursive diversity in NETs governance development: As my findings suggest, simply bringing together a diverse range of types of stakeholders to discuss NETs governance does not guarantee that a broad range of discourses will be represented equally, as existing power/knowledge dynamics may mean diverse stakeholders reproduce the same discursive structures. Rather, before designing a deliberative process, it is important to first have a structural overview which types of discourses are being privileged/excluded in a given debate and context. Subsequently, this "map" of the discursive structures could inform pre-screening of potential participants (i.e., in the form of a questionnaire or an interview) to see what sort of discursive structures they reproduce, which subject/speaker positions they assign or adopt, and which types of knowledge they privilege or exclude. This can build upon existing approaches to "unframing" in deliberative processes (Bellamy and Lezaun, 2017): Discursive mapping prior to deliberative workshop could be used to show participants the "structure" of their own discursive positioning and how they relate to others, thereby exposing, comparing and contrasting different knowledges underpinning "reality inputs" into deliberative processes. Making underpinning knowledges involved in the co-production of objects and subjects explicit could help participatory processes overcome systemic inequalities (Chilvers et al., 2018).

The results of discursive mapping could thus inform the design and facilitation of a deliberative process which (a) includes participants who (re)produce diverse discursive structures, and/or (b) encourages them to recognize and potentially expand the bounds of existing power/knowledge dynamics. The Foucauldian approach iterates that discursive structure is "not so much like a steel web as a spider's"; while we are unable to completely escape its grip, "we are not so trapped as to be immobilized" (Lipschutz, 2014, p. xvi). Elucidating the bounds of a given structure can therefore afford social actors some wriggle room to expand the discursive conditions of possibility (Keller, 2018). Additionally, these sorts of discursive mapping exercises may result in the co-production of diverse discursive templates that can be built upon to facilitate discussion and action on NETs governance in the UK. For example, the sorts of results outlined above could provide the elements of several (complementary or competing) speculative NETs policy narratives which could be used as the basis of participatory processes to deliberate upon different types of NETs governance.

In sum, these results demonstrate that coming to "grips" with the structuring role of discourse has clear benefits for the development of responsible NETs governance: Anticipating how given discursive structures may be coalescing into systems of knowledge that make certain types of governance thinkable and practicable, and elucidating their contingent nature can enable those engaging in the NETs debate to recognize (and potentially expand) the discursive power/knowledge structures they are reproducing. Such structural mapping helps to identify what types of knowledge may be missing in the current debate, and could inform the design of deliberative processes to further "open up" discursive diversity in NETs governance development.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Central University Research Ethics Committee (CUREC), Unviversity of Oxford. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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