Elite power in low-carbon transitions: A critical and interdisciplinary review

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Abstract: Modern energy systems have tended towards centralized control by states, and national and multinational energy companies. This implicates the power of elites in realizing low-carbon transitions. In particular, low-carbon transitions can create, perpetuate, challenge, or entrench the power of elites. Using a critical lens that draws from geography, political science, innovation studies, and social justice theory (among others), this article explores the ways in which transitions can entrench, exacerbate, reconfigure or be shaped by "elite power." It does so by offering a navigational tool that surveys a broad collection of diverse literatures on power. It begins by conceptualizing power across a range of academic disciplines, envisioning power as involving both agents (corrective influence) and structures (pervasive influence). It then elaborates different types of power and the interrelationship between different sources of power, with a specific focus on elites, including conceptualizing elite power, resisting elite power, and power frameworks. The Review then reviews recent scholarship relevant to elite power in low-carbon transitions—including the multi-level perspective, Michel Foucault, Anthony Giddens, Karl Marx, and other contextual approaches—before offering future research directions. The Review concludes that the power relations inherent in low-carbon transitions are asymmetrical but promisingly unstable. By better grappling with power analytically, descriptively, and even normatively, socially just and sustainable energy futures become not only more desirable but also more possible.

Keywords: energy transitions; energy justice; climate justice; political economy

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1. Introduction

To many institutions such as the Intergovernmental Panel on Climate Change or International Energy Agency, low-carbon transitions are a way of rapidly achieving progress towards addressing climate change, usually via the pathways of mitigation or adaptation. To others, they are a way of addressing market failures and capturing co-benefits such as jobs or improved health outcomes. However, many interpretations fail to show how low-carbon transition processes and pathways (e.g., mitigation, adaptation) can become intertwined with power-laden processes of inequality, exclusion, and injustice. In modern energy systems, resources have tended towards centralized control by states, and national and multinational energy companies. This implicates the power of these elites in realizing low-carbon transitions. In particular, low-carbon transitions can create, perpetuate, challenge, or entrench the power of elites.

Using an interdisciplinary lens, this Review explores how low-carbon transitions relate to elite power. Power generally, and elite power specifically, can be conceptualised in innumerable ways. These perspectives are not necessarily contradictory. Depending on the approach taken, different perspectives highlight distinct resources, forms, and mechanisms to resist elite power. The appropriate perspective applied to any context depends upon what the researcher is interested in revealing (Haugaard 2002; Sovacool et al 2018). For example, an approach based on the work of Mann (1986) might highlight the sources of power that allow elites to pursue and achieve their goals from a privileged position. The same situation, studied through the theories of Gaventa (1982), might emphasize the different ways that elite power can be expressed and resisted. The two approaches, both discussed in this Review, overlap but reveal different aspects of elite power.

Instead of presenting a single theoretical perspective on power, or seeking to synthesize insights into a meta-theoretical framework, this Review provides an overview of different

perspectives, and their value for the study of elite power in transitions. Some of these approaches have been taken up by transitions scholars and will be discussed later in the Review (e.g., Avelino 2017; Brisbois 2019; Partzsch 2017). The goal is to survey a diverse menu of options, and to provide a navigational resource of the power literature for those interested in applying theoretical perspectives on elite power to low carbon transitions.

We begin by conceptualizing power across a range of theoretical perspectives. The Review envisions power as involving both agents (corrective influence) and structure (pervasive influence) as iterated by Steven Lukes, John Scott, Michael Mann, Mark Haugaard and others. We draw upon existing scholarship to elaborate different types of power that are relevant to elite power in transitions, and the interrelationships between different sources (e.g., human, monetary, artifactual) and expressions (e.g., instrumental, structural, dispositional) of power. A benefit to this conceptualization is that it shows power is invested in not only classes or nation states (Mann 1993) but other social and technical spheres. This focus makes it possible to identify how the power of elites impacts, and is impacted by the processes of low carbon transitions.

To be sure, the themes of power, politics, and political economy have become more prominent in transitions scholarship within the past decade. There has been a significant focus on the exercise of power by elites to resist, slow or shape low carbon transitions. However, elites are also able – if not always overly willing – to mobilise action in support of low carbon transition. Low carbon transitions can also reconfigure long standing structures of social dominance that determine who is considered *elite*.

A multidimensional examination of *elite* power has, to date, been lacking. Different approaches to power involve distinct levels of analysis, foci, and themes, all of which help to make sense of elite power. We first offer a high-level summary of these approaches. We then

explore examples of how power has been operationalized relative to elites in transitions scholarship, and offer a future research agenda.

2. Grappling with the basics: Conceptualizing "power" and "elites"

Bertrand Russell (1939: 10) wrote that the concept of "power" is as fundamental to the social sciences as the concept of energy is to physics. A long and prominent line of scholars have explored the topic, adding complexity and depth (and perhaps making it a bit of a conceptual minefield). This includes some of the most influential academics of the previous half *millennium*, including Russell but also Niccolò Machiavelli (1532), Thomas Hobbes (1655), Adam Smith (1776), Karl Marx (1867), Max Weber (1913, 1922), Vilfredo Pareto (1916), C. Wright Mills (1956), Robert Dahl (1961), Talcott Parsons (1963), Amatai Etzioni (1964), Antonio Gramsci (1971, 1975), Michel Foucault (1982), Anthony Giddens (1979), David Harvey (2003, 2004, and 2006) and Elinor Ostrom (2005). Rather than get lost in this debate, this section briefly offers a few definitions of power relevant to low carbon transitions before summarizing schools of thought that have been influential in the social sciences.

2.1 Defining power

Definitions of power often center on a relationship that facilitates the exercise of authority, coercion or control, or simply allows to "get things done" (Epstein et al. 2014; Haugaard 2012 Haugaard 2002; Lukes 1974; Parson 1963). Scott (2007: 25) suggests that, at a basic level, power can be defined as "the production of causal effects" or "the intentional use of causal powers to affect the conduct of other agents." Gaventa (1982) and others offer a distinction between capacity ("power to" do something) and relation or domination ("power over" somebody or something). Historical perspectives on power have tended to divide along lines focused on capacity (e.g., Parsons 1963, Arendt 1969), and domination (e.g., Lukes

12005, Foucault 1982, Bourdieu (1998), Strange 1996). Many of these scholars have further developed theories on specific *sources* of power, and the *ways* it is exercised.

2.2 Power, structure, and agency

A central question in the theorizing of power is to what extent it functions as a property of systems, structures, and events, or a property of distinct agents (Giddens 1979; Boonstra 2016). From one ideal conceptualization, power is *agent centered* (Weber 1922: 53). This is what Scott (2007, 2008) calls corrective influence held by actors or institutions. Power from this perspective is about making somebody else do something they would not otherwise have chosen to do. Ostrom (2005: 50) writes that:

> *The "power" of an individual in a situation is the value of the opportunity (the range in the outcomes afforded by the situation) times the extent of control. Thus, an individual can have a small degree of power, even though the individual has absolute control if the amount of opportunity in a situation is small. The amount of power may also be small when the opportunity is large, but the individual has only a small degree of control.*

Actors may exercise choice, but their choice is constrained by the resources that others are able to bring to bear in influencing them, often through force or manipulation. Here, sources of power include individual assets such as wealth, muscle power, reputation, social capital, or access to resources and technologies (Boonstra 2016). Those same actors may also not even realize that they are able to exercise choice, reflecting deeper hegemonic influences.

The other idealized conceptualization of power sees it as *structure centered*. This is what Scott (2007, 2008) calls pervasive influence as it embeds power in institutions, infrastructure, or other cultural and structural frameworks. Sometimes, power is hidden because it is inherent in structures that shape everyday life (Lukes 2005). Power exists then as a collective property of systems of cooperating actors. For example, financial markets are a set of rules that function because participants tacitly agree to them and abide by them. Talcott Parsons (1963) saw power as referring to authority or the "authorization" of actors to issue commands, and Michel Foucault (1982) wrote about cultural or socialized dispositions

towards self-discipline and control, or "disciplinary power". Power embodied in structures is faceless and can exist above, below, or in-between actors. Indeed, Scott (2007) writes that power can only become domination when it is articulated or routinized into stable and enduring structures, what Giddens (1979) terms "allocative domination." Boonstra (2016) adds that power is viewed as "context shaping." In empirical application, power can most usefully be understood as a continuous relational interplay between co-created structures and agency. The power of elites in low carbon transitions thus reflects the ways that those empowered by existing structures and institutions participate in the development of emerging low carbon-based regimes, pathways, and institutions.

2.3 Relational power and power relations

Scott (2008) notes that the exercise of power—although it can vary by type and agent—is embedded in a complex network of power relations defined by multiple, interconnecting and circulating forms of power. Power relations are almost always asymmetrical and organized around the conflicting interests of the actor groups trying to wield their respective power. In the context of low carbon transitions, this can play out through, for example, the efforts of school children to mobilize their normative legitimacy as future generations through organized mass truancy from school (i.e. school strikes), in an attempt to influence political elites to take action toward low carbon transitions. Gramsci (1971, 1975) demonstrated the relational and context-dependent nature of power when he proposed maps of elementary power relations that could solidify into fully developed power relations, including domination, resistance (counteraction), and interpersonal power. These relational perspectives on power are central to understanding how it operates.

For the purposes of low-carbon transitions study, we view power as simultaneously agent centered, corrective, and conduct shaping, as well as structure centered, pervasive, and context shaping. This dual view makes clear that power is always a dynamic relationship

between entities. It is not a static tool that can be wielded, put away and taken out later to be used to the same effect as under previous conditions. We further view structures as mutable over time as they change through the intentional, or unintentional, actions of agents (Bourdieu 1998).

2.4 Conceptualizing elite power

Even though power is shapeshifting and multidimensional, it can still be mobilized more strongly by particular agents. Okereke et al. (2009) note that power (used often interchangeably with authority) is almost always linked to an actor, or a "hegemon". For Weber (1922) and Mosca (1939), all societies can be divided between the rulers and the ruled, or the elite and the non-elite (hence the terms "ruling elite" or "power elite"). Meisel (1958) thus defined elites as those in positions of dominance, e.g., a "powerful actor."

However, this definition of agency and power is underwhelming, especially since it could result in an almost interminable number of possible elites. As such, there are different types of elites distinguished by their resources as well as their scale. Both Mann (2012b) and Scott (2008) characterize four types of elites based on the resources they have at their disposal (Scott terms these "strategies of domination"):

- Coercive or physical elites (soldiers, police officers, organized criminals), who control access to the means of violence and are able to dominate others into obedience;
- Manipulative or financial elites (property owners, local businesspersons, corporate directors, investors), who control access to capital or industrial assets that therefore influence the calculations of others;
- Expert or technical elites (scientists, engineers, researchers), with specialized knowledge and wisdom based on their control over cultural resources or information;

- Commanding or regulatory elites (lawyers, national planners, political representatives, members of a political party), who can use the legal system as a form of political power.

Scott (2008) admits these are ideal types only, and that some elites may mix different attributes, such as a military general who can be both coercive and commanding. He also suggests that coercive elites and manipulative elites rely more on allocative domination (distribution of resources), whereas commanding elites and expert elites rely on authoritative domination (commitment, loyalty, and trust). Mann (2012b) explicitly links the types of elites to sources of military, economic, ideological and political power.

Weiss (2005) offers a spatial categorization of elites based on their mobility and scale: transnational elites are spatially autonomous and have the capacity to move seamlessly around the world and profit from global flows of capital. National elites are more dependent on national welfare states and sovereign borders and profit mostly from infrastructure within a single country. Local elites have limited access to global and national flows of wealth but are authoritative or hegemonic within a community or region.

Bonds (2011) and Domhoff (2006) use power relations to map out how elites may mobilize resources to corrupt or influence policy or broader structural change. Generally, this research supposes that elites organize themselves and shape power via:

- The *special-interest process*, in which the elites themselves formulate policy proposals and attempt to implement them by lobbying legislative assemblies and influencing executive agencies;
- The *policy-planning process*, in which the general interests of elites are formulated in think tanks and presented to deliberative bodies;
- The *candidate-selection process*, in which elites influence the selection of political candidates most sympathetic to their interests;

- The *opinion-shaping process*, in which elites mobilize public relations techniques to influence public opinion in ways that promote their agendas;
- The *knowledge-shaping process*, where elites actively work to influence via information suppression, contesting knowledge, or generating their own data to shape what is known (or unknown) about a particular subject to better realize their goals (Domhoff 2006).

These types of elite strategies, when applied to the crafting of policy, offer a more robust take on how power relations unfold.

Finally, Kreuze et al. (2018) elaborate on the notion of the "persuasive power" of elites, building on Scott (2001). Persusaive power intertwines conceptions of power and legitimation. For them, persuasive power combines power (the relational capacity of an actor to influence other actors in ways that favor their interest) and cognitive symbols and value commitments. These symbols and values include winning over people's hearts and minds, or strategies of convincing the public or other audiences about the benevolence of an existing power regime. They studied shale gas developing in the United States and argue that people become "persuaded" that the interests of power match their own desires or goals. Persuasive power, similarly elaborated as discursive or ideological power (e.g., Lukes, Foucault) and strongly linked to concepts of hegemony (e.g., Gramsci), thus extends beyond logic and reason to include values and symbols.

Kreuze et al. (2018) note that pervasive power operates through both the rhetoric of the mass media and stipulations embodied in actual regulations and law. They caution it seems to be most effective in marginalized communities where non-elites have access to fewer resource (e.g., education, legal recourse), with substantial negative impacts on, for example, social justice and public health. For them, pervasive power mixes together sovereign power, reflected in local and national laws and regulations, and corporate power,

the interests of large and influential companies in order to advance elite interests. Persuasive power can be used to manipulate or exploit fears and emotions. It can also be used to manufacture points of agreement, or what Herman and Chomsky (2010) call "manufacturing consent".

In sum, energy provision and use spans scales and is tied to all types of resources, all different types of elites, and the different strategies that they use to exercise power. Elites are thus clearly implicated in low carbon transitions.

2.5 Resisting elite power

Elites can and do exercise power to advance low carbon transitions. For example, the 2015 Paris agreement is an example of elite mobilization to address decarbonization (Kern and Rogge 2016). However, a significant strand of transitions research presents evidence that low carbon transitions have been hindered by those currently able to exercise elite power. This is because elites are often interested in maintaining incumbency and that incumbency depends upon the structures and practices that emerged in response to existing carbon consumption patterns (Feola 2019; Meadowcroft 2011; Geels 2014).

Power that circulates and disempowers can also empower—and be resisted. Arendt (1969) framed this type of resistance as "collective empowerment." Mann (1986) called this "organizational outflanking" or the ability to overcome resistance to one's interests and prevent others from advancing their own priorities. Clegg (1989) hypothesized that the circular processes of power—and resistance—flow in different circuits. An overt circuit of power can be observed, such as when analyzing a public form of decision-making. A social circuit of power refers to the rules or social relations that give rise to groups and membership that accept some and exclude others. The systemic-economic circuit of power is the most abstract, referring to the broader socio-material system in place behind the other two circuits.

Such a circuits of power approach (Clegg 1989) differentiates between two forms of resistance:

- Effective resistance—the most rare—refers to organized, sustained challenging of an entire system of power. Resistance becomes institutionalized as a new source of power that creates new fields of power relations (e.g., the French revolution replaced a monarchy with a democracy);
- Episodic resistance—the most common—manifests itself not against the institutions or systems of power, but against a particular exercise of power like a policy or a specific decision (e.g., a hunger strike within a prison usually leaves the overall system of power intact).

Alternatively, Scott (2008: 38) framed his notion of resistance around "counteraction," given that he believes "power is intrinsically tied to the possibility of resistance, and the power of any elite must be seen as open to challenge from the resisting counteraction of its subalterns." For him, power can be resisted by pressure groups, social movements, and counter elites who can all challenge, disrupt, or subvert dominant elite interests. Gaventa's 'power cube' (1982) was developed through empirical study of both the acceptance and resistance of unionized coal miners to exploitive corporate practices. The power cube was developed to explicitly account for resistance to relationships of domination. Finally, James C. Scott's (1985, 1998) description of how peasants, citizens, and scholars resist dominant and oppressive forms of state and bureaucratic control through *weapons of the weak* is equally germane. Scott posited that successful strategies that create intellectual openness and a more pluralistic society often rely on asymmetrical, non-violent forms of interaction such as protests, land-squatting, and verbal debate. There is thus considerable research examining both how elite power is mobilized and exercised, and how this power is resisted and transformed over time (or not), that is relevant for low carbon transitions.

2.6 Power frameworks

Scholars have developed a number of different analytical approaches that are applicable to the study of elite power. For example, Mann (1986, 1993, 2012a, 2012b) distinguishes between distributive power exercised over others, versus collective power secured jointly through cooperation. Power for Mann can be authoritative (commanded by an actor with clearly delineated subordinates, e.g. the military chain of command), diffuse (distributed in spontaneous, unconscious, or decentered ways, e.g. consumers participating in a market), extensive (organizing large numbers of people over geographic space), or intensive (mobilizing a high level of commitment from participants).

From another perspective, Lukes (2005) organizes power over three overlapping dimensions. The first dimension is a relationship of domination and control that is visible and coercive. The second dimension is power inherent in the societal structures that we create and reinforce as we participate in social life. The third dimension is ideological power, which is diffuse and often invisible as we negotiate, from unequal positions, the norms, values and ideals that structure our behavior.

Table 1 provides a selection of commonly used core power theories, summarizes their defining characteristics, and highlights their utility for the study of elite power and transitions. The list is comprised of dominant theories in policy and political studies that have specific relevance for elite power in transitions studies. It thus reflects the societal power dynamics that have historically defined those disciplines and, consequently, lacks representation of women (excepting Arendt), and non-Western scholars. We will return to this issue in our recommendations for future research.

Table 1: Overview of select power theories applicable to the study of elite power in transitions. Source: Many descriptors paraphrased from Haugaard 2002 as well as Giddens 1984 (14-17), Lukes (2005), Scott (2007) and Ahrendt (1969: 44-56).

Root Theorist	**Theory/Concept**	**Summary**	**Relevance for elite power in low carbon transitions**
Michel Foucault	Disciplinary power	• Power is constituted through surveillance as well as categorization and classificaction • Power is not just political but an inherent part of our everyday life • Power is embodied in disciplinary institutions such as prisons, schools, hospitals, and militaries	• Describes how our participation in systems reinforces their dominance • Establishes that power can both dominate and emancipate • Makes conscious our participation in the structures that support carbon-intensive systems, and reveals ways to change them
Antonio Gramsci	Hegemony	• Power is constituted through accepted knowledge and ideas and expressed through consent • Hegemony – a dominant, pervasize set of power relationships – is reproduced through media, education, culture, and other social interactions	• Describes how life is structured by relationships of dominance • Establishes that ideas and beliefs must be challenged to create new relationships of power • Reveals that changing dominant power structures that support carbon intensive systems is difficult because power relations are omnipresent; Succesful low carbon transitions involve challenging structures across all spheres of society, not just those directly linked to energy policies
Anthony Giddens	Structuration	• Power is defined as capacity for action • (In)action is shaped by continuously interacting and co-created structures, and individual agency	• Describes how our actions are constrained by structures • Demonstrates that even enduring structures are the product of decisions of agents over time • Reveal that low carbon transitions are creating new structures and new power relationships; The structures and elites we co-create through this process will define our future reality

		• Structures aggregate into more durable, yet still mutable, social fabrics and culture	
Steven Lukes	Three faces of power	• Power is defined as the ability of "A" to make "B" do something they would not otherwise do, usually linked to policy spheres • Power is expressed through instrumental, structural and ideational dimensions	• Specifies ways that power impacts formal policy processes • Describes visible, hidden and invisible expressions of power • Reveals that decisions about low carbon transitions are disproportionately influenced by those with the ability to define policy agendas, set rules, provide and control information, and use the media to shape the public imagination; Revealing these dynamics make them contestable
Michael Mann	Sources of power	• Choices of agents are both enabled and constrained by the power sources available at the moment • Power is derived from networks of military, economic, political and ideological power sources	• Describes how different resources can be mobilized for (in)action • Reveals that those with access to resources can disproportionately shape transitions; However, it is possible to mobilise different resources in the pursuit of low carbon outcomes, any of which have the potential to help realize ultimate outcomes
Stewart Clegg	Circuits of power	• Power can be causal, dispositional, or facilitative • The different types of power interact at "passage points" where action can either alter or reinforce the existing network of power relations • Specifically conceptualizes resistance to power as integral to the definition of power itself	• Describes the specific points at which actions can affect greatest change • Reveals that there are key turning or tipping points where the exertion of power will have greater consequences for movement toward low carbon transitions; There will also always be resistence to transitions and solutions will never be completely "win-win"

John Gaventa	Power cube	• Builds upon Lukes' 3 faces • Power is expressed across 3 axes: visible, hidden and invisible forms; closed, invited and claimed spaces, and; local, national, and global levels • Intended to capture both domination and empowerment	• Describes how different aspects of power interact in empirical spaces • Establishes possibilities for action, mobilization, and change • Reveals that actions affecting low carbon transitions are taking place in multiple spheres, many of which are disproportionately occupied and influenced by elites; These spaces can be (partially) claimed if collective action is appropriately mobilized and targeted
Hannah Ahrendt	Empowerment	• Power is defined as the human ability to act in concert • Power is derived through empowerment by a "group" • The "group" is able to act in concert as a result of dialogue and consensus building	• Describes how the marginalized can mobilize collective power to induce change • Reveals that collective action toward low carbon transitions is key to mobilizing the power required to make consequential societal changes
John Scott	Domination and stratification	• Power becomes domination when it is articulated into stable and enduring structures of control by one agent or set of agents over another • Coercion restricts action alternatives through direct force or the threat of force and establishes repressive structures • Inducement operates through the preferences and desires of actors by influencing their calculations of advantage and disadvantage	• Describes how power can become entrenched in "class situations" via property, financial markets, and labour markets • Establishes that power can also become entrenched in "status situations" through symbolic resources, values, and notions of "honour" • Reveals that forms of domination and stratification can become embedded in social structures that then interact with class and status. Low-carbon transitions do not emerge in a vacuum; In many cases they can exacerbate existing class and status inequalities, or give rise to new ones

The next section examines some of the ways that elite power has been specifically examined in low carbon transition scholarship. After that, we reflect on the power insights discussed above to offer ways that transitions scholarship can further develop to better understand elite power.

3. Approaches to elite power in transitions

Early calls for attention to power in transitions scholarship (e.g., Avelino and Rotmans 2011, Meadowcroft 2011, Markard et al 2012), have recently blossomed and magnified (Köhler et al 2017; Schot and Kanger 2018). Empirical analysis of transitions indicates that power strongly shapes transitions pathways (Avelino and Wittmayer 2016), and that transition processes can reallocate sources of power, or redefine who is considered "elite" (Kelsey and Meckling 2018). There are an increasing number of scholars who use established approaches to power and operationalize them across transition contexts to reveal insights about power in transitions and the role and construction of elites. The following section reflects upon some of these endeavors.

3.1 Power, politics and the multi-level perspective (MLP)

There have been ongoing attempts to operationalize power across the multi-level perspective on transitions (MLP). The MLP suggests that sustainability transitions occur through interactions between three multi-scalar levels: the niche, the regime, and the landscape. Niches, or emerging eco-innovations, are protected spaces for innovation but still often face uphill struggles against existing regimes. Regimes are dominated by elites, as defined earlier. The "landscape" refers to exogenous developments or shocks (e.g. economic crises, wars, catastrophies like climate change) that create pressures on the regime, which in turn create windows of opportunity for the diffusion of niche-innovations.

Early conceptualizations of the MLP drew heavily from the structure-agency debate in how it envisioned power (Geels 2004). Geels (2014) updated this to take a neo-Gramscian

approach to power to highlight how the hegemonic regime state resists challenges to the existing order. Other transitions scholars have deepened a discussion of power in the MLP by drawing from more classical power theorists. For example, Power et al (2016) respond to the MLP's focus on innovations promoted by elite actors by examining transition processes through an international political economy perspective that accounts for discursive, institutional and material power. The MLP offers one way to examine elites as dominant regime actors. However, other approaches expand our understanding of elite power in low carbon transitions.

3.2 Foucauldian, Giddensian, and Marxist Approaches

Other scholars have taken power concepts and applied them to transitions more broadly. Bues and Gailing (2016) use Foucault's concept of governmentality to discuss how transitions have the potential to shift the power of elites. Giddens' structuration theory is operationalized by Hermwille (2016) to study the role of nuclear energy narratives in energy transitions. Haas (2019) takes an explicitly Gramscian perspective to argue that transnational corporate energy elites are working to passively take control of the ongoing energy transition. Wishart (2019) takes a neo Marxist approach to examine networks of power in the US energy industry that highlight the elite position of coal interests in shaping climate and energy debates. This list is not exhaustive but instead demonstrates that there is a growing body of transitions work that draws from diverse perspectives and provides useful empirical examples for using power theory to draw out insights related to elites.

3.3 Transitions-specific conceptual approaches

There are also emerging comprehensive approaches that attempt to account for a dynamic view on power. Partzsch (2017) and Tyfield (2014) argue for the need to move away from a dialectic perspective on power and empowerment. These perspectives emphasize transitions not just in low carbon systems, but in the societal structures that define who is

considered "elite" and to what extent the power of "elites" is both concentrated and just.For example, Partzsch links together concepts of power "over", power "to" and power "with" by focusing on who is responsible for societal change (i.e. individuals, elites, or the collective). Brisbois (2019) operationalizes Lukes' three dimensions of power for transitions contexts to account for shifts in political power as decentralised renewable energy technologies enable potential redistribution of the elite power historically associated with ownership of centralised energy resources.

Avelino (2017) has established a new stand-alone analytical framework that is applicable to the study of elite power, and resistence to it, in low carbon transitions. Her POINT (POwer IN Transitions) framework uses insights from Mann (1986), Foucault (1977), Arendt (1958) and social psychology to argue for a "horizontal" approach to power that acknowledges the power of elites, while emphasizing that agents can be empowered through transitions to reorganize power relationships and transform regime level structural conditions. Building upon Avelino and Rotmans (2011), she identifies different resources that can be mobilized to exercise power:

- Human power (human leverage, muscle power, sex or sexuality);
- Mental power (intelligence, information, ideas);
- Monetary power (cash, stocks, financial assets);
- Artifactual power (apparatus, products, technologies, hardware, infrastructure);
- Natural power (raw materials, organic life, natural resources, time).

As with Mann (2012) and Scott (2008), these different types of power can all influence each other, i.e. artifactual power can interrelate with the harvesting of natural resources, or financing and monetary wealth, or mental ideologies and beliefs. This emphasizes that power is shapeshifting, influenced by agency and structure, and can therefore take many forms, or transform from one form into another (Boonstra 2016).

In the POINT framework, power resources can be mobilised across innovative, transformative, and reinforcive dimensions which correlate with the niche, niche-regime, and regime levels of the MLP. The innovative power dimension has been developed to respond specifically to the niche level in transitions contexts. Innovative power builds on Arendt's (1958) perspective on human creativity and is defined as the "capacity to invent and create new resources". These resources then have the potential to act as sources of power (e.g., new ideas, new technologies such as solar panels).

In the context of elite power, innovative power represents an opportunity to disrupt th entrenched power relationships that hinder low carbon energy transitions. The reinforcive dimension reflects the ability of actors to reinforce existing structures. The transformative dimension reflects the capacity of actors to create new structures and institutions. These new structures and instititutions will shape future opportunities for action and thus have signficant implications for elite power and low carbon transitions.

The preceding examples, summarised in Table 2, provide a few examples of different approaches and applications, drawn from different disciplines with distinct epistemologies, that provide insights for studying elite power in low carbon transitions.

Table 2: An overview of select approaches to elite power in transitions literature

Author	**Framework**	**Summary**	**Relevance for elite power in low carbon transitions**
Avelino (2017)	Power in Transitions (POINT)	Power resources can be mobilised across innovative, transformative and reinforcive dimensions that correlate with the niche, niche-regime, and landscape levels of the MLP	• Reveals both the processes of power relations as well as potential focal points for unbalancing power • Distinguishes between constructed and fixed landscape conditions • Identifies potential new sources of power that can be

			used to challenge elites
Brisbois (2019)	Powershifts	Power can be empirically examined through indicators across instrumental, structural and ideological power dimensions that direct attention to various relevant aspects of structure and agency	• Reveals ways that elites use their power to shape outcomes, and the structures that shape future outcomes – and how these strategies can be co-opted or resisted • Useful for comparative analysis across cases
Partzsch (2017)	Power "with", power "to", power "over"	Power can be conceptualised as power with, power to and power over. The type of power identified has implications for the actors who are responsible for creating change in a given situation (e.g., elites, individual actors, collectives)	• Provides lenses to understand the domination, resistance and empowerment that need to be considered to understand low carbon transitions

Source: Authors

The next section discusses future research directions that will benefit from perspectives emphasizing agency within co-created but constraining structures. Perspectives that focus on both empowerment and domination are particularly promising for revealing ways to transform the systems that determine the concentration and distribution of elite power, rather than simply reestablishing power relationships around new constellations of powerful low carbon energy elites. This area of investigation, also discussed below, is important because research is increasingly questioning the sustainability of transitions that do not simultaneously address the underlying systems that lead to exponential resource exploitation, as well as vastly unequal concentrations of societal wealth, capital and political power (Feola 2019)

4. Future research directions

Here, we channel the theoretical richness described above to highlight five fruitful areas for future transitions research or research agendas that address elite power. These areas are especially relevant for low-carbon transition contexts defined by regime resistance, rapid change, and widespread global inequality. The five proposed areas include elite mobilisation; (re)empowerment or counteraction; typologies for change and temporality; policies and practices to rebalance power relations; and the application of under-represented perspectives on power to group together.

4.1 Frameworks for understanding elites and how they mobilise

The first proposed research focus is the further application and adaptation of existing frameworks on elite mobilization to transitions contexts, or the creation of new ones. Mann (2012b), Scott (2008), Domhoff (2006), Bonds (2011), Gaventa (1982), and James C. Scott's (1985, 1998), discussed in Section 2.6 above, provide typologies and strategies of elites that are useful for examining low carbon transition contexts. These frameworks can be used to examine, for example, how elite level knowledge is produced and used to either enable or constrain decisions on decarbonization policies, how elites use money and connections to ensure their interests are represented in political processes, or how elites work together to set regulatory rules that promote their interests at the expense of others.

This research call is simply for more conceptual and empirical research on power in transitions context in order to explore diverse power perspectives and draw out new insights. Research on the power of elites in transitions processes will also help respond to ongoing calls for research into the ways that the power of elites shape low carbon transitions (e.g. Roberts et al 2018).

4.2 Resistance, outflanking and counteraction

The tenuous commitment of elites to mobilise sufficient action toward low carbon transitions means that strategies for resistence, outflanking and counteraction are very important. As highlighted by Partzsch (2017) and Avelino (2017), power and resources circulating in low carbon transitions contexts can both disempower and empower. We have noted a number of theories and frameworks that have the potential to further develop understanding of this duality beween disempowerment and empowerment. Further conceptual and empirical development of transitions-oriented frameworks that provide both theoretical insights and practical mechanisms for subverting, challenging or counteracting elite power is one area for future research. Examples include Avelino's (2017) POINT framework, as well as those presented by Tyfield (2014), and Brisbois (2019).

We further recommend low carbon transitions research that incorporates the diverse non-transitions specific perspectives on resistance to elite power described above. This might include research into the "passage points" described by Clegg (1989) as windows for consequential action, as well as strategies for "effective", sustained challenges, and "episodic" event-based acts of resistance. In addition, the "collective empowerment" perspective of Arendt (1969), J. C. Scott's (1985, 1998) "weapons of the weak", and Gaventa's (1982) "power cube" all highlight the emancipatory potential of inclusive collective action, deliberative decision-making, and non-violent strategic action. Research of this type intersects with highly topical issues of climate activism and social organizing and foregrounds the political nature of transitions. It thus also responding to calls from the transitions community for more research into the politics of accelerating low carbon transitions (Roberts et al 2018).

4.3 Temporality and change

A third compelling area relevant to elite power and low carbon transitions is temporality, or how power ebbs, flows, and changes over time. Avelino (2017: 508) notes that "most existing interpretations of power as found in social theory lack, or at least underplay, the dimensions of time and change." However, many social theorists do depend upon notions of temporality to describe, for example, how individual actions over time are formalized into structures and can thus change (e.g., Giddens 1979). Likewise, Haugaard (2012) and Clegg (1989) both note that agents sometimes consciously consent to domination relationships because there is an expectation of a shift in power in the future (e.g. those who consent to unwelcome outcomes of democratic elections when there is the potential to advance their candidate in the future). However, this aspect of power is understudied in the context of transitions.

The temporality of power gives rise to potentially compelling dynamics, such as shifts from the power to change (if following the path of effective resistance above) to the power to maintain (if aspects of an old regime are indeed more just and equitable than those replacing it). How temporality unfolds in relation to power and low-carbon transitions requires considering the timing and scaling of possible costs and benefits. Some benefits and risks, such as labor market disruption, may occur now whereas others, such as advanced climate change, will affect primarily those in the future. Considering costs and benefits thus invokes debates about responsibility and capacity, as well as a possible duty to minimize harm, especially to future generations (Barry 1983; Shue 2005; Nolt 2011).

Research questions that arise related to the power of elites in transitions include a stronger focus on the temporal interplay between structure and agency. In many ways, transitions scholars have been mirroring this discussion in, for example, examining how grassroots innovations move from niche to regime levels. However, explicitly using theory on

how power defines, and is defined by, this process will lead to a more robust understanding of transition dynamics.

4.4 Policies and practices for redistributing power

A fourth promising avenue of research relates to policies or principles that would help promote more egalitarian power sharing and more just future energy systems. The presupposition, explored in work on energy democracy (e.g., Burke and Stephens 2017), is that more egalitarian power distributions will lead to decisions that prioritise low carbon energy futures. As an illustrative, yet not exhaustive, list of possible redistributive options, Sovacool and Dworkin (2014) present 30 potential energy policy mechanisms or practices that can promote core dimensions of justice, equity, and responsibility. Many of these themes relate directly to the resources underpinning elite power discussed above.

While Sovacool and Dworkin (2014) provide a list of tangible actions for redistributing power, the implementation of just policies and practices is usually dependent upon elite power. Therefore, it is also useful to examine the extent to which those in elite positions are willing to use their power to support redistributive policies – especially when those redistributive policies might undermine their own elite positions. Further research is also needed into the extent to which low carbon transitions are redistributing the resources upon which elite power depends (e.g., Brisbois 2019).

4.5 Application of underrecognized power perspectives

Even a cursory examination of citations in this Review will reveal that almost all influential conceptual work on power and transitions to date has been produced by Western, often male, scholars writing from industrialized countries. Policies and practices for studying elite power in low carbon transitions – and transitions scholarship more generally – will benefit from insights developed by scholars who have conceptualised alternative theories specifically to study power relations. For example, Iris Marion Young (1990) took a feminist

approach to the development of "five faces of oppression". She emphasizes addressing structural inequalities as necessary to account for power imbalances. Hanna Pitken (1972) likewise provides insight into power-laden issues of representation within democratic systems that are highly relevant for examining elite power in transitions contexts.

There is also a vast amount of non-Western power scholarship from which the transitions community has much to learn. For example, Paulo Friere (1970) discusses the role of critical, reflexive learning in his text, *Pedagogy of the Oppressed*. His ideas on the active participation of the oppressed in reorganizing relationships of oppression have direct relevance for low carbon transitions movements seeking to understand and address elite power. Mahmood Mamdani's (1996) theory of *decentralized despotism* contains important insights into how local authority structures can be co-opted by elites and, in turn, resisted. Orlando Fals Borda's (1969) concept of *positive subversion* describes a process through which subversive counter visions of the future interact with the existing elite-dominated ideology and are either co-opted and neutralized, or succeed in shifting the dominant regime. This has direct relevance for transitions scholarship on regime shifts.

These are just a handful of examples. However, as it becomes increasingly clear that addressing elite power is an essential part of the whole systems transitions needed to address decarbonisation, scholarship developed in response to elite power can provide rich understanding—all the more so if it draws from non-elite and more inclusive scholarship (Martello and Jasanoff 2004). Therefore, we further recommend low carbon transitions research that incorporates these perspectives.

5. Conclusion

In sum, those of us concerned about the politics of low-carbon transitions should also begin to concern ourselves with more sophisticated and multidimensional conceptualizations of power and elites. Power, according to our view, is not a mere commodity position, prize

or conspiracy (Sadan 2004). Instead, it is the mobilisation of power resources that operate across complex networks of power relations. Power occurs across multiple sites of visible and invisible struggle, in all shapes and sizes, from the intimate to the infrastructural, and across micro and macro scales. This also makes power relations asymmetrical but (promisingly) unstable.

This Review offers a number of tools and conceptual starting points for a more robust study of elite power in low carbon transitions. The overview of popular power perspectives and their relevance to elite power in low carbon transitions provides a useful resource for those who encounter political and power-laden empirical contexts and are seeking conceptual tools to better analyse and develop these situations. Table 1 will also help to situate the conceptual approaches taken by existing power-focused transitions researchers within the wider field of theoretical power research.

Admittedly, power language (and scholarship) can be somewhat alienating when first encountered – this complexity is part of the reason why power is understudied. Our intent was to help lower the barriers to entry for transitions scholars who don't identify as power or critical theorists, as well as for critical theorists to perhaps take more appreciation in the study of transitions. Relatedly, we hesitate to be too prescriptive in describing more concrete future research directions. Writing on power in transitions has been dominated by a small group of scholars, something either ironic or unsurprising, given how power operates. A significant part of the benefit of a broad call for more power scholarship is that will be epistemologically diverse, depending on the approaches of future authors. Transitions scholarship earnestly needs people to take power concepts and run with them to diversify our understanding. As much as we wanted to survey diverse approaches, we most certainly did not want to tell people what to study – we would prefer, as this Review has done, to give people some of the

tools they need to come up with their own conceptually unique and interesting research questions.

The overview of transitions-specific power research, while not exhaustive, demonstrates where work relevant to elite power in low carbon transitions has been done. In particular, there are existing research frameworks that will benefit from further empirical testing that already use the ideas of prominent power theorists to examine transitions contexts. However, the topic of power and politics in sustainability transitions, and low carbon transitions in particular, remains under explored. We therefore additionally propose future research that builds upon existing power theory from across disciplines to examine how and to what ends elites are mobilising, as well as strategies and opportunities for resistance. Outflanking and counteraction to the power of elites, and a better appreciation for the temporality of elite power relative to low carbon transitions, are called for. Ways that elite power can be re-distributed with the aim of accelerating low carbon transitions, and the application of diverse perspectives that have been developed in response to the oppressive exercise of power by elites, also deserve to be examined.

We all exist in a morphing grid of power relations with embedded structures, rules, and forms of hegemony and domination. Better grappling with these—analytically, descriptively, and even normatively—will help ensure they are not only identified, but better understood and, ultimately, resisted and transformed into more just and sustainable energy futures.

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