The influence of social movements on policies that constrain fossil fuel supply

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Abstract: Mounting evidence suggests that a large portion of the world's fossil fuel reserves will have to remain in the ground to prevent dangerous climate change. Yet, the fossil fuel industry continues to invest in new infrastructure to expand fuel supply. There appears to be a prevailing logic that extraction is inevitable, in spite of growing climate change concerns. Few political leaders seem to be willing to challenge this logic. The absence of adequate political action on climate change has sparked a burgeoning social movement focused on constraining fossil fuel supply. This paper describes this movement, and explores the role that social mobilization may play in enabling policies that limit fossil fuel extraction. Drawing from literature on social mobilization and political change, this work: (1) discusses some of the social and political barriers to mobilization focused on restricting fossil fuel supply; (2) describes the pathways through which mobilization efforts may influence climate policy; and (3) highlights insights from studies of successful social movements that have relevance for the issue of fossil fuel extraction. The paper concludes with directions for future research on social mobilization focused on supply-side climate policy.

Policy insights:
-Enacting policies to limit fossil fuel supply has proven challenging in many contexts.
-There is renewed interest in the role social movements may play in shifting the political landscape, to make it more likely that policies to restrict fossil fuel extraction may succeed.
-Effective social mobilization requires a combination factors aligning at the right time to influence policy outcomes, such as windows of political opportunity opening, and compelling framing that calls citizens to action.
-Critical examination of the factors that lead to movement success is necessary to understand the circumstances where social mobilization may influence supply-side climate policies.

Keywords: mobilization; collective action; social movement; advocacy; supply-side climate policy

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1. Introduction

A contradiction exists in international climate policy. Global leaders have agreed to ambitious targets to limit global warming, but have failed to commit to commensurate policies to limit the supply of fossil fuels. Analysis suggests that a large portion of global fossil fuel reserves will need to remain unburned to keep climate change 'well below' 2°C (Leaton, Ranger, Ward, Sussams, & Brown, 2013; McGlade & Ekins, 2014, 2015; Meinshausen et al., 2009). Yet, investment in fossil fuel infrastructure continues at a pace that is inconsistent with agreed climate goals, and no meaningful global policies exist to keep fossil fuels in the ground.

It seems that a logic that 'extraction is inevitable' dominates domestic policy-making in many nations. This logic was neatly articulated by the Canadian Prime Minister Justin Trudeau, who recently pronounced that 'there isn't a country in the world that would find billions of barrels of oil and leave it in the ground while there is a market for it'. This logic isn't necessarily inconsistent with a belief in the need for climate action; indeed, in the same statement Trudeau asserted that 'Climate change is real. It is here. And it cannot be wished or voted away' (Office of the Prime Minister of Canada, 2016). Instead, this logic leads to an emphasis on climate policies that inhibit the demand for fossil fuels, rather than restrict supply, as is evident in the current international climate policy regime.

A growing social movement is, however, challenging the logic that extraction must continue unabated until fossil fuel demand drops. This movement exists in many guises, including anti-fracking campaigns, pipeline protests, and fossil fuel divestment initiatives. This paper explores the potential impact this social movement may have on

supply-side climate policy[1]. Section two discusses the rationale for pursuing supply-side policy, and outlines some of the social and political factors that have limited the widespread adoption of supply-side policies to date. Section three reviews the various ways citizen mobilization[1] can influence policy-making, and discusses some of the strategies and tactics used by supply-side movements in aid of this goal. Section four discusses insights from social movement theory about factors that influence mobilization outcomes. The paper concludes with a research agenda on social mobilization to limit fossil fuel supply.

2. Background: Supply-side climate policies

2.1 The case for supply-side climate policies

Much of the climate policy that exists worldwide focuses on reducing the demand for fossil fuels. These policies emphasize energy efficiency, low-carbon technologies and carbon pricing as a means of limiting fossil fuel combustion. However, there is growing concern that initiatives pursued so far are insufficient to limit fossil fuel consumption to the levels necessary to avert dangerous climate change (Climate Action Tracker, 2017; Covert, Greenstone, & Knittel, 2016). A complementary suite of policies focused on

[1] A note on terminology: The term "supply-side policy" refers to climate policy aiming to limit the exploration, extraction and transportation of fossil fuels, as opposed to demand-side policies which focus on limiting the consumption of fossil fuels, including consumption by electricity producers (see Lazarus, Erickson, & Tempest, 2015). The terms "citizen mobilization" and "social mobilization" are used interchangeably in this article; the two terms are not perfectly synonymous (e.g. social mobilization may encompass non-citizen actors), but are closely related in the context of mobilization to influence climate policy outcomes.

limiting fossil fuel supply may be necessary to achieve global goals to restrict warming to well below 2°C (Lazarus, Erickson, & Tempest, 2015; Muttit et al., 2016).

Several policy options exist for restricting fossil fuel supply, including price-based instruments (such as removing fossil fuel subsidies, or taxing production or exports of fuels), quantity-based instruments (e.g. cap-and-trade on extraction) regulatory approaches (such as moratoriums on drilling), and limiting public financing for fossil fuel projects (Lazarus et al., 2015; Rentschler & Bazilian 2017). While supply-side policies are far rarer than demand-side policies, some illustrative examples of such policies exist. For example, during the final years of the Obama administration, the U.S. government enacted a number of policies to limit fossil fuel extraction, including restrictions on new oil drilling leases in the parts of the Arctic and Atlantic seas (The White House, 2016), limits on coal extraction on federal lands (U.S. Department of Interior, 2016a, 2016b), and the rejection of permits for the Keystone XL oil pipeline (The White House, 2015). Likewise, in 2007 the Ecuadorian government proposed an ultimately unsuccessfully policy limiting oil extraction in three blocks of the Yasuni National Park if the international community committed half the forgone oil revenues (Larrea & Warnars, 2009; Temper et al., 2013). While some of these policies have since been abandoned or overturned, they provide an indication of what supply-side policies may entail.

There are several rationales for pursuing supply-side climate policies. First, such policies can support demand-side policies, by levelling the playing field for green technologies, and tackling some of the perverse side-effects of demand-side action, such as the 'green paradox', whereby owners of fossil fuel resources accelerate production in anticipation of stringent climate policies (Sinn, 2012). Second, supply-side policies can limit overinvestment in fossil fuel infrastructure, helping to limit the problem of 'carbon

lock-in' (Erickson, Lazarus, & Tempest, 2015). Third, a combination of supply and demand side policies may be a more economically efficient approach to achieving emissions abatement, rather than tackling fossil fuel demand alone (Fæhn et al., 2017). Finally, supply-side policies target a narrower set of actors and actions than demand-side policies, and thus may be easier to target and track as policy solutions (Collier & Venables, 2014; Heede, 2013). Yet, despite these advantages, supply-side policies are far less prevalent than demand-side climate change solutions. To understand why this is the case, it is important to consider some of the barriers that exist to enacting supply-side policies.

2.2 Barriers to enacting supply-side policies

There are a number of barriers to introducing supply-side policies that may account for their under-representation in the global climate policy mix. Perhaps the most critical barrier is the fact that many societies suffer from 'carbon entanglement' – namely, the deep interconnection of economies and political structures with the fossil fuel industry (Gurría, 2013). Governments who are dependent on fossil fuel revenues, and are influenced by industry interests, are unlikely to enact policies to restrict those same industries.

Additionally, movement away from fossil fuels forces us into a new cultural reality (Hoffman, 2010, 2015). Fossil fuel energy has been central to the development of modern societies, and permeates democracies and many aspects of daily life (Mitchell, 2009). This is especially true for those in natural resource-dependent communities, where individual and community identities are often deeply intertwined with resource industries (Bell & York, 2010; Jacquet & Stedman, 2014).

Another challenge is the well-organized climate change denial movement, that has developed with aims to cast doubt on the science of climate change, and to limit

political action. The climate change scepticism of this movement has been echoed by conservative politicians, highlighting the links between the movement and political actors (Dunlap & McCright, 2011). While climate change denial affects the adoption of both demand- and supply-side policies, arguably supply-side policies will engender stronger pushback, because research indicates this movement has ties to the fossil fuel industry, who are directly harmed by restrictions on extraction (Brulle, 2014; Farrell, 2015; Mulvey & Shulman, 2015; Oreskes & Conway, 2010). These issues also play out at a localized level. Misutka et al. (2013) note a range of tactics that the fossil fuel industry adopt to limit restrictions on the industry. These include co-opting local groups, deliberately slowing down or clogging up democratic processes (such as community consultations), and other efforts to ensure their central role in resource-dependent communities is not challenged.

Furthermore, supply-side policies may raise equity concerns. Disavowal of opportunities to develop using fossil fuels can be seen as fostering injustice. Specifically, a transition away from fossil fuels raises questions about equity for those with unmet energy development needs, and for those whose livelihoods depend on a fossil fuel economy (Kartha, Lazarus, & Tempest, 2016; Newell & Mulvaney, 2013).

Finally, supply-side policies are hampered by a lack of supporting institutional arrangements, such as international agreements and accounting measures. For instance, UNFCCC territorial accounting for greenhouse gas emissions emphasizes fossil fuel consumption over supply, so countries are incentivized to pursue demand-side policies to fulfil international agreements (Lazarus et al., 2015; Piggot, Erickson, Lazarus & van Asselt, 2017). The necessary institutional frameworks to support supply-side policies are under-developed in comparison to demand-side policies (Benedikter, Kühne, Benedikter, & Atzeni, 2016; van Asselt, 2014).

This combination of factors makes enacting supply-side policies challenging. A common critique of supply-side policies is that they are a sensible climate solution, but are politically unfeasible (Roberts, 2015). To overcome political resistance to supply-side policy, there is a growing interest in the role social movements can play in pushing climate policies forward. The basic premise of this idea is that major societal shifts on the scale of a transition away from fossil fuels (such as the abolition of slavery) have required citizen mobilization to drive policy changes (Azar, 2007; Coplan, 2016). The remainder of this paper will examine the ways that social movements influence policy, and identify a number of areas where research could illuminate the role of social movements in limiting fossil fuel supply.

3. Citizen mobilization and supply-side policy adoption

3.1 Citizen mobilization and policy change

While we often think of environmental social movements in terms of their most visible symbols (e.g. large-scale protests, and major environmental groups), social mobilization is a broader concept that involves various forms of actors adopting a range of tactics to engender change. Amenta et al. (2010) define political social movements as any 'actors and organizations seeking to alter power deficits and to effect social transformations through the state by mobilizing regular citizens for sustained political action' (p.288). Citizen mobilization on climate change can happen at multiple scales, from small groups of landholders resisting local fossil fuel development, all the way up to transnational climate organizations working to shape global policies (Dietz & Garrelts, 2014; Schaeffer Caniglia, Brulle, & Szasz, 2015).

How does this citizen mobilization shape climate policy? A simple model would suggest that the act of mobilization in and of itself leads to policy change: a concerted

movement by citizens raises public support for an issue, leading to increased political pressure and consequently policy change. However, this model oversimplifies the act of mobilization, and the pathways between mobilization and policy change. Amenta et al. (2010) critique this model as a 'throw-back to rational choice accounts in which once a collective action problem (say, gaining contributions for pizza) is solved, a collective benefit (pizza) is automatically provided' (p.296). In reality, the relationship between social mobilization and policy change tends to be far more complex.

First, mobilization on a major issue such as climate change is rarely brought about by a single group, but rather a diverse array of actors with varying interests. These actors may use a variety of strategies and tactics to bring about change, such as civil disobedience, lobbying, public education or boycotts (Taylor & Van Dyke, 2004). Therefore, it is often difficult to attribute policy influence to one single actor or tactic within this broader landscape of movement activities.

It is also difficult to tease apart movement influence from other external influences on climate policy-making that occur concurrently, such as media attention, related economic issues (e.g. fuel price fluctuations), and extreme weather events. Consequently, while there is reasonable support for the idea that social movements can influence public policy (Amenta et al., 2010), pinpointing the exact influence of mobilization efforts can be tricky on issues such as climate change where a multitude of factors influence policy outcomes.

Moreover, the degree of pressure that social movements may exert over the policy-making process depends on the issue, timing and political context. For example, in the United States, environmental issues such as climate change tend to be highly polarized, so the ability of citizen mobilization to influence policy will depend on which party is in power (Agnone, 2007). Likewise, in countries with high levels of political

repression, mobilization may lead to worsening outcomes (more restrictions against citizen involvement in political processes) rather than positive change (Amenta et al., 2010). The relative effectiveness of movement actions must be considered in relation to the political context where mobilization occurred.

Finally, movements may achieve a range of outcomes that shape the policy process, in addition to or in lieu of legislative change. For instance, movements can be influential in the agenda-setting phase of policy-making, where mobilization may help an issue gain recognition, or shift views about what is politically feasible (Johnson, Agnone, & McCarthy, 2010; Olzak & Soule, 2009). Even if a mobilization effort ultimately fails to influence a given policy, the movement may still play a role in shaping future decisions. For example, a movement may win concessions for involvement in policy-making processes (Olzak & Soule, 2009); create resources such as social networks and organizational infrastructure that enable future movements to achieve success (Diani & McAdam, 2003); or shift the political discourse, so that moderate alternatives to the policies advanced by the movement gain traction (Schifeling & Hoffman 2017). Therefore, it is important to think about movement influence on policy outcomes broadly, in both direct and indirect terms (Giugni, 1998).

3.2 Citizen mobilization on supply-side policies

Citizen mobilization focused on limiting the supply of fossil fuels exists in many forms. This includes direct efforts to stop construction of fossil fuel infrastructure, or disrupt transit of fossil fuels, such as protests around the Keystone XL pipeline in the United States, or the blockade of the world's largest coal port in Newcastle, Australia, by activists from 12 Pacific Island Nations in traditional canoes (Milman, 2016). Citizens have also used divestment as a tool to force change, moving investments out of fossil fuels for both moral and financial reasons (Ayling & Gunningham, 2017). There have

also been a number of legal challenges, such as the recent case brought by seven youth plaintiffs arguing the U.S. government 'permitted, encouraged, and otherwise enabled continued exploitation, production, and combustion of fossil fuels...deliberately allow[ing] atmospheric CO_2 concentrations to escalate to levels unprecedented in human history' (*Juliana, et al. v. United States of America*, 2016). These various citizen actions combined form a global movement focused on the supply of fossil fuels, and they have both direct and indirect policy implications.

While concern over climate change is the rationale pushing many actors to collective action to limit fossil fuels, other rationales exist for joining supply-side movements. These can include localized concerns about the impact of extractive industries; for example, farmers and traditional landholders may be concerned about the impacts of extraction on local land or water, or conservationists may wish to protect biodiversity. Concerns may also exist around land rights, specifically, the rights of corporations or federal governments to make decisions about land-use that override local governments or landowners. Thus, while climate change can be a key reason for people to advocate for supply-side policies, it is by no means the only reason that citizens join movements to restrict fossil fuel development. Furthermore, while in this paper the distinction is made between supply and demand-side climate action, in practice there is significant overlap between supply and demand side movements.

A wide array of strategies have been used by movement actors to influence policy-making, with varying degrees of success, including:

- Breeding uncertainty about the financial viability of the fossil fuel industry, by framing investments in climate change as 'stranded assets', and gains on investments as reflecting a 'carbon bubble';

- Stigmatizing the fossil fuel industry, so that it will lose economic or political support (for example through divestment campaigns);
- Directly stopping infrastructure development, by blocking construction and use of fossil fuel infrastructure;
- Increasing public and policy-maker attention to the issue, through media campaigns, marches, petitions and other attention-grabbing actions;
- Using supply-side mobilization as an organizing tool, to build a movement structure that can then be transferred to advocating for other forms of climate policy (such as a carbon tax);
- Steering social norms away from fossil fuels, for example, by consistently highlighting the risks of new fossil fuel extraction, and the benefits of a low-carbon economy; and
- Helping politicians get elected who are supportive of restrictions to the fossil fuel industry, or conversely preventing pro-fossil fuel officials from being re-elected.

These strategies are not mutually exclusive. Movement actors may aim to achieve (or inadvertently achieve) multiple goals at the same time. Movement strategies will manifest themselves in a range of different tactics. Tactics can include indirect efforts to influence policy, through public education and awareness raising. Movement actors may also use disruptive tactics, such as occupations or boycotts, to force companies and politicians to pay attention to supply-side issues. Actors may also influence policies and political processes through established forums, such as pursuing legal challenges or working to get aligned politicians elected. Table 1 provides a summary of different tactics that have been employed by supply-side movements to engender change.

In sum, the supply-side movement includes a wide variety of civil society actors – from researchers, to landowners, environmental organizations, and lawyers – using a range of tactics to limit fossil fuel use. This diversity of actors and tactics may be a strength of the movement, as prior research has shown that organizational diversity and tactical innovation boosts the vitality and success of mobilization efforts (McAdam, 1983; Olzak & Ryo, 2007). The following section will discuss some other features that influence movement outcomes.

4. Building a successful movement: Considerations and emerging questions

There is no single recipe for successfully mobilizing and shaping policy outcomes. However, scholars of social movements have identified some features that tend to characterize relatively successful movements. This section discusses four key factors that have relevance for limiting fossil fuel extraction: framing, resource mobilization, political opportunity, and transition planning.

4.1 Framing

Collective action requires the development of a shared appreciation of a problem. Thus, the process of framing an issue so that it resonates with a given audience is an important task of social mobilization. The framing process involves defining the issue (diagnostic framing), outlining possible solutions (prognostic framing), and providing a rationale for action (motivational framing) (Benford & Snow, 2000). In the case of supply-side movements, the goal of framing may be twofold – to mobilize public support, and to convince policy-makers that supply-side policies are necessary.

While a number of studies have looked at the framing of climate change (see for example Morton, Rabinovich, Marshall, & Bretschneider, 2011; Schlichting, 2013; Wahlström, Wennerhag, & Rootes, 2013), less research has focused specifically on the

framing of supply-side initiatives (though some work has been conducted on specific forms of fossil fuel development such as hydraulic fracturing, see for example Bomberg, 2017a, 2017b). There are several reasons to assume resonant frames may differ for supply-side strategies versus climate change policies more broadly. First, some mobilization to limit extraction may occur around concerns other than climate, such as labour conditions, resource ownership, or water contamination. Second, many supply-side movements focus on localized issues (extraction within a particular location), whereas climate change framing tends to focus on global problems.

There are several prominent narratives that align with movements supporting or opposing supply-side policies. For instance, some groups aiming to restrict fossil fuel use have framed the issue in terms of impacts on financial markets, arguing that we are creating a carbon bubble that will eventually lead to market declines, or that fossil fuel investors will be left with stranded assets when governments enact more stringent climate policies (HSBC Global Research, 2013; Leaton et al., 2013). Another framing argues investment in extraction leads to carbon lock-in, where governments and industry focus on recouping value from existing carbon-intensive investments, leading to ongoing climate impacts, and limiting consideration of low-carbon alternatives (Erickson et al., 2015). Counter-movements have argued that continued fossil fuel extraction is needed to ensure energy security (Mueller, 2014), and provide jobs (Campbell, 2015). Additionally, some have argued for extraction in some regions (such as the Canadian Tar Sands), based on the idea that they represent a more ethical energy source than fossil fuels sourced elsewhere, due to better labour relations, national environmental policies or socio-political conditions (Levant, 2011).

These represent a small selection of frames used in the context of supply-side policies. Further analysis is needed to understand the use and impact of frames in

different political contexts, and around different types of supply-side policy. Some unanswered questions include whether frames that mobilize public supporters are the same as those that resonate with policy makers, and whether movements framed around supply-side imperatives can be re-mobilized around demand-side climate policies (such as carbon taxation).

4.2 Resource mobilization

Successful social movements rely on the mobilization of resources behind a goal (McCarthy & Zaid, 1977). Resources are conceived broadly, to include factors such as financial support, human resources, political access and media attention. Formal social movement organizations and informal networks provide the necessary infrastructure to manage resources. The types of resources that an organization channels and controls influences the types of action they employ (Carmin & Balser, 2002).

One resource mobilization tool that has been utilized by the environmental movement on supply-side issues is coalition building with related interests. For example, the expansion of the coal mining and coal seam gas industry in Australia led to the formation of an unlikely coalition between farmers, traditional custodians, and conservationists, called the 'Lock the Gate' alliance (Lock the Gate Alliance, 2017). Farmers and environmentalists, who had traditionally been characterized as having an antagonistic relationship, came together over a shared concern about the impacts of coal and gas mining. Members of the movement had varied interests – some opposed mining due to place-based concerns (such as property rights, and impacts on local land and water quality), whereas others came to the movement with more global environmental concerns (in particular, the impacts of using the extracted fossil fuels on climate change). General opposition to industry activities enabled a diverse constituency to find common ground (Colvin, Witt, & Lacey, 2015; de Rijke, 2013) The alliance currently

consists of over 250 community groups and 40,000 members working together to limit inappropriate mining (Lock the Gate Alliance, 2017). A similar model of partnership between landowners and environmental movements has been used in the 'Bold Nebraska' alliance in the United States, which organized to stop development of the Keystone XL pipeline (Ordner, 2017).

Alliance building among social movement groups can increase capacity to promote change, by increasing access to resources and facilitating long-term persistence of the movement, though it can also diminish movement efficacy in some cases, for example if conflicts amongst alliance members lead to an erosion of membership or commitments (Beamish & Luebbers, 2009). It is notable that many supply-side movements that have been successful to date have involved coalitions between environmental groups, local landowners, and indigenous peoples asserting their rights over natural resources and development (Allen, Bird, Breslow, & Dolšak, 2016; Manno & Martin, 2015). Further work is needed to characterize the types of coalitions and resources mobilized in successful efforts to restrict fossil fuel supply.

4.3 Political opportunity

Social movements need political opportunities in order to successfully mobilize and influence policy processes. Political opportunities can come in many forms, such as the provision of participation forums, declines in repression that enable citizens to form movements, or schisms amongst political elites that can be exploited in the pursuit of movement goals (Tarrow, 2011). Political opportunity theory helps to explain why social movements vary over time and space – differing access to political opportunities can influence movement formation and outcomes. This theory also includes the broader environment into our understanding of social movement outcomes – exogenous shocks can create vulnerabilities in the political system that social movements can exploit. For

instance, the Fukushima Daiichi nuclear disaster in Japan played a key role in re-shaping Germany's energy policy, by changing the discourse about the risks of nuclear power, and bolstering arguments made by groups advocating for a transition to renewable energy (Strunz, 2014).

Social movements are not always strictly bound by political structures - skilled movement actors (known as 'policy entrepreneurs') can alter the political context to aid movement interests (Mintrom & Norman, 2009). For instance, Rabe (2004) argued that policy makers in progressive states in the U.S. acted as policy entrepreneurs, by re-shaping perceptions of climate policy, through the implementation of programmes that demonstrated environmental policy could promote economic growth. Likewise, political opportunities can be opened up by 'institutional entrepreneurs' who reshape the political landscape to make it more conducive to achieving movement outcomes (Levy & Scully, 2007), for instance, by creating new participation arenas in the policy-making process. Opportunities can also be opened up by 'norm entrepreneurs', who alter prevailing societal norms about appropriate responses to a given issue (Finnemore & Sikkink, 1998). Examples of individuals who are helping to normalize the idea of supply-side interventions include environmentalist and author Bill McKibben, who has been at the forefront of the global divestment movement, or Pope Francis, who discussed the need to transition away from fossil fuels in his encyclical, *Laudato Si'* (Green, 2016; Schifeling & Hoffman 2017). The presence of these various forms of entrepreneurs demonstrates how mobilization efforts can be both influenced by, and influential in shaping, political opportunity structures.

Political opportunity theory is particularly relevant for the case of fossil fuel extraction. Research shows that climate change has become a politically polarized issue in some national contexts, particularly the United States (McCright & Dunlap, 2011),

and that politicians are forming their opinions on climate policy within echo chambers that reinforce this polarization (Jasny, Waggle, & Fisher, 2015). Finding opportunities to influence policy within this context is a key task for social movements focused on limiting fossil fuel supply. There is no simple answer to overcoming these challenges, however, identifying key sources of polarization can be a useful first step (see for example Fisher, Waggle, & Leifeld, 2013).

The availability of political opportunities for citizens to mobilize to restrict fossil fuel supply vary considerably amongst fossil fuel producing nations. Within the top fossil fuel producing nations are some of the most repressive regimes, and some of the most open democracies. For example, Saudi Arabia - the largest oil producing nation in the world - has been ranked one of the least free countries in the world for political rights and civil liberties; whereas conversely, other major fossil fuel producers such as Australia and Canada have been ranked amongst the most democratically free (Freedom House, 2016). The ability for citizens within a country to mobilize safely using most of the tactics previously outlined (such as civil disobedience, judicial or legislative pressure) depends heavily on democratic freedoms that may not be available in all countries. In cases where repressive regimes limit opportunities for domestic mobilization, social movements may need to work outside national borders, for example by calling on other countries to place diplomatic or trade pressure on nations unwilling to constrain fossil fuel supply.

Related to the concept of political opportunity structures are decisions made within the environmental movement about how best to influence policy-making. Newell (2005) suggests that differing ideologies and tactics amongst environmental organizations influence their access to political processes, denoting a divide between ‘insider’ and ‘outsider’ organizations. Insider organizations typically work alongside

governments to enact change, using tactics such as provision of research or advice to alter policies. Outsider organizations tend to be excluded from political processes, and use more confrontational tactics such as protest and demonstration to force change. Organizations with insider status may be wary of using certain strategies or pushing more extreme policies, lest they lose access or influence over political forums. Indeed, this approach may be well-founded; research on the influence of environmental advocacy groups on U.S. Congressional decisions demonstrates that actors with more extreme ideological positions will be less likely to advance pro-environmental legislation (Olzak, Soule, Coddou, & Muñoz, 2016). This raises the question: does challenging the prevailing logic that 'extraction is inevitable' limit or enhance political opportunities? Further analysis of how supply-side movement strategies relate to political opportunities is needed to shed light on this question.

4.4 Transition planning

Successful social movements tend to rally around a vision. To move away from fossil fuel extraction there needs to be plans in place for alternatives - both in terms of supplying energy, and supplying meaningful work for those who were previously employed in the industry. There is a wide body of literature on transitions towards a low-carbon future; however this has tended to focus more on innovation and new green technologies, rather than the 'unmaking of unsustainability' (Shove, 2012). There needs to be greater acknowledgement that the transition to a low-carbon future will have a major impact on those who work in fossil fuel industries, or who were expecting to utilize fossil fuels to grow their economies.

An emerging body of work on 'just transitions' has started to look the impacts of a transition away from fossil fuels on those who are affected by industry decline (Cooling, Lee, Daub, & Singer, 2015; ILO, 2015; ITUC, 2015; Newell & Mulvaney,

2013). Additionally, analysts have begun to raise questions about the design of equitable global supply-side policies, and what "fairness" means in the context of limiting fossil fuel supply (Kartha et al., 2016). This work is important for supply-side movements, as lessons from the broader climate movement suggest that attention to issues of justice and equity need to be a key consideration when advocating for particular policies or approaches. Enacting climate policies without consideration of the distribution of impacts can lead to reinforcement of existing inequalities in society (Roberts & Parks, 2009). Researchers can help build a body of knowledge around these questions, by examining the impacts of supply-side policies on extractive industry workers, and the impact of a managed decline in fossil fuels on energy justice imperatives.

5. Conclusion

The need to drastically reduce emissions, to keep global temperature rise well below 2°C, has spurred a growing interest in supply-side policies to limit fossil fuel extraction. This paper examined how the growing social movement focused on restricting fossil fuel supply may influence policy outcomes. It identified a range of tactics used by the movement to disrupt fossil fuel industry activity, alter norms, and push policy change.

This paper also highlighted a number of emerging research questions about factors that may influence movement success. These relate to the four areas outlined in Section 4 that tend to characterize movement outcomes: framing, resource mobilization, political opportunities, and transition planning. With regards to framing of movement goals, questions include whether frames that mobilize the public are effective at influencing policy makers, and whether movements framed around supply-side policy bolster or diminish support for demand-side policies. Research can also shed light on the resources and tactics successful movements have used in aid of their goals, and on

the coalitions that have been fruitful or problematic for supply-side movements. Recognizing that political opportunities shape movement outcomes, it is also important to examine the political opportunity structures for supply-side movements; for instance, identifying who the policy entrepreneurs are that can potentially influence norms and policy-making activities regarding fossil fuel extraction, and examining circumstances where challenging the prevailing logic that 'extraction is inevitable' limits or expands opportunities for movement actors. Finally, there are questions about how supply-side movements ensure that the transition away from fossil fuels happens in a just and equitable manner; for example, examining how movements can address the concerns of those who will lose their livelihoods as a result of restrictions on fossil fuel extraction they are advocating for, and how supply side policies interact with energy justice imperatives.

Further work is needed to answer these questions, and to tie together insights from studies across a range of fossil fuel industries and political contexts, to discern the conditions under which supply-side climate movements can influence policy outcomes. While social movements can play an important role in pushing social change, it is not a given that movements always achieve their aims (Amenta et al., 2010). Indeed, some have argued that the broader climate movement has had limited success thus far in mobilizing and pushing for policies commensurate with the scale of the climate change challenge (McAdam, 2017).There are reasons to believe that supply side movements might have more success than movements focused on climate change writ large, because the movement can focus on more tangible targets such as fossil fuel infrastructure, as opposed to the more amorphous target of carbon emissions. It is important to think critically about how citizen mobilization may limit fossil fuel

development, because failure to do so may limit the effectiveness of this potentially powerful force for achieving climate goals.

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Table 1. Examples of tactics used by supply-side movement actors

Tactic	Examples	Illustrative cases
Civil disobedience	Occupation Blockade	Obstruction of extraction projects and related infrastructure (e.g. pipelines; shipping terminals) through occupation and blockades. These various transnational efforts have been referred to as 'Blockadia' (Bradshaw, 2015; Klein, 2014).
Demonstration	Marches Petitions	Petitions highlighting public support for limiting fossil fuel industry influence or stopping extraction projects. For example, a petition signed by 500,000 people (coordinated by Corporate Accountability International) called for fossil fuel lobbyists to be excluded from the UN climate change negotiations (Slezak, 2016).
Economic disturbance	Divestment Boycott	A global campaign encouraging individuals and institutions to divest from the fossil fuel industry (Alexander, Nicholson, & Wiseman, 2014; Ayling & Gunningham, 2017). To date, more than 700 organizations and 58,000 individuals have committed to divesting their investments (Fossil Free, 2017).
Judicial and legislative pressure	Litigation Lobbying	Legal challenges to stop new fossil fuel extraction projects. For instance, the Carmichael Coal Mine in Queensland, Australia has been the subject of a number of challenges, including objections to mining permits from conservation groups, and challenges to indigenous land use agreements from traditional owners of the land (McGrath, 2017).
Education and persuasion	Public education Research	Research on the amount of fossil fuel reserves that can be burned in order to remain below 2°C warming (see for example: Carbon Tracker Initiative & Grantham Institute, 2013; McGlade & Ekins, 2014, 2015; Meinshausen et al., 2009; Muttit et al., 2016). This work has informed a number of public outreach efforts, such as Bill McKibben's 'Do the Math' *Rolling Stone* article and speaking tour (350.org, 2017a; McKibben, 2012; Nisbet, 2015).
Electoral strategies	Supporting aligned political candidates Establishing a new political party	Scorecards used to rank political candidates and parties on their environmental or climate change record and policies (see for example: Australian Conservation Foundation, 2017; Climate Hawks Vote, 2017; League of Conservation Voters, 2017), or campaigns drawing attention to fossil fuel industry contributions to candidates (350.org, 2017b).