Institute for
New Economic Thinking
AT THE OXFORD MARTIN SCHOOL

Five Worlds of Political Strategy in the Climate Movement

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19th March 2021

INET Oxford Working Paper No. 2021-07



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ABSTRACT

The chasm between required and actual emissions abatement continues to grow in part because stringent climate laws and policies have repeatedly been blocked, repealed or weakened by obstructionist lobbies. Lobbying by the climate change countermovement dwarfs that by the climate movement. To make meaningful progress towards global emissions abatement, smart political strategies are needed. Drawing on evidence from current and past sociotechnical transitions and social movements, we propose a taxonomy of five strategic paradigms for overcoming obstructionism: ***antagonism*** ("name, shame, boycott and sue"), ***appeasement*** ("compensate the losers"), ***co-optation*** ("change from within"), ***institutionalism*** ("change the rules of the game") and ***countervailance*** ("support the alternative"). Each "world" of strategy addresses the problem of obstructionism through a different lens, reflecting a diversity of actors, tactics, and theories of change within the climate movement. We develop a heuristic model to explore how these strategies change a politician's incentives across different institutional contexts, both statically and dynamically.

† For thoughtful feedback, we thank Cameron Hepburn, Jacquelyn Pless, Matthew Ives, Sam Fankhauser, Thomas Hale, Joris Bücker, Marion Leroutier and INET-Oxford EOS seminar participants. Financial support from the Oxford Martin School Programme on the Post-Carbon Transition is gratefully acknowledged.

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1 Introduction

Great socioeconomic transitions involve significant shifts in power. The transition to a post-carbon economy will not be different. The exigencies of climate policy require economic and energy systems built around hydrocarbons to transition to a net-zero emissions paradigm by mid-century.

In the process of the transition, some firms will die, others will successfully diversify, and those specialising in low-carbon technologies may gain market share. The "existential politics" of the post-carbon transition (Colgan, Green, and Hale 2020), notably the $10-22 trillion worth of assets at risk of stranding (Mercure *et al*. 2018; Tong *et al*. 2019), makes it particularly prone to obstructionism by vested interests.

Scholarship on movement-countermovement dynamics has recently been applied to climate change to study reactionary forces to decarbonisation (e.g. Brulle 2014, 2019; Farrell 2016; McKie 2019). Opponents to the post-carbon transition are part of what is known as "the climate change countermovement" (CCCM) which engages in tactics to ***prevent, repeal, weaken or delay*** existing and proposed climate policies. The CCCM lobby does this by, inter alia, questioning the scientific basis on which scientists assert that anthropogenic climate change is real or presenting exaggerated trade-offs between climate action and economic development (Vesa, Gronow and Ylä-Anttila 2020) (see Table 1). More subversive techniques include "technical" studies that present biased forms of modelling and analysis.

Members of the CCCM lobby may include industry associations, carbon-exposed firms, utilities, workers, unions, corporate-funded think tanks, state-owned enterprises and, government ministries with strong incentives to protect carbon-intensive interests. While not all carbon-intensive agents belong to the CCCM, those that actively try to block the post-carbon transition are considered members.

Table 1. Narratives Deployed by the CCCM Lobby to Discredit the Climate Movement

Technique	Application to Climate Change
Denial of responsibility	Climate change is happening, but humans are not the cause
Denial of injury	There is no significant harm caused by human action and there may even be some benefits
Denial of victim	There are no climate change victims. If climate change victims do exist, the deserve to be victimized.
Condemnation of the condemner	Climate change research is misrepresented by scientists, and manipulated by media, politicians and environmentalists.
Appeal to higher loyalties	Economic progress and development are more important than preventing climate change.

Source: Adapted from McKie (2019)

The corollary to the CCCM lobby is the climate movement, which champions decarbonisation. The strategic operations of the climate movement have received relatively scant attention in lobbying literature. Studies such as Brulle (2018) and Gullberg (2008) have focused on the political organisation of renewable energy companies and environmental NGOs against large corporate hydrocarbon interests. We consider a broader range of actors in in the climate movement and CCCM lobby to shed light on the many types of political conflicts in the post-carbon transition and the diverse strategies for overcoming resistance.

We document tactics deployed by the climate movement and classify them into a typology of political strategies to overcome obstructionism by the CCCM lobby. We identify five key political strategies (Figure 1):

- ***Antagonism*** *("name, shame, boycott and sue")* which increases the reputational and economic costs of participating in obstructionism and "business as usual" activities;
- ***Appeasement*** *("compensate the losers")* which offers monetary relief, re-training and restitution to the "losers" of the transition;

— ***Co-optation*** ("change from within") which seeks to persuade the obstructionists to reform their business model;

— ***Institutionalism*** *("change the rules of the game")* which involves regulatory and structural changes to institutions to make obstructionism harder; and

— ***Countervailance*** *("support the alternative")* which bypasses direct confrontation with political opponents by supporting alternative technologies and strengthening their disruptive market potential.

We highlight how each "world" of strategy advances a rival theory of change, contains distinct tactics and is best suited to different actors. The aim of the typology is to illustrate the different ontologies and epistemologies that underpin efforts to overcome climate policy obstructionism. We believe the typology is also broadly applicable to other contexts in which there is organised resistance.

Figure 1. Five Worlds of Political Strategy



We develop a heuristic model to assess how politicians' incentives to enact stronger climate policy change in response to these strategies under varying institutional conditions. Based on several stylized scenarios, we show that the choice of strategy is sensitive to:

(i) *democratisation*: the bargaining power citizens relative to business interest groups;

(ii) *climate consciousness*: the salience and power of citizens who support climate policy relative to citizens who oppose it; and

(iii) *green industrial incentives*: the power of business interest groups who support climate policy to those who oppose it.

Our heuristic model can be calibrated to gauge the impact of interest group strategies across diverse political economy regimes, from the many varieties of democracy and interest group pluralism to distinct forms of oligarchy. Our analysis demonstrates that due to positive feedback loops, it is likely that each strategy will have a role to play, although sequencing will be key. Some strategies may initially outperform others due to the institutional context, while others may set the stage for more ambitious action later. Tactics that garner the most success are: appropriate to the actors who carry them out, appropriate to the institutional setting in which they are applied, and timely.

Few studies in the literature have situated both the CCCM lobby and the climate movement within a single political economy framework describing the dynamics of political competition. Much of the existing literature in climate politics has focused on international climate negotiations, with less attention on how domestic politics may constrain climate policy. Studies most closely related to ours are those of Aklin and Urpelainen (2013) and Meckling (2019) which look at "green" versus "brown" governments, focusing on how politicians attempt to exploit path dependence and policy lock-in while their coalition is in power. Our model features multiple strategic actors: the CCCM lobby, the climate movement, the citizenry, and politicians, which allows us to explore rich, interactive dynamics in climate policy-making and strategic interest group competition.

We focus on "perceived welfare" rather than real welfare to capture issues around misinformation and biases. Previous studies have shown that weather extremes and the promulgation of scientific information does little to change aggregate opinions about climate change. Instead, "political mobilization by elites and advocacy groups is critical in influencing climate change concern" (Brulle, Carmichael and Jenkins 2012). The mechanisms by which interest groups have unequal influence over climate policy-making operate not only through the *actual* distribution of constituents' preferences but also through politicians',

firms' and citizens' (imperfect) *perceptions* of these preferences (Stokes 2020; Rafaty 2018). Misinformation and climate denialism have been used as strategic tools. And although studies acknowledge such biases exist and have tested them empirically (e.g. Gilens 2012; Gilens and Page 2014), incorporating them into heuristic models on decision-making and inter-group conflict is limited.

The motivation for our work stems from a growing understanding that climate policy is rarely the outcome of "optimal" decision-making (Stokes 2020). Purely technocratic proposals to enhance policy are of little practical value if they fail to survive the political process. It is in this environment that political strategy to advance the climate movement's agenda becomes of paramount importance, especially as the timeframe to limit warming to 2°C is fast narrowing.

The rest of the paper is organized as follows: section 2 provides a brief overview of climate policy obstructionism and explains how it is a global phenomenon, section 3 describes the five strategies in detail, section 4 presents the heuristic model, and section 5 discusses system-level change.

2 Brief Overview of Obstructionism

Whether it is the diversity of tactics, the cultivation of deep political networks (Farrell 2016), or the extent of expenditure (Brulle 2018; Ard, Garcia, and Kelly 2017), CCCM lobbying dwarfs climate movement lobbying on all dimensions.

Tactics used to incentivize and extract favours from politicians include offering lucrative private sector roles after serving in office (Blanes i Vidal, Draca, and Fons-Rosen 2012), strategically leveraging tax-free corporate philanthropy for political purposes (Bertrand *et al.* 2020), threatening politicians with competition if they do not acquiesce to a particular demand (Stokes 2020; Dal Bó and Di Tella 2003; Chamon and Kaplan 2013), inserting representatives into political and regulatory institutions to directly influence policy formation (Leonard 2019), and swaying voters and politicians by sponsoring advocacy

institutions, agenda-driven think tanks and media outlets (DellaVigna, Durante, and La Ferarra 2016). All of these tactics have been leveraged by the CCCM lobby.

Obstructionism in the US has been especially well-documented (Stokes 2020). The domestic CCCM lobby obstructed efforts to establish a national cap-and-trade scheme in 2010, an endeavour which came at a substantial cost to society (Meng and Rode 2019). The lobby also captured the Environmental Protection Agency and generously funded climate denialism (Farrell 2016). Koch Industries, ExxonMobil, and the American Legislative Exchange Council have been central nodal points in the spread of misinformation about climate change and in funding think tanks and pseudo-grassroots organisations to discredit climate action (Leonard 2019; Stokes 2020). The tactics of ExxonMobil have extended beyond the domestic sphere to the international arena where the company founded the Global Climate Coalition, a powerful erstwhile multinational lobbying consortium that staunchly opposed the Kyoto Protocol. Polarization of climate change issues along partisan lines has been a concerted strategy which has led to repeated U-turns in US climate policy from the Trump Administration's withdrawal from the Paris Agreement to Biden's subsequent re-instatement (Kim and Urpelainen 2017).

However, climate policy obstructionism is not unique to the paradigmatic US case. Many other nations with indigenous fossil fuel resources have their own forms of obstructionism. In several instances, the obstructionists are state-owned enterprises who exert disproportionate influence within elite governmental structures.

In India, the central government's majority stake in Coal India Limited, the world's largest coal company by production, creates perverse for regulation and misalignments in policy objectives across ministries. Overt instances of obstructionism include the government's periodic censorship of grassroots civil society groups advocating for stronger environmental regulations (Nandi 2020), and the freezing of the bank accounts of NGOs such as Greenpeace and Amnesty, in retaliation for their role in publicly exposing the human and environmental costs of open-pit coal mining (Burke 2015; Kumar 2020).

In China, provincial politics is tilted in favour of high-carbon "prestige projects". Chinese provinces operate in silos, eager to secure their own energy needs and pursue large-scale investments to boost reported GDP growth rates. This results in incentives to build capital-intensive, carbon-intensive assets, such as coal-fired power plants, even if they will be under-utilised and economically inefficient (Nelder 2021). China's plans for "carbon neutrality" by 2060 must contend with the reality of provincial politics.

In Russia, a staunch CCCM lobby has blocked and diluted climate policy ambition. In 2019, The Economic Development Ministry drafted a bill which proposed quotas on CO_2 emissions, a national emissions trading system, and penalties for polluters. However, Russia's most powerful business lobby, the Russian Union of Industrialists and Entrepreneurs, intervened to obstruct these proposals, which were subsequently scrapped and replaced with a lax "climate audit" provision. A spokesperson for the lobby group stated, "we have to maximize our sales of gas, oil, and coal as much as we can without stopping while there is still a buyer for it…" (Gershkovich 2019).

In Germany, the CCCM lobby has pressured politicians to obtain subsidies, tax exemptions, and protections against an "overly speedy" energy transition. Green-left party strength in the late 1990s and early 2000s led to the passage of feed-in-tariff legislation that caused solar photovoltaic and wind energy installations to surge. But when this began to pose a commercial threat to energy-intensive and trade-exposed industries, parliament stepped in to amend the feed-in tariff four times until it was replaced with a lax market mechanism (Leiren and Reimer 2018). Under successive coalition governments, parliament and ministerial departments have curtailed regulatory support for renewable energy, exempted heavy industry from paying various energy taxes, abandoned a proposal for a carbon tax, and subsidized coal production in the name of economic competitiveness and energy security (Leipprand and Flachsland 2018). The domestic lignite lobby in early 2020 settled for hefty financial compensation in return for a protracted phase-out involving "early" plant closures up to 2038. However, critics question whether the pay-outs were

necessary since the business case for lignite power plants was already threatened due to high costs of excavation and the presence of cheaper energy alternatives in Germany.

In Australia, the Abbott government (2013-2015) repealed a national carbon pricing scheme only two years after it was enacted due to organized industry resistance. At the time, an estimated one-third of media coverage of climate change in Australia was biased in favour of climate scepticism, with disinformation campaigns openly sponsored by media mogul Rupert Murdoch (Bacon 2013).

In Brazil, the Bolsonaro government has secured powerful support and avoided criticism from his party's rural agribusiness and mining base by dismantling environmental regulations, disenfranchising indigenous forest dwellers, and facilitating land-grabbing across the Amazon and Cerrado biomes, leading to a rise in deforestation rates after years of effective reduction (Rochedo *et al.* 2018).

Even in the European Union, which is considered an innovator in climate policy, obstructionism is present. Studies of lobbying activity show that carbon-intensive industry associations have endorsed the emissions trading system (ETS) during periods of reform but have used it as a Trojan Horse to pre-empt stricter regulations. Generous free allowances have diluted the impact of the ETS and generated windfall profits for some (Markard and Rosenbloom 2020). Moreover, the farm lobby has created a different frontline of resistance by aggressively supporting the Common Agricultural Policy which has important shortfalls in safeguarding climate, biodiversity, soil and land quality (Pe'er *et al.* 2020).

Therefore, the world over, climate politics abounds with high-profile episodes of the prevention, dilution, or reversal of climate change mitigation laws and policies. The persistent difficulty in phasing out fossil fuel subsidies is a testament to the degree of hysteresis within the system (Skovgaard and van Asselt 2018). The comparative politics of climate policy reveals how it has been a "tug-of-war" between contending interest groups rather than any form of technocratic policy setting exercise (Jahn 2016; Mildenberger 2020; Stokes 2020). Political strategies to overcome resistance are therefore of paramount importance in the effective passage of climate policies that can achieve the goals of the Paris Agreement.

3 Five Strategies to Change a Politician's Incentives

We now review the ontologies and epistemologies that underpin the five strategies. How do different strategists in the climate movement see themselves and relate to each other? What is their theory of change? Which actors are best suited to carry out each strategy? We will consider these questions for each strategy in turn.

3.1 Antagonism

Antagonism springs from grassroots movements by activists, indigenous groups, lawyers, academics, social enterprises, and civil society at large. Antagonistic action seeks to awaken public consciousness about the urgency of climate change and, encourage changes in consumer and voting behaviour. Antagonists challenge the social "license to operate" for businesses engaged in obstructionism, and pressure governments to act with greater urgency to reduce emissions. The antagonist mantra can be summarised by: "*name, shame, boycott and sue*".

Antagonism as a strategy is most easily implemented in institutional contexts in which there is "political opportunity" (Gamson 1996), that is, where citizens can exert influence on politicians by freely assembling, voicing demands, and trusting the judiciary to remain independent when filing lawsuits.

Antagonism places great emphasis on the egalitarian, participatory, deliberative, and emancipatory ideals of democracy. Antagonists seek to elevate the voices and environmental grievances of citizens. Many antagonists see themselves on the frontlines of a struggle against the undue political influence of wealthy corporate polluters or captured governmental institutions.

Antagonists reject the depoliticization of the public sphere and challenge stolid, amiable, elite and technocratic approaches. Antagonists see such approaches as too quick to dismiss the necessary aspects of socio-political conflict. Climate activist, Greta Thunberg, is an archetype of a climate strategist that espouses the theory of change embedded within antagonism, which is best captured by Frederick Douglass' 1857 speech:

> *"If there is no struggle there is no progress. Those who profess to favour freedom and yet deprecate agitation are men who want crops without ploughing up the ground; they want rain without thunder and lightning. They want the ocean without the awful roar of its many waters…Power concedes nothing without a demand. It never did and it never will" (Douglass 1979, 204).*

Protest movements, which are core part of the antagonistic toolkit, can raise the salience of climate change. The protest movement against the Vietnam War provides an instructive historical example. What began as a small and inauspicious movement on several university campuses eventually turned into a mass movement. It successfully raised public consciousness and aroused moral indignation at the atrocities that were being inflicted on the South Vietnamese population: by 1969, 58% of the public had come to regard the war as not merely "a mistake" but also "fundamentally wrong and immoral", a view which reached 70% support by the 1980s (Kiernan 1992). Around this period, mass movements for women's liberation and ecological awareness also scored important cultural and legislative victories through similar methods.

In line with classical social movement theory, antagonistic mass mobilisations are more likely to occur when there is undue structural strain on society (Smelser 1963), such as intolerable levels of air pollution or a fast narrowing window to halt dangerous climate change. Activists are framing climate change along deeply moral lines, emphasising issues of intergenerational justice and the threat of irreversible tipping points.

For antagonists, the possibility of a social zeitgeist is not remote but rather just below the surface: they believe that democratic support for stronger climate policy will grow louder as the climate crisis is brought to the forefront of attention. Where citizens have a large pull on politicians (i.e. high levels of *democratisation*), mass mobilizations, such as those galvanised by Fridays for Future or the Sunrise Movement have a chance at altering politicians' incentives. However, in contexts where citizens' have relatively less influence compared to corporate CCCM interests, politicians may play lip-service to the demands of citizens while delaying meaningful policy reforms.

There is a danger in promulgating heavy-handed antagonistic tactics insofar as they widen rather than narrow existing chasms. For example, when several Extinction Rebellion activists blocked commuter trains during rush hour in London in 2019, many citizens were alienated and infuriated, becoming less sympathetic to the cause. Antagonists need to convince their audiences that they are not acting out of exaggerated indignation but rather, that they are on the same side in an asymmetric tug-of-war which may sometimes require uncomfortable tactics and contentious politics (Giugni and Passy 1998).

Activists who espouse antagonism can also leverage their rights as consumers to boycott products from companies that fail to act ambitiously on climate change. If such boycotting occurs on a scale that impacts corporations' bottom line, it can create strong incentives for behavioural change. Consumer boycotts are likely succeed in contexts where there is consumer choice, salience and low barriers to switching. For example, competition in the retail market for electricity in the UK allows citizens to opt for suppliers that source from, and invest in, renewable energy. In the US, by contrast, switching between suppliers is exceedingly cumbersome. Similarly, some products have clear, transparent and credible labels allowing consumers to make informed choices while others are still in the process of agreeing upon what is "sustainable".

Similarly, condemnatory exposure of alleged wrongdoing ("naming and shaming") can reduce the social license to operate in a "business as usual" manner. Historical precedent can be found with the 1904 publication, *The History of the Standard Oil Company*, written by investigative journalist Ida Tarbell. According to historian Daniel Yergin, it was "the single most influential book on business ever published in the United States", one which exposed the financial shenanigans of John D. Rockefeller during his reign over the Standard Oil monopoly (Yergin 2011). The public outrage at the revelations that followed culminated in a 1911 Supreme Court ruling which dissolved the monopoly. One of the successor companies which formed in its wake was Exxon.

However, Exxon itself continued obstructionist activities. The "Exxonknew" campaign exposed how Exxon was aware of the dangers of rising CO_2 emissions as early as 1968 but publicly sowed doubt by emphasizing the epistemic uncertainties of climate science and funding outlets that promulgated climate denialism (Oreskes and Conway 2011; Robinson and Robbins 1968). This provided the evidentiary basis for numerous lawsuits filed by states such as New York and California. Exxon's ignominy soon became that of the wider petroleum industry as this episode revealed that any of supermajors – Chevron, Shell, BP, Total, etc. – could be the next target of antagonistic litigation (Carton 2020).

Lawsuits against companies for damages due to their hydrocarbon activities may become increasingly common. Existing evidence shows that there is a valid legal case to challenge the issuance of fossil fuel permits when damages are localised and low-cost alternatives are present (Rafaty, Srivastav, and Hoops 2020). Moreover, scientific advances in causally attributing damages to climate change (Stuart-Smith *et al.* 2021) are making it easier for claimants to robustly argue their case.

However, where courts are bought into the CCCM lobby's agenda, such actions may be less effective. For example, in India, indigenous communities displaced by open-pit coal mining are often assisted by NGOs to seek legal recourse; however, the success rate of these cases is limited since local courts tend to be biased in favour of the Ministry of Coal's position.

There is also a danger of pursuing poorly crafted lawsuits that do little to reduce emissions, but which provoke companies to launch a slew of countersuits that do greater harm. Legal interventions should be carefully formulated to invoke the principles and precedents of legal systems *as they are*, rather than as one *may wish them to be* to increase the chances of successfully promoting legal accountability.

Climate litigation can also be used by citizens against the government. A high-profile case is the Urgenda Foundation *v.* the State of the Netherlands (2019), in which Dutch citizens sued their government over its failure to adopt ambitious climate mitigation measures. The court ruled in favour of citizens arguing that the government was in violation of citizens' constitutional right to secure adequate protection from

environmental harm. Such litigation may not only result in direct changes to climate policy but also increase how politicians weight the welfare climate conscious citizens.

3.2 Institutionalism

Institutionalism involves changing the "rules of the game" through the use of public institutional powers (Garud, Kumaraswamy, and Karnøev 2010; Beunen and Patterson 2019). It is a strategy best leveraged by those in government, the judiciary, or the technocrats who advise them. Institutionalists believe that choices at the individual level are unlikely to reduce global emissions, rather changes at the system level are warranted. Yet, they are not revolutionaries who want to upend the system overnight. They are aware that the current "policy status quo reflects compromises from past rounds of policy conflict" (Breetz et al. 2018). Instead they believe in smartly targeted gradualist interventions with enduring impacts.

However, the receptivity of public institutions to changes in rules is far from guaranteed, especially since many tactics within institutionalism directly and saliently target the operations of the CCCM lobby (e.g. carbon pricing). For institutionalist measures to get passed through, "windows of opportunity" are required. Such opportunities may arise after elections, antagonistic mass mobilisations, climate lawsuits and exogenous shocks which raise the salience of the climate agenda (e.g. the release of an IPCC report) or which force the system to do things differently (such as the COVID-19 pandemic).

For example, negative screens on major stock exchanges can have far-ranging impacts. Expanding due diligence procedures to ensure that companies must be "Paris-consistent" before listing on a stock exchange can not only make direct access to capital difficult but also raise the cost of insurance for carbon-intensive firms. Such institutionalist reforms hasten progress towards the post-carbon transition by capitalising on "sensitive intervention points" i.e. areas of the system that ripe for change and which can produce positive feedback dynamics (Farmer *et al.* 2019).

Central Banks can also ensure that actions such as quantitative easing, that involve the large-scale purchase of corporate bonds, do not end up inadvertently supporting businesses that compromise on the

stability of the system by exacerbating climate change risks (Dafermos, Nikolaidi and Galanis 2018). Similarly, in response to an economic depression, bailouts can made conditional such that carbon-intensive recipients are forced to decarbonise or invest in green technology as a necessary condition (Hepburn *et al*. 2020).

Mandatory disclosure of climate risks is another institutionalist tactic that can change how markets value corporations. If the assumptions that underpin corporations' market valuations are made transparent to shareholders, and if these assumptions are increasingly viewed as implausible (e.g. robust forecasts for fossil fuel demand out to 2050), then investment is likely to move to firms that do adequately consider climate change. All of these measures involve shifts in the system that can dramatically change capital flows.

Institutionalism can also involve the establishment of independent oversight committees that shield climate policy from the vagaries of electoral cycles. For example, under the 2008 Climate Change Act, the UK established the Committee on Climate Change (CCC) which was tasked with setting science-based carbon budgets every five years, giving independent advice to the government, and reporting to Parliament on progress. Independent commissions such as the CCC ensure that there are checks and balances against political short-termism. In many political systems, the creation of arm's length bodies of this sort may be decisive in enhancing the credibility of long run emissions targets.

Caps on corporate contributions to political campaigns are another example of changing the rules. This intervention can reduce the bargaining power of corporations relative to citizens which can incentivize politicians to pursue more stringent climate policy if corporate lobbying disproportionately reflects CCCM interests and citizens are in favour of climate policy. In many countries across the world, empowering citizens relative to corporations is likely to incentivize climate action because these conditions are satisfied.

Finally, legally binding emissions reduction targets may also be impactful institutionalist measures, insofar as they provide a credible direction of travel and signal legislative intent. The EU, China, Japan, South

Korea, Sweden, UK, France, Denmark and New Zealand have all passed laws or extemporary decrees establishing net-zero emissions targets. Such commitments can provide the basis upon which citizens hold governments accountable (e.g. under the strategy of antagonism). They may also send strong signals to markets to cause carbon-intensive corporations to voluntarily alter their trajectory.

3.3 Appeasement

Appeasement provides compensation to the "losers" of the transition as a means of quelling their resistance. Leveraging this strategy is typically the prerogative of governments, local authorities and courts. Common forms of appeasement include worker re-training programmes; pay-offs for workers and asset owners due to early closures; and regional transition funds to support economic diversification in localities that are dependent on climate-forcing assets.

The juridical foundations of appeasement can be found in the law of indemnities, while its moral foundations, insofar as the compensation is only directed at workers relies on the concept of a "just transition".

However, there is another purely instrumental logic of appeasement, which does not require normative appeals about the necessity of a "just transition". It may simply be politically expedient to pay-off capital owners, in recognition of the fact that they are powerful lobbyists who may otherwise excoriate and derail important reforms. This form of appeasement is closer to how the term has been used in International Politics (Rock 2014).

Appeasement for workers relies on the theory of change that successful strategy uplifts the economic hopes and developmental prospects of low-income communities. Climate activists who espouse this view include Naomi Klein and Alexandria Ocasio-Cortez who frequently bundle climate policy with measures to reduce inequality, create jobs, and uplift marginalised communities.

In regions where many were once employed at bituminous and anthracite mines, which fuelled the Industrial Revolution, there is a persistent state of economic deprivation. Many such communities retain the

memory of having been "left behind" and harbour a deep distrust of elites and the climate change agenda. When visiting the deindustrialized towns of the Rust Belt during his campaign trail, US President Joe Biden proposed compensation to miners and their communities as a core element of his climate proposal.

Similarly, in the coal mining belt of Eastern India, stealing from open-pit coal mines is the last recourse for indigenous communities, even though the same collieries were responsible for the deracination of forests and pastoral lands that once supported traditional livelihoods (Lahiri-Dutt 2016). A parallel exists for indigenous tribes in the Amazon and North America who have come to depend on revenues from the same activities that marginalised them. Claims on preserving mining, logging or pipeline construction to "protect the poor" overlook the nuance of these experiences. Appeasement will require regaining the trust of these communities and, undertaking concerted efforts to re-train workers and ensure economic diversification in their areas (Jakob *et al.* 2020). Transition funds can play a key role by actuating a vision for a net-zero economic revival such that the dignity of these communities' past is written into the energetics and architecture of their future.

In terms of appeasement for capital owners: many groups consider it morally dubious to give wealthy polluters "yet another bailout". However, others point towards the discomfiting fact that such forms of appeasement have silenced powerful incumbents and paved the way for change in the past. They highlight how slave-owners were famously compensated for "lost property" during emancipatory episodes in the British Empire, Zanzibar, Haiti, and elsewhere. The logic of offering monetary compensation to slaver-owners was "to pre-empt the use of violence to end slavery". This is analogous to the logic of compensating owners of climate-forcing assets to pre-empt further conflict and obstructionism in climate policy, notwithstanding the obvious moral differences in such a comparison.

One of the most urgent forms of appeasement in the net-zero transition concerns the early closures of coal mines. Germany is a high-profile example of a country which is navigating this challenge, and appeasement has arguably been indispensable as a means of silencing the domestic lignite lobby.

Germany's coal exit law stipulates that a total of 4.35 billion Euros in compensation will be paid for planned shutdowns by 2030 (Wettengel 2020). However, appeasement on its own, without complementary measures, could lead to inefficiently large pay-outs to the owners of climate-forcing assets. In the German case, challenge is imminent as the European Commission questions whether "compensating operators for foregone profits reaching very far into the future corresponds to the minimum required" (European Commission 2021). The Commission has doubts on the model used to calculate "foregone profits".

It is likely that antagonism or institutionalism will be needed as complementary strategies to safeguard public interest and put a reasonable upper bound on compensation to capital-owners. We can derive lessons about the dangers of unfettered compensation to capital-owners from the history of compensated emancipation. The British government borrowed £20 million to compensate slaveowners, which amounted to a hefty 40 percent of the Treasury's annual income at the time. The indemnity was not paid off until 2015 illustrating how this measure came at significant cost to society.

Finally, there may be situations in which appeasement has symbolic value when directed towards those who are the wealthy beneficiaries of the old regime. During the end of Apartheid in South Africa, when political conflicts were especially fractious and bitter, those who confessed their crimes were pardoned, and many – not least Nelson Mandela – wholeheartedly urged others to avoid the impulse to punish the perpetrators, believing that only forgiveness could heal a bitterly torn society.

This reconciliatory view of appeasement might pertain to certain forms of climate litigation targeting multinational oil corporations. Starting in 2015, the Climate Leadership Council (CLC) in the US put forward a national "carbon dividends" proposal that included a provision to establish a "legal liability shield", which would statutorily exempt oil and gas companies from all tort liability in court cases seeking restitution for the monetary damages attributed to their historical emissions. This provision was motivated by a theory of change which believed that (i) no comprehensive climate legislation will ever pass through Congress without bringing the oil supermajors to the table, (ii) to bring oil supermajors to the table as allies in drafting climate

legislation, the policy must provide not only sticks but also carrots (appeasement), and (iii) the climate lawsuits which the companies would be shielded from are far less effective at reducing emissions than the carbon dividends proposal. This proposal did not prevent the outrage that many environmental groups expressed towards the liability provision. However, there was another segment of environmentalists who preferred to focus on the emissions abatement that could be achieved if "carbon dividends" were adopted. Holding no particularly strong moral conviction about historical liability for emissions, they were willing to endorse the CLC's proposal as a reasonable compromise.

3.4 Countervailance

Countervailance is based on the insight that it is unlikely that the post-carbon transition will happen in the absence of cheap, clean, and dependable substitutes to the hydrocarbon assets that propelled the industrial revolution. Proponents of countervailance tend to be technology-focused and frame the climate change challenge as one around the need for a "green industrial revolution".

The idea however, is not apolitical. Creating large green industrial interests helps create a "countervailing power" to the existing CCCM lobby, thereby levelling the political playing field. Moreover, interventions to make green technologies cheaper help dissipate a large portion of the political conflict and enable market forces to drive rapid deployment (Breetz, Mildenberger and Stokes 2018).

Under countervailance, innovation, industrial policy, and a compelling socio-technical vision of the future are of first-order importance. On this point, individuals as ostensibly dissimilar as Karl Marx, Joseph Schumpeter, and today's Silicon Valley CEOs all agree: it is the technological possibilities available to a society which prefigure politics, culture and institutions. They are the wellspring from which Schumpeter's "creative destruction" occurs.

Governments are, in principle, best placed to leverage the countervailance toolkit through tactics such as R&D tax credits, prizes, innovation incubators and subsidies for green innovation, as well as, renewable portfolio standards, renewable energy auctions, government procurement for green technologies, and

policies that de-risk green investments (e.g. feed-in-tariffs and contract-for-differences). Municipal governments can also create incentives for green innovation through, for example, establishing low-carbon zones in cities, providing tax-cuts for electric vehicle purchases, issuing (legitimately) green bonds, and setting high energy efficiency standards for buildings and appliances. Finally, high net-worth individuals can fund green innovation directly, while financiers can create special arrangements for financing green technology.

Countervailance tactics can be impactful. When technologies are nascent, markets are reluctant to finance innovation even if the social benefits may be high. This is due to a host of market failures including credit constraints, asymmetric information, and imperfect appropriability (Arrow 1972), in addition to the classic climate change externality. Public intervention at the early stages can provide the necessary push to ensure private players fund important solutions. After initial support, positive feedbacks can trigger a virtuous cycle of more production, more learning, lower costs, and higher demand. Countervailance, therefore, taps into the ubiquitous logic of the market: businesses begin to realise that there are financial gains from switching to promising new technologies which increases the number of green corporations and the profitability of green business models.

In many cases, countervailance comes with the political advantage of bypassing direct confrontation with the CCCM lobby. Unlike a carbon tax or climate lawsuit, which would involve immediate head-on confrontation with the CCCM lobby, countervailance involves enacting a portfolio of policies to support innovation and uptake in low-carbon alternatives. This may naturally reduce the business case for carbon-intensive corporations but is less politically salient as an attack on the CCCM lobby. This is not to say, however, that countervailance strategies will not elicit any backlash – they certainly can and have.

As technology cost curves begin to slope downwards, some incumbents may start to feel threatened and ramp up lobbying to discredit the rise of low-carbon technologies, rather than undertaking the necessary business model reform. In many countries, this stage has already been reached. A salient example of

incumbents feeling threatened is the 2020 launch of pseudo-scientific report sponsored by Aston Martin that claimed that electric vehicles are far less efficient than once imagined. This claim was thoroughly debunked in a public expose spearheaded by the head of Bloomberg New Energy Finance, which also revealed that the PR company responsible for the report was headed by the spouse of the head of Government Affairs of Aston Martin (Ambrose 2020).

Another example is that of Germany's feed-in-tariff legislation which was removed after incumbents lambasted its costliness and alleged risks to energy security. Although critics did not state it so explicitly, at a fundamental level, the concern was that the feed-in tariff worked "too well" and "too quickly" (Hoppmann, Huenteler, and Girod 2014). One of the authors of the original feed-in tariff law argued that it history would call it the "Birth Certificate of the Solar Age" since it created assured demand for renewable energy that led to increased production and learning-by-doing.

Countervailance in conjunction with other strategies offers potential answers to such reactionary forces. For example, when complemented with antagonistic strategies such as mass movements to raise climate awareness, there is likely to be greater support for countervailing tactics, as citizens see that the transition is not only affordable but also realise the extent of obstructionism propagated by the CCCM lobby.

Furthermore, the positive feedback of learning-by-doing can overpower political setbacks. Under the Trump Administration, cost declines in renewable energy pushed decarbonisation forward despite the Administration's openly hostile stance towards renewable energy, and support for coal. Renewable energy continued to grow in share, even in states that were part of the old hydrocarbon order, such as Texas. As more businesses found it profitable to switch to cheaper and greener technologies, the hydrocarbon business case diminished, generating additional positive feedbacks in the form of self-reinforcing expectations.

As green technologies acquire market share, novel political realignments tend to emerge (Meckling, Sterner and Wagner 2017). "Politically active tech clusters" can become powerful advocates of stronger climate policies, deter policy backsliding and create windows of opportunities for institutionalist reform

(such as the creation of independent commissions to monitor progress on climate change or higher carbon prices).

An instructive example occurred in Denmark after a centre-right coalition government abandoned several renewable energy commitments in the late 1990s. Vestas, the country's largest wind turbine manufacturer, threatened to leave Denmark and take its suppliers. Vestas formed an ad hoc green lobbying coalition within the Danish Board of Industry, which included Rockwool (insulation material manufacturer), Danfoss (heating and cooling), Grudfos (gas boilers and pumps), Siemens (wind turbines), VELUX (solar panels and roof windows), Novo Nordisk (healthcare), Novosines (biofuels), and DONG Energy (electric utility). Each of these companies had benefitted from government policies to support energy efficiency and renewable energy. The government quickly learnt that it was in its interests to heed to the demands of the green business coalition because, among other realities, renewable energy was quickly becoming a major source of the country's export revenue.[1] The government re-instated various support measures for the wind industry, admitting that they had underestimated the sentiments of big green businesses.

In this way, the aspiration of green businesses not to lose market share is scarcely different from that of CCCM incumbents. The ability of countervailance to invigorate a green lobby is a positive feedback dynamic that can safeguard gains in climate policy.

3.5 Co-optation

Co-optation is a highly individualized strategy carried out by tactful reformers with privileged access to elite centres of power. Co-optation involves bringing climate policy obstructionists to the side of the climate movement. Co-optation is usually considered feasible when the co-*opter* has relatively more power or moral

[1] In the 1990s, Denmark had become a net energy exporter and controlled two-thirds of the global wind turbine market, despite being a small country of less the five million inhabitants.

authority than the co-*opted* (Holdo 2019), or when the co-opter provides strong incentives or rationales for reform such that the co-opted views it in his/her best interests to change course.

Co-optation is traditionally discussed in the context of entrenched interests absorbing smaller and less powerful movements (Holdo 2019), however, in this case we will consider it for the climate movement absorbing agents of the CCCM lobby. Examples of co-opters in the climate movement include Pope Francis who has used his immense moral authority to summon oil & gas executives to change strategy; family members of executives who are in a unique position to "change hearts and minds"; and majority shareholders, high profile advisors, and elite academics.

Co-opters try to persuade businesses or public institutions to become allies of the climate movement. The theory of change is based on the idea that by convincing a relatively small number of elite individuals, such as the CEOs of large, energy-intensive companies or top government officials, great sums of capital can be reallocated away from climate-forcing assets.

Compared to the other strategies in our typology, co-optation is available to relatively few members of the climate movement, and perhaps for this reason, many groups tend to discount its potential. Co-optation is likely to be a strategy of choice in contexts where ordinary citizens have relatively less bargaining power compared to corporations (e.g. corporatist oligarchies).

Co-opters can bring about a number of different changes within business organisations that include: commitments to stop funding CCCM lobby groups; linking executive pay to measurable emissions reductions; adopting internal carbon pricing; committing to deforestation-free supply chains; and investing more in green innovation. Increasingly, elite members of society are engaging in shareholder activism to hold oil & gas supermajors accountable. This may include shareholders using their influence to demand firms to invest in clean technologies and reduce scope 1 to 3 emissions (Clark and Crawford 2012).

Co-opters navigate the art and politics of persuasion, and their required skillset is not unlike that of an effective politician. Beyond access to elite networks and corridors of power, the successful co-opter tends

to be stolid, pragmatic, and careful not to alienate those who they wish to persuade. For the most part, when addressing incumbents, co-opters tend to avoid sententious platitudes (unless they are of exceptionally high stature like Pope Francis). This does not mean that co-opters are moral relativists who lack conviction; to the contrary, many have strong scruples and care passionately about climate change but simply wish to make the most of their privileged position and avoid certain rigidities that could spoil their mission.

However, the co-opter who conforms *entirely* to the social mores of the organization they wish to reform risks being the one who is actually co-opted. Both co-opte*r* and co-opte*d* are elites who agree to interact in the same social and institutional milieu; the essential quality that distinguishes them is that the co-opte*r* is more skilled at identifying the right time to intervene to advance one's agenda.

Since co-optation deals fundamentally in the art of persuasion, its intellectual foundations can be traced back to the ancient Greek concept of *kairos* which denotes "adaptation and accommodation" as well as "timeliness" (Pierson 2000). In Renaissance political philosophy, Machiavelli and other writers evoke *kairos* as a rhetorical theory of "when and how to say things".

Looking ahead, co-opters could move beyond attempts to persuade hydrocarbon businesses and start building new alliances with businesses in sectors that have been largely overlooked in climate policy but can play a pivotal role in precipitating change. Google, Amazon, Facebook and other technology companies have recently announced plans to eliminate or neutralize their carbon footprints from Scope 1 through Scope 3 emissions. These companies have market-moving power and actions across their supply chains, data centres, and global distribution networks could amplify net-zero efforts in other areas of the economy.

Co-opters can hold such companies to their promises, ensure their net-zero plans are not undermined by faulty carbon offsets, and find new business associations with similar recruitment potential. Perhaps most importantly, since such companies have unique political clout in Washington and other political capitals of

the world, efforts to turn them into proactive lobbyists for climate action rather than merely passive supporters may tilt the balance of power in gridlocked legislatures such as the US Congress where carbon-intensive incumbents currently control the scales.

4 Heuristic Model to Examine Strategy Choice

This section develops a simple heuristic model for how the five strategies, and the tactics within them, influence a politician's incentives to enact stronger climate policy across different institutional settings.

4.1 The Politician's Objective Function

A politician selects the level of emissions reduction, x, such that she maximizes the *perceived* welfare, W, of citizens and business interest groups:[2]

$$W = \underbrace{\alpha(\overbrace{\beta_1}^{\text{'Pro'}} W_P(x) + \overbrace{\beta_2}^{\text{'Against'}} W_A(x) + (1 - \beta_1 - \beta_2)\overbrace{W_N(x)}^{\text{'Neutral'}})}_{\text{Citizenry}} + \underbrace{(1-\alpha)(\overbrace{\phi}^{\text{'Fossil'}} W_F(x) + (1-\overbrace{\phi}^{\text{'Green'}}) W_G(x))}_{\text{Big business}} \quad (1)$$

$\alpha \in [0,1]$ describes the level of democratisation, i.e. the relative bargaining power of citizens versus that of corporations in the political system.[3] Subscripts P, A, and N represent citizens that are 'pro', 'against'

[2] x may be interpreted as an explicit emissions reduction target or the expected outcome of policy.

[3] 'Consensus democracies' such as those of the Nordic countries, or semi-direct representative democracies such as that of Switzerland, will have a relatively high value of α. Where there is a strong revolving door between industry and government, such as in the United States, α is lower. In China, where citizens cannot vote but still play a role insofar as they can leverage implicit threats of civil disobedience, α is even lower.

and 'neutral' vis-à-vis climate policy respectively. The perceived welfare of P citizens increases with greater emissions reduction ($W_P'(x) > 0$), decreases for A citizens ($W_A'(x) < 0$) and remains unchanged for N citizens ($W_N'(x) = 0$). The distribution of beliefs within the citizenry or how the politician weights them is controlled by β_1 and β_2.[4] Corporations are divided into two groups, G and F.[5] G businesses experience increases in perceived welfare with higher emissions reductions ($W_G'(x) > 0$), while F businesses support the carbon-intensive status quo ($W_F'(x) < 0$). The distribution of corporate interests between G and F or how a politician weights them is determined by $\phi \in [0,1]$.[6]

The politician's objective function features citizens because they supply votes and business interest groups because they supply finance. We assume the politician's chance of election or re-election increases in W.[7] Citizens and corporate interests are considered separately to capture cases of divergent interests. Neutral

[4] $1 - \beta_1 - \beta_2 = 0$ and $\beta_{1,2} = \in [0,1]$

[5] We use the terms 'corporations' and 'business interest groups' interchangeably. 'Corporations' refers not only to large publicly traded companies but to all firms, industry associations, and business groups which engage in political activity.

[6] For simplicity we assume there is no neutrality for firms in relation to how perceived welfare will change in response to climate ambition. This can be modelled but it will not change the core conclusions.

[7] In the case of countries without democratic elections, this can be rephrased as a politician's "ability to retain power".

citizens are included to model common phenomena in opinion dynamics, i.e. it is more likely to switch to or from a neutral stance relative to switching across extremes.[8]

We focus on *perceived* welfare because the "true" level of welfare an agent experiences in response to different emissions scenarios may differ from how the agent perceives the matter *ex ante*. This may be due to informational asymmetries (Druckman and McGrath 2019), motivated reasoning, biases relating to elite cues or social milieus (Hart and Nisbet 2012; Gabel and Scheve 2007; Mildenberger and Tingley 2019; Kaufmann *et al*. 2017), and biased media consumption (Feldman *et al*. 2014). The politician may also mis-judge citizens' or firms' perceptions of their own welfare for the same reasons.

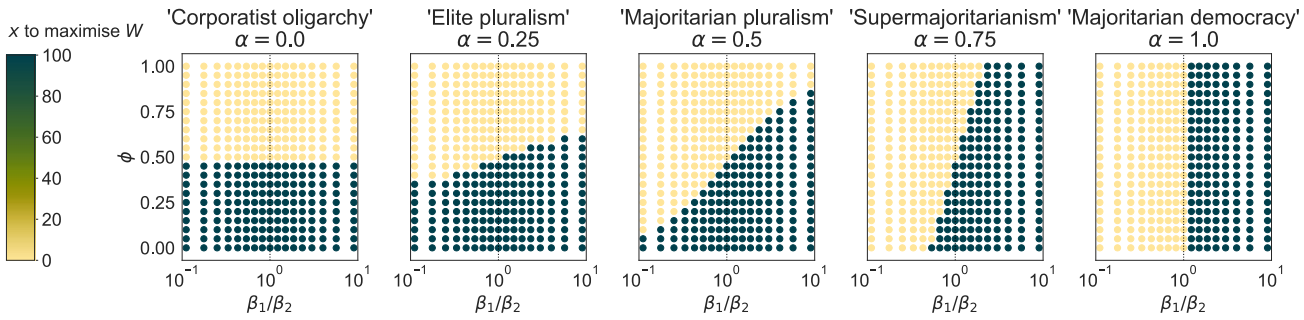
Figure 2 simulates how the politician's incentives change in *green industrial incentives* $(1-\phi)$, *the level of democratisation* (α), and *climate-consciousness* (β_1/β_2). On the extreme left panel of Figure 2, we see that in a pure corporate oligarchy ($\alpha = 0$), the incentive to reduce emissions is invariant to changes in the relative beliefs of citizens (β_1/β_2). The only parameter that matters is ϕ. If $\phi > 0.5$, the politician is incentivised to reinforce the pollution-intensive status quo (yellow bubbles). On the other end of the spectrum is a majoritarian democracy ($\alpha = 1$). Here, if the majority of citizens is in favour of climate action ($\beta_1/\beta_2 > 1$), the politician is incentivised to reduce emissions (blue bubbles) regardless of the value of ϕ. The panels in between show middle-ground scenarios.

The model shows that from a static perspective: (i) tactics that change citizens' beliefs (antagonism) and which compensate "losers" (appeasement) can be powerful in systems where citizens have more bargaining power than corporations (high α); (ii) tactics that involve increasing corporate incentives to adopt climate-compatible business models (co-optation, institutionalism, and countervailance) or abandon carbon-intensive

[8] For example, awareness-building social movements are most successful when they tap into the large and latent pool of citizens with neutral views and effectively recruit them into the 'pro' camp.

business models (antagonism) are likely to be effective where corporate interests are stronger (low α); and (iii) increasing α through antagonistic or institutionalist measures may be necessary in contexts where the CCCM lobby disproportionately exerts influence against the will of a climate conscious citizenry. Table 2 further details how the choice of strategy depends on these institutional parameters.

Figure 2. Incentive to Reduce Emissions as a Function of Political Regime Type and Balance of Interest Groups[9]



[9]*Colour-coded values correspond to a politician's overall propensity to reduce emissions. For simplicity, estimates from the simulation are restricted to either the maxima or minima of emissions abatement, where the minimum is always zero. Negative values denoting a propensity to increase emissions are also possible, but not considered here. Our choice of terminology in the panel titles is based on the taxonomical literature exploring political regime types: corporate oligarchy (Winters 2011), elite vs. neutral pluralism (Gilens and Page 2014), and supermajoritarianism vs. neutral democracy (Ganghof 2013).*

Table 2. The Sensitivity of Strategies to Initial Conditions (Static Perspective)

Initial Conditions *If:*	**Goal** *Then:*	**Tactic** *By:*	
1. Most citizens are 'against' climate policy ($\beta_2 > \beta_1$), and citizens have at least as much political influence as corporations ($\alpha \geq 0.5$)	Increase β_1/β_2	(a)	Awareness campaigns and pro-climate grassroots movements such as Fridays for Future, Sunrise Movement, and Extinction Rebellion (*antagonism)* to induce switch from: A to N; N to P; or A to P.
		(b)	The switch away from A can also be enabled through financial compensation to the 'losers' (*appeasement*)
2. F firms have more political influence than G firms ($\phi > 0.5$) and corporations have at least as much political influence as citizens ($\alpha \leq 0.5$).	Decrease ϕ	(a)	Pressure F firms to overhaul their business model and become G firms via co-*optation*
		(b)	Put F firms out of business via *antagonism* (climate lawsuits, boycotts and reputational damage)
		(c)	Make conditions more favorable for G firms relative to F firms through c*ountervailanc*e (e.g. support for green technologies)
		(d)	Buy the silence and cooperation of F firms through financial compensation (*appeasement*)
		(e)	Enact institutional reforms, including carbon pricing and mandatory disclosure of risks, that incentivize F corporations to become G.
3. Politicians disproportionately weight the welfare of citizens who are 'against' climate policy than those who are 'pro' ($\beta_2 > \beta_1$)	Increase β_1/β_2	(a)	Persuade politicians that the public overwhelmingly supports ambitious climate policy (*antagonism*)
		(b)	Make it a liability for politicians to discount the perceived welfare and preferences of the of citizens (*antagonism; institutionalism*)
		(c)	Empower the "silent majority" of climate conscious citizens through mass mobilisations (*antagonism*)
4. Corporations have at least as much political influence as citizens ($\alpha \leq 0.5$) and there are at least as many G firms than F ($G \geq F$), but politicians underweight them ($\phi > 0.5$)	Decrease ϕ	(a)	Persuade politicians, financiers and businesses that G firms produce greater long-term economic growth and prosperity than F firms (*antagonism; co-optation*)
		(b)	Make it an electoral liability for politicians to privilege the welfare of F firms at the expense of G firms via *institutionalism*.
5. Corporations have at least as much political influence as citizens ($\alpha \leq 0.5$), F firms outweigh G firms in both size and political influence ($\phi > 0.5$), but most citizens favor ambitious climate policy ($P > A$).	Increase α	(a)	Reform public institutions to improve the quality of democracy through *institutionalism*
		(b)	Make it an electoral liability for politicians to privilege the welfare of corporations at the expense of the welfare of the citizenry through *antagonism*

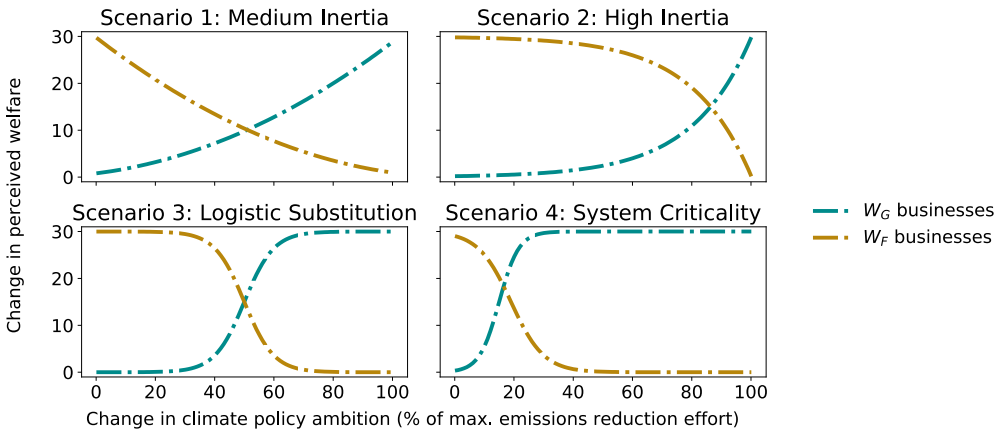
5 System-Level Change: Timing and Sequencing of Strategies

We now move from a static perspective to a dynamic one and consider how the five strategies may build-off each other to create a new status quo. As we will see, strategies that are not immediately effective from a static perspective, may be useful from a dynamic perspective as they set the stage for more ambitious action later. We first outline different plausible states of systems (Figure 3) and then simulate politicians' choices and pathways towards decarbonisation based on Equation 1 (Figure 4).

While some systems may be highly responsive to climate policy, others may exist in a state of high inertia. Figure 3 shows how the perceived welfare of *G* and *F* corporate interest groups may change in response to climate policy ambition. Scenario 1 shows "medium inertia" where a ≥50% increase in climate policy ambition causes the perceived welfare of G corporations to exceed that of F corporations. Scenario 2 portrays "high inertia" where it takes a 90% increase in ambition to signal the same shift. High levels of inertia may exist in, for example, the building system, where due to low asset turnover rates, more ambitious climate policy signals are needed to credibly demonstrate that the post-carbon transition is underway. It may also exist in hard to decarbonise sectors such as cement, and iron & steel where large sums of R&D and countervailance tactics are needed to make zero-carbon alternatives available at low-cost and scale. Scenario 3 shows "logistic substitution" where at a 50% increase in ambition there is a dramatic surge in the perceived welfare of G corporations and a steep drop for F businesses. This could be the transport system where there is a large stock of existing hydrocarbon infrastructure but technological trends such as fast declining costs for electric vehicles and batteries, e-mobility solutions and autonomous driving, point towards a tangible net-zero paradigm. In this case, institutionalist interventions such as a deadline to phaseout all carbon-intensive transport coupled with regulations to enable autonomous driving could result in a rapid transition. Scenario 4 represents "system criticality" where just a small nudge (<20% more ambition) achieves a dramatic surge in W_G and drop in W_F. High levels of criticality may occur in systems where there are network effects, bandwagon dynamics, increasing returns to scale and ready-to-go cheap,

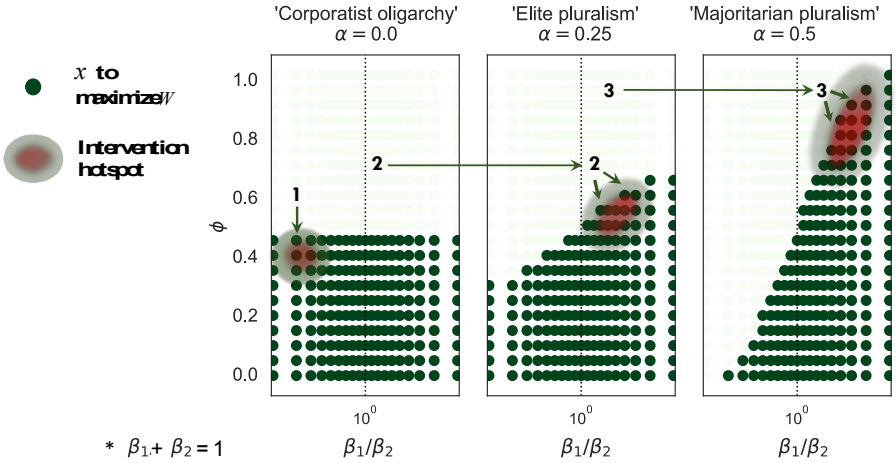
low-carbon alternatives. This could be the financial sector, where requirements such as the mandatory disclosure of climate risk cause financiers and their networked industries, to adopt a new lending paradigm which stops providing easy access to capital for polluting businesses and supports mature, cost competitive, low-carbon technologies such as solar photovoltaics and wind energy. It could also be social media platforms where network effects lead to large-scale climate action protests.

Figure 3. Perceived Welfare as a Function of Climate Policy Ambition



As an illustration of how strategies may be deployed and sequenced dynamically, Figure 4 takes the perspective of the climate strategist and considers potential sensitive intervention points. We assume a "Medium Inertia" scenario. Dark green bubbles correspond to solutions in the state space where the politician pursues emissions reduction. The arrows indicate "paths of least resistance", moving from a state where climate policy ambition is improbable to one where a politician has strong incentives to pursue higher emissions reductions, x.

Figure 4. Sensitive Intervention Points ("Medium Inertia")[10]



Starting from position 1 in Corporatist Oligarchy, where the relative beliefs of citizens are tilted *against* stronger climate policy, the strategist will likely have greater success in increasing the weight of G business interests relative to F interests (i.e. lowering ϕ) as opposed to than democratising the system towards α=0.25. This can be done through *co-optation* to convince F businesses that there is more profit in being green or via *countervailance* to prop up the market for green technologies. Democratising the system without shifting citizens' beliefs will stall the climate movement's agenda since most citizens oppose ambitious climate action. Democratisation, in this case, is best considered *after* appeasement.

However, conditional on being in position 2 in Corporatist Oligarchy, where the weight on F business groups is very high but citizens' preferences are tilted in favour of stronger climate ambition (let's assume this

[10] Colour-coded values correspond to a politician's overall *propensity* to reduce emissions. For simplicity, estimates from the simulation are restricted to either the maxima or minima of emissions abatement, where the minimum is always zero. Negative values denoting a propensity to *increase* emissions are also possible, but not considered here.

happened because of successful *appeasement*), then the strategist may find it easier to pursue structural political reforms to raise the voice of citizens (i.e. bring α to 0.25) relative to doing anything antagonistic that directly upsets a very powerful CCCM lobby. If the politician can successfully put limits on corporate campaign contributions (a tactic within *institutionalism)*, the system shifts to Elite Pluralism and we arrive at an "intervention hotspot" where a politician has much stronger incentives to support greater emissions reductions because the voice of climate-conscious citizens now has more weight.

For a strategist in position 3 in Elite Pluralism, F business interests outweigh those of G corporations, and most citizens' are in favour of stronger climate policy. In this setting, like before, antagonistic action to challenge F corporations will likely face direct backlash and result in stalemate. Again, what may be more effective is pursuing further democratization through institutional reform (i.e. increasing α to 0.5) to move to a Majoritarian Democracy where climate-conscious citizens can form assemblies and garner greater political influence to persuade politicians to ramp up climate ambition. Climate-conscious citizens may now have access to stronger antagonistic tactics such as climate lawsuits, which may be more successful due to the diminished capacity of F corporate interest groups (since α is higher).

This simple sketch illustrates how in a dynamic setting, strategies need to be sequenced appropriately since they can build-off each other synergistically. It also demonstrates how ill thought out sequencing can lock-in stalemates. There are many potential pathways and sequencing options for strategies which depend on initial conditions related to level of democratisation, climate consciousness and green industrial incentives. Another pathway that has been suggested by the literature is countervailance to build up a green lobbies followed by institutionalism (e.g. carbon pricing) (Meckling, Sterner and Wagner 2017). This may be appropriate to certain contexts. As one can see, the choice of strategy very much depends on the initial conditions, and bifurcation points can quickly occur.

Notions of system criticality underscore the need to conceptualize political time as nonlinear and discontinuous. This ties back to the work of political thinkers such as Plutarch and Machiavelli who emphasize that effective political strategists must always keep an eye out for a new opening ("system criticality") to execute a strategy to their advantage. It is less about the dominance of one strategy at any static point and more about how each strategy can be executed at the right time to maximise synergistic impacts.

The US has arguably reached a bifurcation due to the transition from Trump's Administration to Biden's. If political strategists are astute, this moment can be leveraged to pass through legislative reforms that lock-in stronger climate ambition by for example, fundamentally reforming the system such that more weight is given to the concerns of climate conscious citizens and corporations.

A great many windows of opportunity are bound to emerge, and be created through concerted actions, but to galvanise their nonlinear potential, strategists must persuade those who block change, or else fundamentally shift the systems in which their opponents operate. In our view, the evidence and model presented in this paper suggest that this will inevitably require a *concrescence* of strategies, each pursued by different actors with different ontologies but nevertheless united in a common aim to facilitate the net-zero transition.

6 References

Aklin, Michaël, and Johannes Urpelainen. 2013. "Political competition, path dependence, and the strategy of sustainable energy transitions." *American Journal of Political Science* 57:3 (September): 643-658.

Ambrose, Jillian. 2020. "Aston Martin in row over 'sock puppet PR firm' pushing anti-electric vehicle study" [Online] *The Guardian*. Retrieved: 04 November 2020 (https://www.theguardian.com/business/2020/dec/02/aston-martin-pr-firm-anti-electric-vehicle-study)

Ard, Kerry, Nick Garcia, and Paige Kelly. 2017. "Another avenue of action: an examination of climate change countermovement industries' use of PAC donations and their relationship to Congressional voting over time." *Environmental Politics* 26:6 (August): 1107-1131.

Arrow, Kenneth Joseph. 1972. "Economic Welfare and the Allocation of Resources for Invention." In *Readings in Industrial Economics*, pp. 219-236. Palgrave, London.

Bacon, Wendy. 2013. "Sceptical Climate. Part 2: Climate Science in Australian Newspapers." Australian Centre for Independent Journalism.

Bertrand, Marianne, Matilde Bombardini, Raymond Fisman, and Francesco Trebbi. 2020. "Tax-exempt Lobbying: Corporate Philanthropy as a Tool for Political Influence." *American Economic Review* 110:7 (July): 2065-2102.

Beunen, Raoul, and James J. Patterson. 2019. "Analysing Institutional Change in Environmental Governance: Exploring the Concept of 'Institutional Work'." *Journal of Environmental Planning and Management* 62:1 (January): 12-29.

Blanes i Vidal, Jordi, Mirko Draca, and Christian Fons-Rosen. 2012. "Revolving door lobbyists." *American Economic Review* 102:7 (July): 3731-48.

Breetz, Hanna, Matto Mildenberger, and Leah Stokes. 2018. "The political logics of clean energy transitions." *Business and Politics* 20:4 (April): 492-522.

Brulle, Robert J., Jason Carmichael, and J. Craig Jenkins. 2012. "Shifting Public Opinion on Climate Change: An Empirical Assessment of Factors Influencing Concern over Climate Change in the US, 2002–2010." *Climatic Change* 114:2 (February): 169-188.

Brulle, Robert J. 2014 "Institutionalizing Delay: Foundation Funding and the Creation of US climate Change Counter-Movement Organizations." *Climatic Change* 122:4 (April): 681-694.

Brulle, Robert J. 2018. "The Climate Lobby: A Sectoral Analysis of Lobbying Spending on Climate Change in the USA, 2000 to 2016." *Climatic Change* 149:3 (March): 289-303.

Brulle, Robert J. 2019. "Networks of Opposition: A Structural Analysis of US Climate Change Countermovement Coalitions 1989–2015." *Sociological Inquiry*.

Burke, Jason. 2015. "Greenpeace Bank Accounts Frozen by Indian Government". [Online] *The Guardian*. Retrieved: 04 November 2020 (https://www.theguardian.com/world/2015/apr/10/greenpeace-bank-accounts-frozen-by-indian-government)

Carton, Wim. 2020. "Carbon Unicorns and Fossil Futures. Whose Emission Reduction Pathways is the IPCC Performing?" In: Sapinski, J.P., Buck, H., Malm, A. (eds.), *Has it come to this? The promises and perils of geoengineering on the brink*. Rutgers University Press.

Chamon, Marcos, and Ethan Kaplan. 2013. "The Iceberg Theory of Campaign Contributions: Political Threats and Interest Group Behavior." *American Economic Journal: Economic Policy* 5:1 (February): 1-31.

Clark, Cynthia E., and Elise Perrault Crawford. 2012 "Influencing Climate Change Policy: The Effect of Shareholder Pressure and Firm Environmental Performance." *Business & Society* 51:1 (January): 148-175.

Colgan, Jeff, Jessica Green, and Thomas Hale. 2020. "Asset Revaluation and the Existential Politics of Climate Change." *International Organization,* 1-25.

Dafermos, Yannis, Maria Nikolaidi, and Giorgos Galanis. 2018. "Climate change, financial stability and monetary policy." *Ecological Economics* 152 (October): 219-234.

Dal Bó, Ernesto, and Rafael Di Tella. 2003. "Capture by Threat." *Journal of Political Economy* 111:5 (October): 1123-1154.

DellaVigna, Stefano, Ruben Durante, Brian Knight, and Eliana La Ferrara. 2016. "Market-based Lobbying: Evidence from Advertising Spending in Italy." *American Economic Journal: Applied Economics* 8:1 (January): 224-56.

Douglass, Frederick. 1979. *The Frederick Douglass Papers: 1855-63*. Vol. 3. Yale University Press.

Downs, Anthony. 1957. "An Economic Theory of Political Action in a Democracy." *Journal of Political Economy* 65:2 (April): 135-150.

Druckman, James N., and Mary C. McGrath. 2019. "The Evidence for Motivated Reasoning in Climate Change Preference Formation." *Nature Climate Change* 9:2 (January): 111-119.

European Commission. 2021. "State aid: Commission opens in-depth investigation into compensation for early closure of lignite-fired power plants in Germany." Press Release. 2 March, Brussels. Retrieved: 14 March 2020 (https://ec.europa.eu/commission/presscorner/detail/en/ip_21_972).

Farmer, J. Doyne, Cameron Hepburn, Matthew C. Ives, T. Hale, Thomas Wetzer, Penny Mealy, Ryan Rafaty, Sugandha Srivastav, and Rupert Way. 2019. "Sensitive Intervention Points in the Post-Carbon Transition." *Science* 364:6436 (April): 132-134.

Farrell, Justin. 2016. "Corporate Funding and Ideological Polarization about Climate Change." *Proceedings of the National Academy of Sciences* 113:1 (April): 92-97.

Feldman, Lauren, Teresa A. Myers, Jay D. Hmielowski, and Anthony Leiserowitz. 2014. "The Mutual Reinforcement of Media Selectivity and Effects: Testing the Reinforcing Spirals Framework in the Context of Global Warming." *Journal of Communication* 64:4 (July): 590-611.

Finnegan, Jared J. 2019. "Institutions, Climate Change, and the Foundations of Long-term Policymaking." Retrieved 14 March 2021 (https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2019/04/working-paper-321-Finnegan-1.pdf).

Gabel, Matthew, and Kenneth Scheve. 2007. "Estimating the Effect of Elite Communications on Public Opinion using Instrumental Variables." *American Journal of Political Science* 51:4 (October): 1013-1028.

Gamson, William A., and David S. Meyer. 1996. "Framing Political Opportunity" edited by Doug McAdam, John D. McCarthy, and Mayer N. Zald." Pp. 275–90 in *Comparative Perspectives on Social Movements: Political Opportunities, Mobilizing Structures, and Cultural Framings*. Cambridge University Press.

Ganghof, Steffen. 2013. "Does public reason require super-majoritarian democracy? Liberty, Equality, and History in the Justification of Political Institutions." *Politics, Philosophy & Economics* 12:2 (April): 179-196.

Garud, Raghu, Arun Kumaraswamy, and Peter Karnøe. 2010. "Path Dependence or Path Creation?" *Journal of Management Studies* 47:4 (June): 760-774.

Gershkovich, Evan. 2019. "How does a powerful Russian lobby plan to halt climate change? With coal, oil and gas." [online] *The Moscow Times*. Retreived15 November 2020 (https://www.themoscowtimes.com/2019/11/15/how-does-a-powerful-russian-lobby-plan-to-halt-climate-change-with-coal-oil-and-gas-a68173).

Gilens, Martin. 2012. *Affluence and influence: Economic inequality and political power in America*. Princeton University Press.

Gilens, Martin, and Benjamin I. Page. 2014. "Testing theories of American politics: Elites, Interest Groups, and Average Citizens." *Perspectives on Politics* 12:3 (September): 564-581.

Giugni, Marco G., and Florence Passy. 1998. "Contentious Politics in Complex Societies." Pp 81-108. *From Contention to Democracy*. Rowman & Littlefield Publishers, Inc.

Gullberg, Anne Therese. 2008. "Lobbying Friends and Foes in Climate Policy: The Case of Business and Environmental Interest Groups in the European Union." *Energy Policy* 36:8 (August): 2964-2972.

Hart, P. Sol, and Erik C. Nisbet. 2012. "Boomerang Effects in Science Communication: How Motivated Reasoning and Identity cues Amplify Opinion Polarization about Climate Mitigation Policies." *Communication Research* 39:6 (December): 701-723.

Hepburn, Cameron, Brian O'Callaghan, Nick Stern, Joseph Stiglitz and Dimitry Zenghelis. 2020. "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?" *Oxford Review of Economic Policy*, *36*:1 pp.S359-S381.

Holdo, Markus. 2019. "Cooptation and Non-Cooptation: Elite Strategies in Response to Social Protest." *Social Movement Studies* 18:4 (July): 444-462.

Hoppmann, Joern, Joern Huenteler, and Bastien Girod. 2014. "Compulsive Policy-making—The Evolution of the German Feed-in-tariff System for Solar Photovoltaic Power." *Research Policy* 43:8 (October): 1422-1441.

Jahn, Detlef. 2016. *The Politics of Environmental Performance*. Cambridge University Press.

Jakob, Michael, Jan Christoph Steckel, Frank Jotzo, Benjamin K. Sovacool, Laura Cornelsen, Rohit Chandra, Ottmar Edenhofer et al. 2020. "The Future of Coal in a Carbon-Constrained Climate." *Nature Climate Change* 10:8 (July): 704-707.

Kaufmann, Robert K., Michael L. Mann, Sucharita Gopal, Jackie A. Liederman, Peter D. Howe, Felix Pretis, Xiaojing Tang, and Michelle Gilmore. 2017. "Spatial Heterogeneity of Climate Change as an Experiential Basis for Skepticism." *Proceedings of the National Academy of Sciences* 114:1 (January): 67-71.

Kiernan, Ben. 1992. "The Vietnam War: Alternative Endings." *The American Historical Review*. 97:4 (October): 1118-1137.

Kim, Sung Eun, and Johannes Urpelainen. 2017. "The Polarization of American Environmental Policy: A Regression Discontinuity Analysis of Senate and House Votes, 1971–2013." *Review of Policy Research* 34:4 (July): 456-484.

Kumar, Chetan. 2020. “Amnesty India: Amnesty International halts India Operations Citing Government 'Witch-Hunt'.” [online] *The Times of India*. Retrieved: 04 November 2020 (https://timesofindia.indiatimes.com/india/amnesty-india-halts-operations-in-india-cites-reprisal-from-government/articleshow/78378372.cms).

Lahiri-Dutt, Kuntala. 2016. "The Diverse Worlds of Coal in India: Energising the Nation, Energising Livelihoods." *Energy Policy* 99 (December): 203-213.

Leipprand, Anna, and Christian Flachsland. 2018. "Regime Destabilization in Energy Transitions: The German Debate on the Future of Coal." *Energy Research & Social Science* 40 (June): 190-204.

Leiren, Merethe Dotterud, and Inken Reimer. 2018. "Historical Institutionalist Perspective on the Shift from Feed-in-Tariffs towards Auctioning in German Renewable Energy Policy." *Energy Research & Social Science* 43 (September): 33-40.

Leonard, Christopher. 2020. *Kochland: The Secret History of Koch Industries and Corporate Power in America*. Simon & Schuster.

Markard, Jochen, and Daniel Rosenbloom. 2020. "Political Conflict and Climate Policy: the European Emissions Trading System as a Trojan Horse for the Low-Carbon Transition?." *Climate Policy* 20:9 (June): 1092-1111.

McKie, Ruth E. 2019. " Climate Change Counter Movement Neutralization Techniques: A Typology to Examine the Climate Change Counter Movement." *Sociological Inquiry* 89:2 (May): 288-316.

Meckling, Jonas, Thomas Sterner, and Gernot Wagner. 2017. "Policy Sequencing Toward Decarbonization." *Nature Energy* 2:12 (December): 918-922.

Meckling, Jonas. 2019. "Governing Renewables: Policy Feedback in a Global Energy Transition." *Environment and Planning C: Politics and Space* 37:2 (March): 317-338.

Meng, Kyle C., and Ashwin Rode. 2019. "The Social Cost of Lobbying over Climate Policy." *Nature Climate Change* 9:6 (June): 472-476.

Mercure, J-F., Hector Pollitt, Jorge E. Viñuales, Neil R. Edwards, Philip B. Holden, Unnada Chewpreecha, Pablo Salas, Ida Sognnaes, Aileen Lam, and Florian Knobloch. 2018. "Macroeconomic Impact of Stranded Fossil Fuel Assets." *Nature Climate Change* 8:7 (July): 588-593.

Mildenberger, Matto. 2020. *Carbon Captured: How Business and Labor Control Climate Politics*. MIT Press,.

Mildenberger, Matto, and Dustin Tingley. 2019. "Beliefs about Climate Beliefs: The Importance of Second-order Opinions for Climate Politics." *British Journal of Political Science* 49:4 (October): 1279-1307.

Nandi, Jayashree. 2020. 3 Green Youth Movements Allege Digital Censorship. [Online] *Hindustan Times*. Accessed: 04 November 2020 (https://www.hindustantimes.com/india-news/3-green-youth-movements-allege-digital-censorship/story-TSipMNu23ASOcBhATX2jIK.html).

Nelder, Chris, host. 2021. "Transition in China". Energy Transition Show (podcast). 06 January 2021. Accessed: 16 January 2021. https://xenetwork.org/ets/

Oreskes, Naomi, and Erik M. Conway. 2011. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. Bloomsbury Publishing USA.

Pe'er, Guy, Aletta Bonn, Helge Bruelheide, Petra Dieker, Nico Eisenhauer, Peter H. Feindt, Gregor Hagedorn et al. 2020. "Action Needed for the EU Common Agricultural Policy to Address Sustainability Challenges." *People and Nature* 2:2 (June): 305-316.

Pierson, Paul. 2000. "Increasing Returns, Path Dependence, and the Study of Politics." *American Political Science Review*. 94:2 (June): 251-267.

Rafaty, Ryan. 2018. "Perceptions of Corruption, Political Distrust, and the Weakening of Climate Policy." *Global Environmental Politics*. 18:3 (August): 106-129.

Rafaty, Ryan, Sugandha Srivastav, and Björn Hoops. 2020. "Revoking Coal Mining Permits: an Economic and Legal Analysis." *Climate Policy* 20:8 (August): 980-996.

Rock, Stephen R. 2014. *Appeasement in International Politics*. University Press of Kentucky.

Robinson, E., and R. C. Robbins. 1968. "Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants. Final Report and Supplement." *Stanford Research Institute*.

Rochedo, Pedro RR, Britaldo Soares-Filho, Roberto Schaeffer, Eduardo Viola, Alexandre Szklo, André FP Lucena, Alexandre Koberle, Juliana Leroy Davis, Raoni Rajão, and Regis Rathmann. 2018. "The Threat of Political Bargaining to Climate Mitigation in Brazil." *Nature Climate Change* 8:8 (August): 695-698.

Skovgaard, Jakob, and Harro van Asselt. 2018. *The Politics of Fossil Fuel Subsidies and their Reform*. Cambridge University Press.

Smelser, Niel. J. 1963. *Theory of Collective Behavior*. The Free Press of Glencoe.

Stokes, Leah Cardamore. 2020. *Short Circuiting Policy: Interest Groups and the Battle over Clean Energy and Climate Policy in the American States*. Oxford University Press, USA.

Stuart-Smith Rupert, Gerard Roe, Sen Li, Myles Allen. 2021. "Increased outburst flood hazard from Lake Palcacocha due to human-induced glacier retreat." Nature Geoscience. 14:2 (February):85-90.

Tong, Dan, Qiang Zhang, Yixuan Zheng, Ken Caldeira, Christine Shearer, Chaopeng Hong, Yue Qin, and Steven J. Davis. 2019. "Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5 C Climate Target." *Nature* 572:7769 (July): 373-377.

Vesa, Juho, Antti Gronow, and Tuomas Ylä-Anttila. 2020. "The Quiet Opposition: How the Pro-economy Lobby Influences Climate Policy." *Global Environmental Change* 63 (July): 102117.

Wettengel, Julian. 2020. "Spelling out the Coal Exit–Germany's Phase-out Plan." *Clean Energy Wire*. Retrieved: 14 March 2021 (https://www.cleanenergywire.org/news/german-government-and-coal-power-companies-sign-lignite-phase-out-agreement).

Winters, Jeffrey A. 2011. *Oligarchy*. Cambridge University Press.

Yergin, Daniel. 2011. *The Prize: The Epic Quest for Oil, Money & Power*. Simon and Schuster.