Renewable Energy for Climate Policy? The Impact of Low-Carbon Industries on National Climate Politics

Karl Magnus Møller

Renewable Energy for Climate Policy? The Impact of Low-Carbon Industries on National Climate Politics

PhD Dissertation

Politica

ISBN: 978-87-7335-339-4

Cover: Svend Siune
Print: Fællestrykkeriet, Aarhus University
Layout: Annette Bruun Andersen

Submitted January 7, 2025
The public defence takes place April 11, 2025
Published April 2025

Forlaget Politica
c/o Department of Political Science
Aarhus BSS, Aarhus University
Bartholins Allé 7
DK-8000 Aarhus C
Denmark

Table of Contents

List of Figures

List of Tables

List of Abbreviations

BTSCS	Binary time-series cross-section
CCUS	Carbon capture, utilisation, and storage
DiD	Difference-in-differences
EC	European Commission
EG	Expert group
EU	European Union
FE	Fixed effects
FFP	Fossil fuel phaseout policy
G20	Group of 20
GDP	Gross domestic product
GHG	Greenhouse gas
GIP	Green industrial policy
ICE	Internal combustion engine
IEA	International Energy Agency
IRA	Inflation Reduction Act
IRENA	International Renewable Energy Agency
MPP	Mixed policy package
NIMBY	Not in my backyard
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
OOC	Open online consultation
PCVI	Pro-climate voting index
RE	Renewable energy
RWPP%	Right-wing populist party vote share

Acknowledgements

When I moved to Aarhus in the summer of 2019 for family reasons, I had to abandon my planned path into academia. I had just completed an MA in international political economy in London, and I knew nothing about Aarhus University. I was happy to discover that a political science programme existed there. My admission to this MA programme was, I thought, a good opportunity to acquaint myself with this unknown academic environment before applying to the PhD programme there. Hence, my academic journey into the surprisingly foreign world of political science began. I incurred academic debts to David Andersen, Jonathan Doucette, Jakob Tolstrup, and Tobias Varneskov, who opened up a world of TSCS data and comparative politics and encouraged me to apply for the PhD. I owe a big thank you especially to David Andersen for helping me write in a language comprehensible to political scientists in my PhD application as well as to the hiring committee at the Department of Political Science for taking a gamble on a totally unknown applicant who was citing Susan Strange rather than Schattschneider or Slothuus.

When I was admitted to the PhD programme, I had never heard of Henrik Seeberg or Helle Ørsted Nielsen. But from the moment I set foot in the yellow brick buildings, you have both been über-competent supervisors. Early on, you got me to make tough decisions to focus my project, and this helped me zoom in on the 'green' industries that would ultimately become the focus of my dissertation. From then on, you have helped me sift through my many ideas, supported me in exploring new research territory (from lobbying to fine-grained election results), and augmented my work by getting me to pay attention to the right things (like threshold effects and negativity bias). Somehow, despite your vastly different entry points into this project, you have always managed to act as a true supervisor *team*.

Henrik, you are *Mr. PolSci*, and you have expertly helped me navigate all the labyrinthine disciplinary logics of political science. I have truly appreciated your supervision, both when you saw potential in my ideas and when you didn't; when you wanted me to do more and when you urged me to do less; and when you came to say hi in my office, and when we had marathon meetings about statistical modelling or peer reviews.

Helle, your instant understanding of and thorough engagement with my ideas as well as your deep (though always humbly expressed) expertise in so many aspects of climate politics have helped me stay on course and in the real world. I am immensely grateful that I get to continue working with you at the intersection of our core interests.

On 'IP-gangen', I met the best colleagues I could have hoped for. Thank you to Ashraf, Aske, Ida, Kristian, Matias, and Liv for helping me find my way around at the department – literally and figuratively. Before GAI was a thing, you were my GAI (generous AU insiders). Without the most wonderful and talkative office mates – first AK and Nanna, later Hannah and Maria – I might have had time for more robustness tests, but I would not have enjoyed going to work every day even a fraction as much as I have. Thank you for the frivolities and the cake councils as well as the many conversations about academic and real life. To the rest of the PhD group, thank you for being caring, engaged, witty, inspiring, chatty, and helpful beyond belief. You all prove that academia does not have to be a lonely and competitive place.

As my PhD journey progressed, and I realised that I had to move from the cross-national level of analysis (that I had by then become well acquainted with) to the unknown territory of quantitative interest group analysis and micro-level studies of citizens and voters, I incurred many new debts to numerous helpful people. In fact, I have continuously been astonished by the extraordinary kindness and helpfulness of academics who often work under a multitude of pressures but still find time and energy to listen and help. Thank you to the Section of Comparative Politics for relevant and high-quality feedback and to Anne Binderkrantz, Marten Appel, and Roman Senninger in particular for kindly sharing their respective expertise on interest groups, web-scraping, and text-as-data. Beyond the section, I want to thank Christoffer Dausgaard, Niels Nyholt, and Paula Bings for generously helping me when I forayed into the scary world of political behaviour and local geotropic effects.

Thank you to Federica Genovese and Kathy Hochstetler for meeting with me and taking my ideas seriously in the spring of 2022. A massive thank you to Michael Lerner for deep engagement with my lobbying project during my four-month stay in London in the spring of 2023. I also want to thank the many other people who took time to meet during my time in London, including Jared Finnegan, Liam Beiser-McGrath, Kathy Hochstetler, Peter Wyckoff, Robert Falkner, and Stefano Pagliari. You all helped me improve in different ways, and I have continued to reflect on and draw inspiration from our conversations right until I handed in my dissertation.

When my PhD journey was nearing its end, I finally understood why PhD acknowledgement sections at this Department always include the names of so many technical-administrative employees. What an incredible behind-the-scenes effort that goes into a PhD and the dissertation itself. Thank you in particular to Ruth (for picking up the bill), Olivia (for planning and working with my Excel sheets), to Kate and Natasha (for making sure my sentences have an explicit subject), to Annette (for making my work look good), and to

Helle and Susanne (for vital help with all things administrative related to my MA seminar on comparative climate politics).

Finally, I want to thank my family – Bjørn, Katrine, and Vilje – with the whole of my heart. Thank you for being curious about my work (each in your own way), for giving me space to do this job, and for joining my on our adventure in London. But above all, thank you for demanding my attention and helping me find a balance between peer-reviews and playgrounds; t-tests and travelling; sleek graphs and 'syngedragerne'. I love you for these and many other more important reasons.

Karl Magnus Møller
Aarhus, March 2025

Preface

This report summarises the PhD dissertation *Renewable Energy for Climate Policy? The Impact of Low-Carbon Industries on National Climate Politics*. The dissertation consists of this summary report and the four solo-authored, self-contained articles listed in the table below. This table also provides the abbreviations with which I refer to each article throughout this report.

Full title *(and publication status)*	**Abbreviation**
Domestic Renewable Energy Industries and National Decarbonization Policy *(published in Energy Policy)*	Paper 1(Decarbonization Policy)
Climate Policy Strategies and Corporate Mobilisation in the European Union *(invited to revise and resubmit at the European Journal of Political Research)*	Paper 2(EU Lobbying)
Green Jobs in the Backyard: Do Local Renewable Energy Industries Increase Support for the Energy Transition? *(working paper)*	Paper 3(Green Jobs)
Big Investments, No Electoral Reward: The Inflation Reduction Act, Low-carbon Investments, and the 2024 US Presidential Election *(working paper)*	Paper 4(Low-carbon Investments)

1 Introduction

Good solutions to the problem of inadequate climate policy action are hard to come by. This is attested to by continued increases in global greenhouse gas (GHG) emissions; by the difficulty that even frontrunner countries face in meeting their emission reduction targets and passing the necessary climate legislation; and by frequent outbursts of intense backlash against carbon taxes, new climate regulations, and fossil fuel subsidy removal. The rise of low-carbon industries like renewable energy (RE) holds particular promise as a way to transform the politics of climate change and pave the way for ambitious climate policy. Scholars and policy-makers are increasingly basing their climate policy strategies on this proposition: the emergence of domestic low-carbon industries, aided by supportive green industrial policies (GIPs), removes the political barriers to more ambitious climate action because it generates powerful coalitions of firms and citizens that benefit economically from and support a rapid phaseout of fossil fuels. This dissertation provides the most comprehensive theoretical and empirical assessment to date of this important dynamic.

In this introductory chapter, I expand upon these points and argue that this proposition remains theoretically underdeveloped and largely untested despite its increasing significance to climate politics. I then briefly summarise my core theoretical arguments and empirical results and outline how they contribute to scholarship and policy-making by challenging this increasingly conventional wisdom and pointing to its specific weaknesses. Finally, I provide a roadmap to the rest of the summary report.

1.1 The Political Problem of Climate Change

Climate change is among the most fundamental and urgent challenges facing humanity, and those who have the power to make a difference are coming up short. This includes governments, arguably the most important actors in the fight against climate change (K. Anderson, Broderick, and Stoddard 2020; Tilsted et al. 2021; UNEP 2024). Even when policy-makers intent on passing ambitious laws to mitigate climate change come to power, they often end up enacting watered down legislation or backing down entirely. The key reasons are well-known to ordinary people and political scientists alike: stringent climate policies meet fierce opposition from corporate interests and citizens whose livelihoods depend on fossil fuels in a myriad of ways (e.g. Seto et al. 2016; Cory, Lerner, and Osgood 2021; Colantone et al. 2024). The result is that more than thirty years after the first global climate summit was held and

the first carbon tax enacted, global GHG emissions continue to rise (Stoddard et al. 2021; Hausfather and Friedlingstein 2024). The original ambition in the Paris Agreement of limiting global temperature rises to 1.5 degrees, although still 'technically possible' (UNEP 2024, xi), is realistically no longer within reach, and forecasts indicate that warming of almost three degrees remains the most probable outcome (UNEP 2024; Climate Action Tracker 2024).

Against this background, scholars and policy-makers search with increasing intensity for ways to understand the barriers to climate policy action and unlock the climate policy impasse. However, many of the factors that scholars have shown to be associated with more ambitious climate policy, such as democratic (Povitkina 2018) or neo-corporatist (Finnegan 2022) institutions, are unlikely to provide a way forward simply because they will not expand rapidly in the coming years. Other possible catalysts, like climate protests (Valentim 2023) and extreme weather events (Damsbo-Svendsen 2021), may become more frequent but are transient in nature and therefore unlikely to durably boost climate policy support. Moreover, none of these explanatory factors challenge the basic reality of climate politics that no one has a strong and immediate material self-interest in ambitious policy action. Even those most exposed to the negative impacts of climate change, such as owners of coastal property (Colgan, Green, and Hale 2021), benefit minimally from national climate policy action because it has a marginal and delayed effect on global climate change.

1.2 The Rise of Low-Carbon Industries and Its Potential to Transform Climate Politics

With these observations in mind, the rapid emergence of low-carbon industries and their potential to catalyse climate policy is particularly significant. Wind turbines, solar panels, and electric vehicles (EVs) were uncompetitive niche technologies not many years ago. They are now central players in globally important industries. Wind and solar power met 82 percent of global electricity demand growth in 2023 (Ember 2024), and EVs made up 18 percent of total car sales globally in the same year (IEA 2024). The companies that manufacture these products employ millions of people worldwide. Total global investment in these technologies grew from USD 33 billion in 2004 to USD 313 billion in 2014 and USD 1.8 trillion in 2023 according to BloombergNEF (2024). Estimates from the International Labour Organization (ILO) and the International Renewable Energy Agency (IRENA) indicate that total global employment in RE industries alone increased from 7.3 to 16.2 million between 2012 and 2023 (IRENA and ILO 2024).

These firms and workers represent something unique in climate politics: actors with an immediate and concentrated material self-interest in ambitious climate action. Moreover, they are growing rapidly in number and national economic significance. As much as 13 percent of Danish exports are in 'green' technologies (State of Green 2020), and one estimate suggests that 40 percent of all Chinese economic growth in 2023 was generated by these industries (Myllyvirta 2024). As wind, solar, and EVs continue to expand, many more low-carbon technologies are set to follow in their footsteps in the coming years. This includes green hydrogen, tidal and wave energy, low-carbon steel and cement, heat pumps for domestic and industrial use, advanced battery technologies, and low-carbon vehicles for heavy-duty road transportation, aviation, and shipping. All this raises the alluring prospect of a rapidly expanding pro-climate coalition of firms and citizens that have a clear economic interest in fighting for ambitious climate policy and the ability to influence national climate politics. What if profit-seeking companies and economically self-interested citizens could be a decisive force for, not against, climate action?

Within the past decade or so, scholars have gradually formulated a theory of the catalysing role of these low-carbon interests in the politics of climate change (Aklin and Urpelainen 2013b; Meckling et al. 2015; Hughes and Urpelainen 2015). In its simplest form, the argument is that because stringent climate regulation and carbon taxes are initially politically difficult to enact and generate backlash, governments should begin by subsidising low-carbon technologies through GIP. This will not only lower the cost of these technologies – dampening opposition from incumbent interests (for whom emission reductions become less costly) – but it will also give rise to low-carbon political coalitions that support further GIP subsidies *as well as* more stringent climate regulation. This lowers the political barriers to ambitious and encompassing climate policy action, including those stringent measures that were originally infeasible. In this way, 'carrots buy sticks' (Meckling et al. 2015, 1170).

This theory is not only being promoted by numerous influential scholars (Rodrik 2014; Meckling et al. 2015; Acemoglu et al. 2016; Mildenberger and Stokes 2020). It is also shared by an increasing number of policy-making elites and mirrored more and more in the actual climate policy strategies pursued by governments around the world (Allan, Lewis, and Oatley 2021). For example, Australian Prime Minister Anthony Albanese relied on this logic in his 2022 victory speech when he argued that his government would 'take advantage of the opportunity for Australia to be a renewable energy superpower' and that this would 'end the climate wars' (cited in Carroll 2022). In terms of actual policy, this logic is most explicit in the Inflation Reduction Act (IRA) passed by the Biden administration in the United States in the summer of 2022. It heavily subsidises the domestic production and purchase of various

low-carbon technologies and has been accompanied by a narrative centred on the economic co-benefits of ambitious climate policy. Joe Biden summarised this most succinctly when stating that 'climate means jobs' (cited in The White House 2023). The designers and supporters of the IRA have explicitly legitimised this policy package with reference to its positive political economy effects, including the creation of pro-climate coalitions that would defend the bill and make more stringent regulation feasible down the line (Meyer 2024b).

The IRA is by no means the only example of governments pivoting from stringent regulation to GIP based on this political economy logic of carrots first then sticks. Similar developments are taking place around the world, including in the European Union (EU), South Korea, Australia, the United Kingdom, and most prominently, in China. China has become the undisputed global leader in low-carbon technologies as a result of two decades of focused GIPs targeting solar, wind, EVs, and other sectors (Allan, Lewis, and Oatley 2021; Nahm 2021; Kupzok and Nahm 2024). As of 2020, more than 100 countries had RE tax incentives and/or policies providing grants, loans, or subsidies to put these technologies in place, and an increasing number of governments are also using trade protection to shield these industries from foreign competition (Lewis 2021, 50–51). The International Energy Agency (IEA) counts 1,309 'incentive and investment' climate policies that target technologies like solar, clean transportation, electricity generation, buildings, heating, wind, batteries, and hydrogen.[1] Many of these policies are less than five years old. This policy pivot is accompanied by the increasingly central narrative of 'green growth', which posits that a synergy exists between ambitious climate action and economic growth (Meckling and Allan 2020).

However, despite their environmental, economic, and potential political merits, these supportive GIP instruments are not sufficient to reduce GHG emissions and mitigate climate change. Upwards of 90 percent of known coal and 60 percent of known oil and gas reserves are 'unburnable', and the time horizon for deep emission cuts is rapidly shortening (Welsby et al. 2021). As Allan, Oatley, and Lewis (2021, 2) remind us, 'the costs of technology alone do not determine the pace of change. […] Countries may continue to invest in fossil fuels when they are no longer cost-competitive with alternatives because elites can continue to harvest political and financial benefits from fossil fuels'.

Developments in the two largest national economies and GHG emitters demonstrate the necessity of more direct policies to phase out fossil fuels. Alongside the IRA, the US government has overseen an unprecedented expansion of domestic oil and gas production that has made the United States the

[1] This figure is from the IEA's 'Policies database' (https://www.iea.org/policies) accessed on November 28, 2024.

leading fossil fuel producer globally (Energy Institute 2024). In China, the massive GIP effort that has positioned the country as the global leader in various green technology industries has gone hand in hand with expanded consumption of all fossil fuels (Energy Institute 2024). Stated bluntly, GIP is not enough. Even if it can make low-carbon technologies competitive with their high-carbon alternatives, direct measures to phase out existing emission-intensive technologies and behaviours will also be necessary to achieve a sufficiently rapid energy transition. This is the case not least because new low-carbon technologies are not merely competing against *new* fossil powered technologies but also – sometimes even primarily – against legacy fossil fuel assets with long lifespans and for which the investment cost has already been incurred (Christophers 2024). Existing stocks of cars, airplanes, power plants, steel mills, and cement plants all fit this description. Moreover, after a decade of unprecedentedly low interest rates, the current global context is one of increasing fiscal constraints and rising interest rates. This dramatically shrinks governments' fiscal room for generous GIP subsidies (Martin et al. 2024). For these reasons, the question of whether these policies can indeed create the broader political effects envisioned by scholars and policy-makers is central. Despite its importance, our knowledge of the answer to this question remains limited.

1.3 What We Know and Do Not Know

As the global pivot to GIP continues, spreads, and intensifies, more and more rests on the existence of these positive feedback loops from GIP via growing low-carbon industries to stringent climate regulations that penalise fossil fuel use. If the growth of low-carbon industries truly does remove the political barriers to phasing out fossil fuels, it opens a politically expedient route to rapid decarbonisation. However, the increasing structural power and political influence of low-carbon industries may alternatively only lead to a lock-in and expansion of the direct GIP subsidies that helped these industries grow in the first place (Meckling 2021). If that is the case, the catalysing potential of the policy-led rise of low-carbon industries is much more limited in scope and significance. If so, it might even be detrimental to the efficiency of the energy transition due to increased costs and rent seeking.

From casual observation, the notion that the growth of low-carbon industries can catalyse broader national climate policy seems plausible. First, across countries there are large differences in the stringency of key climate policies like carbon pricing, fossil fuel subsidies, and various regulatory instruments (Tobin 2017; Ross, Hazlett, and Mahdavi 2017; Nachtigall et al. 2022). Second, some of the highly developed countries that have enacted ambitious

climate policies, like Denmark, Germany, and South Korea, are also among the leaders in RE and other low-carbon industries (Lachapelle, MacNeil, and Paterson 2017). Third, the economic importance of RE industries has generally grown over time (Møller 2024) and so too has the stringency of climate policies. Fourth, low-carbon business associations do indeed express support for stringent climate regulation (e.g. Plechinger 2019), and citizens in countries with large RE industries do tend to exhibit high levels of climate policy support (e.g. B. Anderson, Böhmelt, and Ward 2017). The key puzzle is whether these observations are all signs of a genuine, systematic causal relationship or are merely epiphenomenal.

Although scholarly attention to this question is increasing, we presently know relatively little about the most central link in this argument: the effect of the growth and size of low-carbon industries on national climate policy. Do carrots really buy sticks?

Existing theoretical accounts of this positive feedback loop have not paid much attention to the micro level processes that may underpin or undermine the overarching relationship. For example, some of the central untested assumptions include that '[g]reen industries are political allies in the development of more stringent climate policy that [...] penalizes incumbent polluters' (Meckling et al. 2015, 1170) and that 'voters notice the local benefits of renewable energy' and link these benefits to politics (Urpelainen and Zhang 2022, 1310). Both these assumptions are arguably quite sweeping and potentially oversimplified.

Empirically, most of the central observable implications of this theoretical logic at the macro and micro levels also remain unexamined. It is relatively well established that low-carbon industry strength has a narrow positive effect on the further expansion of this industry and on deepening GIP support (e.g. Lyon and Yin 2010; Jenner et al. 2012; Cheon and Urpelainen 2013; Gullberg 2013; Trachtman 2023). But the broader feedback effects of low-carbon industry strength on more general climate policies that seek to phase out fossil fuels remain much less well understood. Scholars have shown that GIPs typically precede fossil fuel phaseout policies (FFPs) such as carbon pricing chronologically (Meckling et al. 2015; Linsenmeier, Mohommad, and Schwerhoff 2022). But this can easily be explained by the relative political difficulties of enacting these types of policies and does not necessarily imply a causal link between them.

Existing work has relied on case studies of most-likely cases including Germany, the EU, California, and Denmark to develop and illustrate this theoretical argument (Nygård 2014; Meckling, Sterner, and Wagner 2017; Pahle et al. 2018; Leipprand, Flachsland, and Pahle 2020). Despite their obvious value, these studies are relatively superficial in terms of studying the micro level

causal mechanisms supposedly driving these effects. They tell a plausible story, but they do not lay out the causal mechanisms in detail. Nor do they document the causal necessity of initial GIP and the resulting rise of low-carbon interests for later climate policy successes. In addition, their insights may not generalise beyond these cases.

In an important study, Urpelainen and Zhang (2022) show that the installation of wind turbines is associated with stronger subsequent support for the Democratic party across congressional districts in the United States. But they do not document that this is due to the growth of actual wind industries and the local benefits and jobs that may follow.[2] Finally, a recent study of Swiss citizens finds indicative evidence (among certain subgroups of voters) that those who self-report that past climate policies have affected their behaviour or who live closer to electric vehicle charging stations tend to report slightly higher support for carbon pricing (Montfort et al. 2023). The emphasis on the importance of the 'perceived material and immaterial benefits' (Montfort et al. 2023, 457) of climate policy in this study is a valuable first step towards deeper engagement with the micro level causal processes necessary for driving these macro level feedback effects. However, besides obvious concerns with endogeneity, this study does not focus on the rise of low-carbon industries as such but merely the policy-induced availability of low-carbon alternatives for consumers.

As it stands, we still lack both a fully developed theoretical argument that connects the rise of low-carbon industries to national climate policy through micro level mechanisms as well as direct empirical evidence of these macro and micro level relationships. With the importance of these dynamics and our limited understanding of them in mind, I formulate the following research question: how does the growth of domestic low-carbon industries impact national climate politics and policy?

1.4 How This Dissertation Contributes

In this dissertation, I advance our knowledge of this question in two ways by zooming in on RE industries, the most important low-carbon industry historically and today. First, I draw on various strands of political science to provide a more thorough theorising of the micro level causal processes that underlie this macro level relationship and to scrutinise core assumptions made in

[2] Whether the installation of RE *infrastructure* – as distinct from the actual industries that make these products – creates positive local effects is disputed and the subject of an entire literature (see e.g. Mauritzen 2020; Shoeib, Hamin Infield, and Renski 2021; Brunner and Schwegman 2022).

existing work. My core argument is that the strength of domestic RE industries has a positive probabilistic effect on national climate policy due to its impact on the distribution of climate policy preferences among domestic citizens and business interests, but that structural, institutional, and informational barriers weaken the influence of RE interests on broader climate policies that seek to phase out fossil fuels (i.e., FFPs) compared to narrower GIPs that aid low-carbon industries directly.

Second, I conduct the most direct and encompassing empirical investigations of this relationship to date at the national, firm, and local levels of analysis. These analyses provide answers to three key questions: do countries with larger RE industries enact more stringent climate policies? How do low-carbon corporate interests prioritise their lobbying on GIP versus broader climate policies including FFPs? Do citizens affected by the local economic benefits of low-carbon industry expansion show greater support for ambitious climate policy? These are all central – but largely untested – observable implications of the theory that GIP and the resulting growth of low-carbon industries can catalyse climate policy more generally. In Paper 1(Decarbonization Policy), I show that the size of domestic RE industries is not systematically associated with more ambitious climate policy across many countries and up to 30 years. In Paper 2(EU Lobbying), I find that low-carbon firms and business associations in the EU focus their lobbying on GIP and are vastly outnumbered when lobbying on broader climate policies. In Paper 3(Green Jobs), I study the most-likely case of the Danish wind industry but find that citizens living close to significant wind industry sites are neither more likely to vote for pro-climate parties nor less likely to vote for anti-climate right-wing populist parties. Paper 4(Low-carbon Investments) confirms this null effect of local low-carbon industry development on pro-climate voting. It does so through a quantitative case study linking the wave of low-carbon investments announced in the wake of the IRA to county-level results from the 2024 United States presidential election.

The central conclusion to emerge from these four empirical investigations is that RE industries do not automatically transform climate politics or catalyse national climate policy. The downstream political feedback effects of GIP are therefore not working as intended. As I discuss in the concluding chapter, this has significant implications for scholarly work on this question and for governments' use of climate policy strategies that rest on this assumption.

1.5 Plan of the Summary Report

This summary report consists of eight chapters in addition to this introduction. In Chapter 2, I lay out the overarching theoretical framework that structures the dissertation and underpins all the self-contained articles. It has two

core components. First, the structural force of rising RE industries affects the political resources of RE firms and the climate policy preferences of citizens who then translate these preferences into concrete pressures on national climate politics. Second, these pressures are likely to be weaker for FFPs compared to GIPs that support these industries directly. Chapter 3 explains my choice to exclusively employ quantitative, observational research designs and reflects on the strengths and limitations of these. This is followed by summaries of each of the self-contained articles in Chapters 4, 5, 6, and 7. In Chapter 8, I pull these empirical results together, discuss their inferential limitations, and propose a theoretical synthesis that integrates more elite-oriented political science theories of climate politics. Specifically, I suggest that my findings point to the need for elite-level *activation* of the latent structural force of growing low-carbon industries that has the potential to catalyse national climate policy but has yet to do so. Chapter 9 concludes with a brief summary of the dissertation and a discussion of how to interpret its policy implications.

2 Theoretical framework

This chapter presents the overarching theoretical framework of the dissertation. This framework consists of the key concepts, actors, and causal processes that link domestic RE industry strength to national climate policy outputs. All the self-contained articles rest on this shared foundation but also focus on and elaborate specific parts of it. These theoretical elaborations are summarised in the chapters describing each self-contained article.

In formulating this overarching theoretical framework, I draw on recent theoretical work on the distributional politics of climate policy (Mildenberger 2020; Aklin and Mildenberger 2020; Colgan, Green, and Hale 2021; Schwander and Fischer 2024) and more indirectly on classic theories of political economy and distributional conflict in public policy (Stigler 1971; Wilson 1980; Pierson 1993). My core theoretical contention is that the strength of domestic RE industries has a positive probabilistic effect on national climate policy due to its impact on the distribution of climate policy preferences among domestic business interests and citizens but that this effect should be weaker for FFPs compared to GIPs. In relation to FFPs, RE interests receive more temporally distant and uncertain gains, are at an informational disadvantage, have less access to key policy-making venues, and face greater cross-pressure and counter-mobilisation.

I present this theoretical framework with a focus on RE industries, which I understand as a case of a broader group of low-carbon industries. Most of the arguments developed here will also apply to other low-carbon industries, and I do include those in my empirical investigations in Paper 2(EU Lobbying) and Paper 4(Low-carbon Investments). But there may also be some differences between the political dynamics of RE industries like solar and wind and other low-carbon industries like electric vehicles, low-carbon steel, and CCUS. I discuss this in more detail in Chapter 8.

2.1 The Overall Model

At the macro level, this dissertation seeks to understand the impact of domestic RE industries on national climate policy outputs. This causal connection is neither direct nor mechanical. The strength of domestic RE industries is a structural characteristic of national economies. National climate policy is the output of government lawmaking. The strength of RE industries is thus a 'deep' explanatory factor in relation to climate policy outputs.

Borrowing Treisman's terminology, I understand the causal role of domestic RE industry strength as a 'predisposition' for ambitious climate policy as

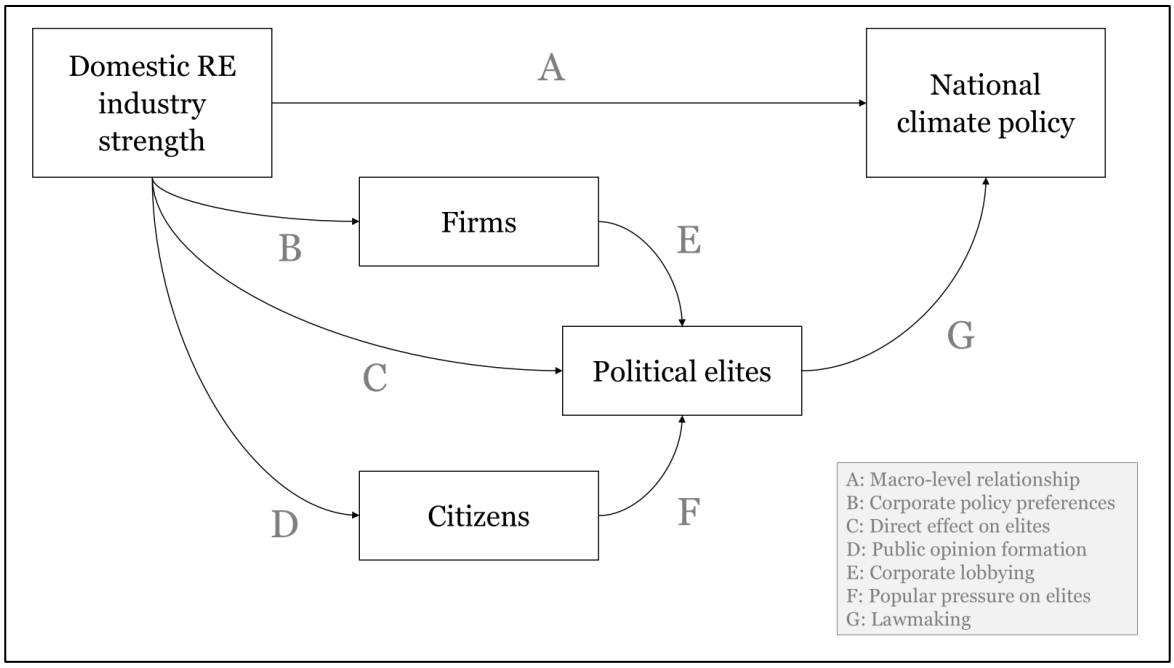
contrasted with more contingent and near 'trigger' causes (Treisman 2020). It makes it more likely that a country will enact ambitious climate policy but does not explain the exact timing. In the path from RE industries to national climate policy, any impact of the former on the latter therefore relies on an extensive causal chain and must involve concrete actors setting in motion concrete processes. To theorise these causal processes, I focus on three sets of actors that are central to national politics in general and climate politics in particular. These are firms, citizens, and political elites. Figure 2.1 illustrates the most important causal channels (denoted by arrows) that make these actors the key forces driving the macro level relationship. Arrow A represents the country-level relationship between RE industry strength and national climate policy outputs.

This theoretical model abstracts from the many other ways in which these actors plausibly relate to each other in this process.[3] By doing so, it allows me to zoom in on and theorise what I consider the most central dynamics. These central dynamics can be divided into two conceptually distinct steps. The first step is a process of preference formation. How are the climate policy preferences of each of these groups influenced by the structural importance of the domestic RE industry? The causal dynamics that concern preference formation in the model are the direct effects of domestic RE industries on the overall balance of corporate climate policy preferences (arrow B) on the views of political elites (arrow C) and on public opinion (arrow D). Each of these causal channels centre on how changing economic interests shape political preferences, and I expand upon these below.

The second step is a set of key causal links concerning preference aggregation. Because citizens and corporations have no direct lawmaking authority, they are assumed to channel their attempts to influence policy towards political elites and the state (arrows E and F). Although the mechanisms of preference aggregation differ across institutional contexts for both firms and citizens, we can reasonably expect both sets of actors to have at least some influence in almost all political systems. As such, I theorise the final lawmaking and regulatory implementation that determines national climate policy (arrow G) to be the result of a combination of the pressures that citizens and firms exert on political elites and the residual agency that these political elites retain in shaping policy.

[3] Alternative causal links include elites and business interests influencing citizens. I elaborate on the potential for such complicating factors in Chapter 8, which seeks to revise the theoretical framework in light of the empirical findings.

Figure 2.1 Schematic representation of the theoretical model



Note: Each line represents a causal process. The arrows show the direction of influence in each of these causal steps. See text for further details.

In the classic terminology of political science, the causal channel concerning firms can be thought of as relating mostly to the instrumental power of RE industries (arrows B and E). The theorising of citizens and elites as helping to channel domestic RE industry strength into politics and policy instead concerns the structural power of the industry (arrows C, D, and F).

I assume none of the three groups of actors to be monolithic. In fact, distributional conflict within each group is central to the theorised dynamic (as in Mildenberger 2020; Colgan, Green, and Hale 2021). I understand all the processes by which these groups are affected directly or indirectly by the strength of domestic RE industries and through which they directly or indirectly influence national climate policy in terms of changes in the relative size of fractions with different (pro- and anti-climate) policy preferences. The basic logic is that as the domestic RE industry grows, climate policies may come to be promoted more frequently in corporate lobbying, supported by a larger share of citizens, and endorsed by greater numbers of political elite actors. Depending on the concrete national and policy context, this can take the form of uniform opposition giving way to emerging support, support from a growing minority, a change from minority to majority support, or a buttressing of already high levels of support. In contrast to models of political tipping points (e.g. Vormedal 2011; Colgan, Green, and Hale 2021, 15), I expect changes at all places on this spectrum to have a positive probabilistic impact on climate policy.

In relation to this point, it is important to emphasise the probabilistic nature of this theory. It clearly abstracts from many case-specific idiosyncrasies (such as natural disasters) and institutional dynamics (such as party competition and entrepreneurial agenda-setting) that can override the structural political economy and be sufficient explanations of climate policy outputs in specific instances. Rather, this theory emphasises how the structural importance of RE industries can, in the longer run and on average, shape national climate politics and change the probabilities of enactment of climate policies.[4]

Moreover, because I expect the effect of RE industry strength on these three sets of actors to act in tandem – i.e., stronger industries lead to overall more pro-climate policy preferences in all three groups of actors – the causal dynamics associated with each group are complementary and mutually reinforcing (rather than conflicting).

This point about mutually reinforcing mechanisms is important for an additional reason. It is undeniable that this theoretical framework abstracts from a wide array of complicating factors at both the stages of preference formation and aggregation. Firstly, large bodies of political science literature have investigated the perceptual biases and limitations that hinder the translation of structural realities or material interests into policy preferences among both citizens (e.g. Bartels 2005) and firms (e.g. Woll 2008; Stokes 2020). Secondly, I abstract from many of the institutional complications that are important moderators of the aggregation of preferences into politics and which have been shown by others to matter for climate politics specifically (Mildenberger 2020; M. Lockwood 2022; Kupzok and Nahm 2024). My argument is not that these moderating factors are unimportant. Rather, this theoretical framework rests on the assumption that although the formation and aggregation of corporate and citizen preferences take distinct forms and operate through

[4] The wide array of more contingent explanatory factors emphasised in other strands of research can be viewed as competing with the structural perspective promoted in this dissertation, but it also appears plausible that many such dynamics are augmented by or become more probable in the presence of a large domestic RE industry. For example, the solution to a natural disaster (and the resulting increase in climate policy salience) can more easily be framed as more ambitious climate change mitigation policy if strong domestic groups stand to benefit from such a framing. Policy entrepreneurs are more likely to gain traction if their proposed solutions (or policy images) align with well-established narratives that are promoted or endorsed by strong fractions in domestic politics. Similarly, party competition around ambitious climate policy is more likely to emerge and be sustained in contexts that are structurally conducive to this and for policies that do not challenge nationally structurally powerful interests directly (see e.g. N. Carter and Little 2021; Harrison and Bang 2022). I elaborate on these interactions post hoc in Chapter 8.

different channels across contexts, they jointly have the ability to translate the structural force of RE industry strength into national climate policy. In less democratic regimes where the mechanism of electoral pressure does not operate, the overall effect may be generated to a larger degree by the direct structural influence of the industry's importance on political elites and by the instrumental power of corporate interests. In corporatist countries, the inability of emerging industries to break into closed industry-government networks (Meckling and Nahm 2018) may be made up for by more long-term thinking among political elites (Finnegan 2022) and so forth.

In summary, the basic theoretical model on which this dissertation rests is one in which the growing economic importance of domestic RE industries gradually increases the fraction of corporations, citizens, and political elites who have a structural interest in the promotion of this industry and thus update their climate policy preferences and channel these demands into national politics, which in turn increases the probability that more ambitious climate policies promoting the interests of RE industries get enacted.

These arguments constitute the basic core of the theoretical framework. The rest of this chapter is dedicated to a more detailed theorising of the ways each collective actor helps translate the strength of domestic RE industries to national climate policy outputs followed by a conceptual disaggregation of the two central phenomena, RE industry strength and national climate policy, which adds important elements to the overall argument.

2.2 The Key Actors

My theoretical framework includes three sets of actors: firms, citizens, and political elites. They each play an important role in channelling the structural force of emerging RE industries into the national political arena and, ultimately, to climate policy outputs. In this section, I lay out exactly how they are each influenced by the size of domestic RE industries (preference formation) and how they, in turn, translate this impact into political pressures for policy action (preference aggregation).

2.2.1 Firms

That corporations exert a strong influence on national climate politics and policy is undeniable. A large and methodologically diverse literature has shown this, especially in the case of fossil fuel-dependent corporate actors (e.g. Markussen and Svendsen 2005; Downie 2019; Stokes 2020; Culhane, Hall, and Roberts 2021). That the climate policy preferences and actions of firms follow from their sectoral and individual structural position is also well-

documented (Genovese 2019; S. E. Kim, Urpelainen, and Yang 2016; Cory, Lerner, and Osgood 2021; Vormedal, Gulbrandsen, and Skjærseth 2020; J. Green et al. 2021; Kennard 2020). Although these facts are much less well established with respect to RE firms, existing theoretical arguments and empirical studies unsurprisingly also point to the likely role of green corporate interests as strong and influential advocates for climate policy action (Michaelowa 1998; Hughes and Urpelainen 2015; Gullberg 2013; Trachtman 2023; Böhler, Hanegraaff, and Schulze 2022). I build on these strands of research to theorise more fully the ways in which the climate policy preferences of national corporate landscapes as a whole will be affected by the increasing prominence of RE industries herein (preference formation) and how corporate actors can exert pressure on the political system for policy change (preference aggregation).

The most obvious way in which a larger RE industry will affect the preferences of the domestic business community is through a change in the balance of power between low-carbon and high-carbon interests. RE industries emerge as niche and then as challenger industries positioned against the incumbent fossil fuel interests, which include the fossil fuel industry itself as well as many industries with a high and negative sensitivity to climate regulation and increasing energy costs (industries that either have high GHG emissions in their own production processes, whose products emit a large amount of GHGs when used by final consumers, or both, see Kupzok and Nahm (2024)).

Like any other industry, RE firms and the business associations that represent them can be expected to lobby in self-interested ways for policies that increase their profitability. But for this industry, ambitious climate policies are generally an opportunity rather than a threat. As RE industries grow, the sheer number, size, and resources of the firms that make up this industry will contribute to closing the 'climate advocacy gap' (Trachtman and Meckling 2022) between fossil and green interests. For instance, Trachtman and Meckling show that the share of energy company lobbying from 'clean energy interests' was around 12 percent in California, 5 percent in Texas, and as little as 0 percent in Alaska in 2017 (Trachtman and Meckling 2022). A similar picture emerges if we compare the membership bases of the interest organisations representing the declining Danish oil and gas industry, Danish Offshore, with that of the world-leading Danish RE industry, Green Power Denmark. At the time of writing, the 87 members of Danish Offshore pale in comparison to the 487 members of Green Power Denmark.[5] A simple structural understanding

[5] This comparison was made based on information on the official websites of the two associations (https://danskoffshore.dk/om-dansk-offshore/medlemmer-af-dansk-

of lobbying in which we merely consider the relative size and resources of competing interest coalitions suggests the obvious importance of this shift in the balance of power brought about by the growth of domestic RE industries.

In addition to this simple focus on size, the growth of RE industries is likely to bring about two organisational changes that enhance the political voice of the industry. The first is corporate consolidation. As domestic RE industries grow, they can be expected to consolidate as a result of economies of scale and competitive pressures – as has indeed been the case historically. Larger organisations have the resources to understand and promote their political interests to a much higher degree than smaller ones. The second relevant organisational change is that as industries mature and grow, they are more likely to form strong industry associations that establish a presence in relevant venues (Lyon and Yin 2010; Jenner et al. 2012; Trachtman 2023). These two developments help translate the changing structural power balance into a shift in the political power balance between incumbent and challenger sectors.

More indirectly, larger domestic RE industries also strengthen ties between this industry and the wider national business community. This happens on a structural level because of increasingly important supplier–buyer relationships through which the economic fortunes of RE industries have spillovers into other industries. This may enrol a larger share of businesses in related manufacturing, transportation, finance, and other service industries in a wider 'low-carbon coalition'. This may also happen at an organisational level as the RE industry gets better representation and a stronger voice in, e.g., peak business associations.[6] This strengthens their ties to other corporate sectors and further amplifies their political voice.

The tools that corporate interests have at their disposal to secure political influence in general and to affect national climate policy in particular are well known. They can lobby through inside and outside strategies using various forms of informational and financial resources (Binderkrantz 2005; Hall and Deardorff 2006; Dür and Mateo 2013; De Bruycker 2016). In line with my general theoretical argument, I do not claim that the many institutional and cultural idiosyncrasies of specific national systems of interest group representation are irrelevant. But I argue that the structural importance of RE

offshore/ and https://greenpowerdenmark.dk/bliv-medlem-danmarks-groenne-erhvervsorganisation/vores-medlemmer) retrieved on October 24, 2024. The number of members is arguably a superficial indicator of the strength of these business associations. This example is only meant to illustrate the general point, not as an actual analysis of the relative strength of these business associations.

[6] Relatedly, Lerner and Osgood (2023) show that firms emulate the pro-climate positions and initiatives of their peers when they share board members.

industries can probabilistically affect national climate policy within the different structures of opportunity and constraint that such systems present. In systems dominated by financial lobbying, a larger, more consolidated, and better organised RE industry is simply in a better position to spend the amounts of money necessary to buy political influence. For instance, data from OpenSecrets.org shows that during the 2020 presidential election cycle in the United States, the total campaign spending of the 'energy and natural resources' industry amounted to USD 239 million of which 27 million or 11.6 percent came from RE groups.[7]

In contexts where informational lobbying is relatively more central (Gullberg 2013), the size of the RE industry will also determine its ability to influence policy because its structural importance shapes how much it is listened to and because larger and more well-organised interests are better equipped to supply the kind of information that legislators demand (Klüver 2012; Flöthe 2019). Information provision can take the form of industry-specific technical insights and reports regarding, e.g., technical feasibility, knowledge about relevant legal interdependencies or obstacles, and information about popular and political support for policies, all of which require resources to produce (Chalmers 2013; De Bruycker 2016).

Finally, a key determinant of corporate influence, especially in neo-corporatist settings, is access to the key venues in which policy is formulated and discussed among insiders (Mildenberger 2020). The structural importance of any industry, including RE, to a national economy will likely condition its ability to get access to these fora. This access can also be facilitated by an ability (that increases with industry size) to attract key individuals. For instance, a former Danish tax, foreign, and finance minister, Kristian Jensen, left national politics to become head of Green Power Denmark, the main interest group representing the domestic RE industry. Moving in the opposite direction, the then head of the Danish electric utility business association (Dansk Energi), Lars Aagaard, moved from that role into the position of Minster of Energy and Climate in 2022 without standing for election.[8] Such prominent revolving-door moves would have been less likely in country contexts where the RE industry is less economically significant.

In summary, I theorise that the rise of domestic RE industries can increase the political voice of firms supporting climate policies that promote the

[7] These figures were retrieved from the following page on the OpenSecrets website on October 24, 2024: https://www.opensecrets.org/industries/indus?cycle=2020&ind=E

[8] Dansk Energi then merged with Wind Denmark and Dansk Solkraft to form Green Power Denmark.

interests of the RE industry by increasing the size and consolidation of this sector and increasing its economic and organisational ties to other parts of national corporate landscapes. I also argue that the balance of corporate climate lobbying in turn probabilistically affects national climate policy through pressure-based and informational lobbying.

2.2.2 Citizens

The rise of RE industries can affect individual citizens in a number of direct and indirect ways. Most obviously, they may get a job in this industry. We know that sector of employment and the risk of unemployment matter for political behaviour in general (Abou-Chadi and Kurer 2021) and for climate policy preferences specifically (Tvinnereim and Ivarsflaten 2016). People employed in, e.g., wind turbine or battery manufacturing are strongly and directly dependent on the economic fortunes of their specific employer and the industry more generally. Their skills may be partly transferable to other industries, but some skills are specific, and there are economic and psychological costs associated with being forced to find new employment in a different industry. This may also be difficult in rural regions where these RE firms are sometimes among the only industrial employers.

However, the political importance of this direct employment mechanism is, of course, limited by the low share of citizens employed directly in RE sectors. In China, the undisputed global leader in many RE technologies, estimates from IRENA puts total RE employment as of 2022 at 5.5 million people (IRENA and ILO 2024), equivalent to about 0.6 percent of total Chinese employment. For Denmark, a global frontrunner in per capita terms, IRENA's estimate of total RE employment of 50,324 people is equivalent to about 1.6 percent of total employment. On a global scale, the same calculation suggests that about 0.39 percent of global employment is in RE. These constituencies are most likely insufficient to drive policy change.[9]

Yet, a number of slightly more indirect mechanisms linked to employment likely buttress and extend the strong but narrow effect of direct employment. The first level at which we can theorise this is the household. We know from existing work that the effect of employment on political behaviour is strongly transmitted within households (Abou-Chadi and Kurer 2021; Clark, Khoban,

[9] It is possible to imagine a scenario in which the small group of people directly employed in RE industries is so well-organised and so highly mobilised that they can have a policy impact. However, this is not observed empirically. Moreover, it is particularly unlikely to be politically sufficient in situations where other groups have countervailing interests in policy and therefore counter-mobilise, such as in the case of restrictive climate policies that impose costs on polluters.

and Zucker 2024). It is therefore plausible that any effect on individuals directly employed in RE industries is at least partially transmitted to the other adult members of their household.

Beyond the household, we can also think of direct employment in other sectors that are – or increasingly become – dependent on emerging RE industries. As RE industries grow, their suppliers, buyers, and service providers may increasingly profit from and specialise in coexisting with these industries. For example, a specialist in lightning protection may end up working primarily with and targeting their products to the wind turbine manufacturing industry. To the extent that their employees are aware of such ties, any effects on policy preferences may extend to them. A similar phenomenon has been documented among firms that buy from or sell to high-carbon industries (Cory, Lerner, and Osgood 2021). However, even when climate policies provide direct and visible benefits to RE industries, this connection might still be too demanding for most ordinary citizens with limited political interest and knowledge.

More broadly still, the large literature on 'geotropic' (Reeves and Gimpel 2012) or 'local context' (Newman et al. 2015) effects on political behaviour has shown convincingly that local economic conditions can matter for political behaviour even among those not personally affected. Certain economic events are structurally or symbolically important to local areas as a whole or function as cues about broader national developments. Information about these events is transmitted through local social networks, local news, and personal experiences (Larsen et al. 2019; Alt et al. 2022; Nyholt 2024).

RE industries also tend to be quite locally concentrated.[10] Salient local cues can matter for preferences precisely because they make abstract phenomena salient to citizens that are time and information constrained and often have limited political knowledge (e.g. Ansolabehere, Meredith, and Snowberg 2014). It is therefore theoretically plausible that RE industries that become structurally important at the local level can affect a broader group of citizens beyond those directly employed there. Their presence may produce a variety of positive local economic spillovers such as local tax revenue and house price increases and reduced levels of unemployment (e.g. Valentim, Klüver, and Erfort 2023). For instance, if one of the largest employers in town is a solar panel manufacturer, local residents are likely to notice and may – particularly if

[10] Consider the difference between an industry like retail food sales and the RE industry. In the former, stores are locally present in all villages and cities of a certain size but generally employ few people in a way that is closely proportional with the surrounding population. The latter has large factories scattered across a few towns, each employing hundreds if not thousands of people.

aided by media or political discourse – draw the connection to climate policies that aid this firm and therefore underpin the economic benefits it brings to the local area.

Finally, these same mechanisms may operate in more general but watered-down versions at the national level among entire citizenries. Even if RE industries seldom employ large shares of national workforces, their positive effects on tax revenue, exports, and economic growth may be disproportionately larger due to their high value added. At least if these benefits become salient enough through political, media, and societal discourse, they may produce a more generalised national effect on citizens. This mechanism has two closely related components. The first is material. If citizens are aware of the general national economic importance of these industries, and their contribution to public finances in particular, they may also update their policy preferences in accordance with this very indirect but genuine structural tie between the fortunes of RE industries and their own economic welfare. This is the core logic that underpins narratives of 'green growth' that have become increasingly prominent among political elites and international organisations and which highlight the strong complementarity between climate policies and short- and long-term national economic growth (Meckling and Allan 2020; Allan and Meckling 2021). A second more symbolic mechanism may support this material effect. In Denmark, for instance, a self-portrayal as a 'green frontrunner' (Danish: *grønt foregangsland*), which is largely based on the mythologising of the rise of the Danish wind industry, is commonly invoked in political and media discourse.[11] More generally, scholars have pointed to the relevance of national identities in climate politics and the cognitive dissonance that arises from not acting in accordance with them (Norgaard 2011; Eckersley 2013; 2016). If the increasing structural prominence of RE industries can, over time, generate associated national identities, this could help crystalise a more general effect on citizens.

In summary, the general theoretical logic is that as domestic RE industries grow, a larger share of the population will be affected by one or more of these direct and indirect positive effects.

In turn, the ability of citizens to put pressure on national politics concerns one of the most central questions in political science, namely that of government responsiveness. Without delving too deeply into this question and the vast literatures that surround it, I assume that citizens are, irrespective of differences in national institutions, able to exert considerable influence over

[11] The terms 'grønt foregangsland' and 'Danmark' appeared within 5 words of each other in 3,076 Danish news articles from 2010 to 2023 according to the Infomedia media archive (search conducted on December 16, 2024).

political elites, who they target in their efforts to influence national climate policy. Their exertion of pressure is most obviously tied to electoral accountability, which is achieved through voting in competitive elections and politicians' subsequent fear of losing office. Especially in the current era of high climate change salience and increasing climate policy polarisation among citizens and political parties, citizens' climate policy preferences likely play a role in the wider dynamic of electoral accountability (e.g. B. Anderson, Böhmelt, and Ward 2017). As I hypothesise in greater detail in Paper 3(Green Jobs), voters with greater structural dependencies on RE industries can be expected to vote for more pro-climate parties in general and abstain from voting for anti-climate parties in particular.[12]

In addition to the electoral mechanism, and especially in contexts where that does not operate (fully), protests and the threat thereof may act as a strong additional channel of citizen influence over political elites. The power of climate protests has been most vividly demonstrated by the gillets jaunes and the Fridays for Future protest movements (Douenne and Fabre 2020; Valentim 2023). But it is also visible in various other protests against rising energy costs (Von Uexkull, Rød, and Svensson 2024) and the Chinese government's concern with air pollution in large cities (Yuan and Shen 2024). It is unlikely that those directly affected by RE industries (e.g. through personal employment) will be inclined to take part in activist pro-climate protests. But they and their relatives may be less inclined to join anti-climate policy protests (e.g. opposing wind turbine construction or the closure of coal mines) that risk harming the very industry on which they depend.

Finally, more subtle and ongoing forms of pressure may also help citizens channel their opinions towards political elites and the policy-making process. Citizens in democratic and many autocratic countries have other means of continually expressing their views, including through hearings and consultations and by contacting authorities (Chen, Pan, and Xu 2016; Lueders 2022). Politicians in democratic and autocratic countries also have strategic reasons to be interested in and solicit information about the public's opinion of various salient issues through opinion polling (Chen and Xu 2017). This may be for reasons of electoral positioning (such as capturing the median voter or setting and owning a crucial agenda) or for reasons of regime survival and legitimacy (Miller 2015; Truex 2017).

Insights from the general political science literature on electoral responsiveness make it easy to imagine time-varying contextual conditions that

[12] In this article, which is summarised in Chapter 6, the theorising is done with respect to *local* ties to RE industries, but the same can be imagined for all the abovementioned types of ties (personal, familial, and national).

moderate citizen influence over climate policy. Plausible candidates include the issue salience of climate policy among mass publics (Schwörer 2024), time left until the next election (Schulze 2021), and incumbents' electoral safety (Finnegan 2023). My argument is not that these factors do not matter but rather that the probability that these conducive conditions lead to a sustained ratcheting up of climate policy is greater when structural conditions, including stronger RE industries, have pushed public opinion in the direction of greater popular climate policy support.

In summary, I theorise that the rise of domestic RE industries can increase the predisposition of citizens to support more ambitious climate policy at the margin by generating a number of personal, familial, local, and national structural dependencies. Moreover, aggregate citizen climate policy preferences can, in turn, probabilistically affect national climate policy through multiple mechanisms of electoral and non-electoral pressure.

2.2.3 Political elites

My theoretical framework ascribes significant influence to firms and citizens, and this leaves limited room for an independent role of political elites, defined as elected officials and bureaucrats. My perspective aligns with the large public policy literature that sees political parties as structurally constrained by conditions external to party systems and as channelling the structural interests of societal groups into the policy-making process (see inter alia Korpi and Palme 2003; Beramendi et al. 2015; Jensen and Vestergaard 2022).

Political elites do, of course, have some independent influence through their ability to set agendas and their control over policy implementation. We know from the general political science literature that politicians can affect public opinion (Slothuus and Bisgaard 2021) and shape firms' understanding of their interests (Woll 2008). Scholars of climate politics have also theorised various ways in which political elites can act strategically to advance their political goals (Aklin and Urpelainen 2013b; Meckling and Nahm 2022). Still, neither the motives of political elites nor their opportunities for strategic action emerge from nowhere and independently of societal structures and pressures. For example, when radical right parties are able to strategically use climate policy as a 'wedge issue' (Dickson and Hobolt 2024), this strategy relies on splits in public opinion that are dependent on structural factors (Tvinnereim and Ivarsflaten 2016; Bechtel, Genovese, and Scheve 2019; Egli, Schmid, and Schmidt 2022). The broader climate politics literature on the effect of fossil fuel dependencies on elite behaviour similarly documents the strong influence of structural constraints on elite behaviour and rhetoric (Cooper, Kim, and Urpelainen 2018; Harrison and Bang 2022). Therefore,

there is good reason to think that political elites contribute to the process of translating the strength of domestic RE industries into national climate policy.

The most important ways in which political elites contribute to this overall causal process is by being on the receiving end of the active pressures for climate action emanating from domestic firms and citizens. Based on the dynamics already described above, these pressures will do much to shape the preference formation of political elites due to purely strategic motives (e.g. re-election). This is also the case even in theoretical frameworks that highlight politicians' strategic incentives to promote green industries for electoral rewards or business support (Aklin and Urpelainen 2013b; Bayer and Urpelainen 2016). In essence, such strategies are more feasible when the domestic RE industry is already of a certain size (Cheon and Urpelainen 2013).

In addition, however, the size of domestic RE industries might have a direct effect on the fraction of political elites that support climate policy for two reasons (as depicted by arrow C in Figure 2.1). The first, which is based on a more self-interested understanding of political elites, is that the growth of RE industries produces new opportunities for personal enrichment. Large domestic fossil fuel industries have enabled politicians to secure massive economic gains from promoting the interests of these industries. In line with this logic, Nahm and Urpelainen show that Chinese state actors own large shares of the Chinese coal power fleet and argue that climate policy 'could therefore face resistance from economic coalitions within the state, as state-owned coal plants and government agencies object to policies that harm their financial interests' (Nahm and Urpelainen 2021, 88). Similarly, investigative reporting has highlighted the extensive fossil fuel stock ownership of politicians in the United States (Kotch 2020). As RE industries grow, this pattern of personal financial ties is more likely to be reproduced for that sector. Similarly, scholars have argued that the expansion of RE carries risks of corruption (Hancock and Sovacool 2018; Sovacool 2021). Politicians interested in using their political influence for some type of private economic gain will have more opportunities to do so by politically aiding RE sectors in contexts where these industries are already large and growing. The example of revolving doors between RE industries and national politics described above could also be seen as indicative of the career benefits that politicians can attain from promoting the interests of this industry if it is sufficiently economically important.

Similarly, if one adopts a more altruistic understanding of political elites as intrinsically motivated to promote the overall wellbeing of their country, the size of the domestic RE industry can influence the fraction of elites that adopt supportive policy positions. If, for instance, political elites are interested in generating economic growth or pursuing the 'national interest' in foreign policy, the presence of a large domestic RE industry becomes a relevant means

through which to achieve such goals. Consider, for example, the Chinese government. It can plausibly be described as one with above-average autonomy from societal pressures. Among the regime's core motives, analysts often mention the generation of economic growth and increasing its geopolitical position (e.g. Pei 2012; Beeson 2018; Crownhart 2024). The sustained Chinese policy support offered to their large and rapidly expanding green industries and the government's willingness to ratchet up their climate commitments may well have been driven at least partly by these motives (Tooze 2024a). Green industries are estimated to have contributed 40 percent of Chinese gross domestic product (GDP) growth in 2023 (Myllyvirta 2024), and Chinese dominance of low-carbon supply chains is now considered a potentially significant geostrategic advantage (IEA 2023b). This use of climate policies to promote domestic RE industries and achieve broader political goals would have been less feasible without an already established RE industrial base. For those reasons, to the extent that such government actions are independent of the preferences of citizens and businesses, the strength of domestic RE industries may increase political elites' incentives and opportunities to pursue climate policies that promote this industry further.

To summarise, the primary role of political elites in this theoretical framework is as recipients of pressure from citizens and corporate interests that they translate into climate policy, and their motives and opportunities to use any residual agency is also likely shaped by the structural importance of domestic RE industries.

An overall summary of these theoretical arguments is presented in Table 2.1. Domestic RE industry strength is translated into national politics and probabilistically impacts climate policy through the three micro level causal channels concerning firms, citizens, and political elites. The corporate causal channel contributes to the overall relationship in two steps. First, stronger domestic RE industries mean that a larger and more consolidated segment of the national business community has a material interest in ambitious climate policies that aid RE firms. Second, these corporate actors use various forms of lobbying to promote their interests in national politics. The citizen causal channel also contributes in two steps. First, stronger domestic RE industries mean that more people have individual, familial, local, or national economic interests in climate policies that aid RE firms, and second, these interests affect their policy preferences and political behaviour. Political elites mostly contribute to this causal process by receiving and reacting to these societal pressures. In addition, as RE industries become more structurally important politicians and bureaucrats are more likely to use any residual agency in ways that promote the interests of these industries.

Table 2.1 Overview of mechanisms by actor group

	Preference formation (effect of RE industry strength on group views)	**Preference aggregation** (impact of group on climate policy)
Firms	Relative strength (vs carbon coalition) Consolidation and organisation Ties to and integration with wider business community	Financial donations Informational lobbying Institutional access
Citizens	Own or household employment Local and national benefits (jobs, growth, tax revenue) National identity	Voting Protests Hearings Contacting politicians Opinion polling
Political elites	Responsiveness to citizen pressures Financial and informational dependency on RE corporate interests Opportunities for personal gain RE as means of achieving policy aims	Agenda-setting Policy implementation

2.3 The Core Concepts

In the preceding sections, I have used the concepts 'RE industry strength' and 'national climate policy' without providing a detailed definition of either. This is useful for clarity of exposition when describing causal mechanisms. However, this misses key aspects of my theoretical argument that I present in this section. Specifically, I argue that the effect of domestic RE industries on national climate policy will be most concentrated for, firstly, the RE manufacturing industry which is existentially tied to RE, and secondly, for narrow GIPs that benefit the RE industry more directly. Inversely, the catalysing effect of RE industries will be weaker for the group of broader climate policies that seek to phase out fossil fuels directly and which I denote 'fossil fuel phaseout policy' (FFP).

To make this argument, I define and disaggregate the two concepts that make up the conceptual core of this dissertation: domestic RE industry strength and national climate policy. Both overarching terms contain a complexity that is key to further theorising the effect of the former on the latter.

2.3.1 Domestic RE industry strength

The core explanatory concept of this dissertation is the strength of domestic RE industries. My conceptualisation, which I also spell out in Paper 1(Decarbonization Policy), is structural and economic as opposed to political. This structural strength shapes the industry's political power but is analytically distinct from

and causally prior to it.[13] I define it as *the importance to national economies, understood in terms of employment, economic growth, tax revenues, profits, and exports, of all firms developing, manufacturing, deploying, generating, and distributing electricity from renewable energy technologies within their jurisdiction*. My definition of RE technologies focuses primarily on their low-emission nature and hence includes wind, solar, geothermal, ocean, wave, hydro, biomass, and nuclear energy.[14] This also means that I exclude other low-carbon technologies such as EVs and CCUS. I understand RE technologies as a case of the broader category of low-carbon technologies and reflect on similarities and differences in Chapter 8. Much like in work on the political consequences of fossil fuel dependencies, my definition of RE industry strength highlights the structural power of RE industries in national economies in terms of their ability to produce economic benefits that are generally valued in contemporary societies (e.g. Mahdavi, Alvarez, and Ross 2022). Conceptually, domestic RE industry strength varies across countries and sub-national units as a function of the size and profitability of the industry in absolute terms as well as the diversification and more general prosperity of that country or region.

As hinted at in the definition itself, this overall structural importance is generated by several sub-sectors. Although this point is often lost in more

---

[13] See Kupzok and Nahm (2024) for a similar distinction.

[14] There is some ambiguity and considerable political controversy about which energy technologies should and should not be included under this umbrella term. Specifically, nuclear energy has very low carbon intensity but is not strictly speaking 'renewable', whereas bioenergy (biomass and biofuels) is indeed renewable but often has high carbon emissions (Edenhofer et al. 2014, 71). In addition, whereas most RE technologies have been growing rapidly from very low baselines over the past few decades or are still only in a nascent development stage, nuclear and hydro power are well-established, long-running energy technologies. In my definition, I take an inclusive approach because these technologies share a fundamental structural interest in the phaseout of fossil fuels. However, in each self-contained article, I adopt a pragmatic empirical approach that fits the specific context. In Paper 1(Decarbonization Policy), my main operationalisation is based the OECD's definition of 'renewable energy generation' which includes wind, solar, geothermal, marine, and hydro energy (Haščič and Migotto 2015). In Paper 2(EU Lobbying), I include all technologies mentioned in the main text in the sectoral category of 'renewable energy technologies' and in the 'low-carbon camp' but code them separately at the sub-sector level to allow for re-specifications and more detailed investigations. In Paper 3(Green Jobs), I only focus on the wind industry due to its unparalleled importance to the Danish economy. In Paper 4(Low-carbon Investments), I expand my focus to include these technologies alongside other low-carbon technologies like EVs and batteries.

general political science work on this topic, some prior work has recognised that the RE industry is made up of distinct sub-sectors strung together by complex supply chains. Lachapelle, MacNeil, and Paterson (2017) argue that more countries than commonly assumed can make a positive contribution to the energy transition through a global green division of labour by specialising in the development (i.e., innovation), production, or deployment of RE technologies. They also indicate descriptively that these three activities do not covary perfectly across countries. In a similar vein, Nahm (2021) describes the mutually beneficial specialisation of American, German, and Chinese wind and solar energy firms into innovation, cutting edge manufacturing, and mass production, respectively.

I build on these insights and add the politics of these sub-sectoral distinctions. I distinguish between three aspects of domestic RE industries: manufacturing (which includes innovation and actual production), electricity generation (including installation, ownership, maintenance, and distribution), and electricity consumption.[15] Other than a descriptive difference in the actual content of these three RE industry segments, what are their politically relevant differences? I argue that they differ in their level of asset specificity and, partly as a result, in their core climate policy interest. Both differences have important implications for the potential role of each sub-sector in impacting national climate policy. Table 2.2 summarises these points.

Table 2.2 Asset specificity and interests along the RE supply chain

	RE industry segment		
	Manufacturing	**Generation**	**Consumption**
Activities	Design, development, component manufacturing, assembly	Project development, installation, operations and maintenance, distribution	Private and commercial consumption of electricity from renewable sources
Asset specificity	High	Moderate	Low
Core interest	Expansion of RE	Electrification	Cheap and secure energy

[15] The third sub-sector, RE consumption, extends beyond the definition I provided above. It is included here for two reasons. It helps illustrate the importance of asset specificity, and it allows me to explain why RE consumption dependencies are less impactful compared to fossil fuel consumption dependencies, which have been a central focus in the large literature on the politics of fossil fuel lock-in and climate policy backlash (Seto et al. 2016; Cory, Lerner, and Osgood 2021; Colantone et al. 2024).

By asset specificity, I mean the degree to which the intellectual property, physical assets, core competencies and skills, market position, and profitability of firms are tied to RE in particular.[16] Put differently, it concerns the ease with which firms can transition away from RE and remain profitable. Degrees of asset specificity shape the material interest of actors who depend in one way or another on these industries to fight for climate policies that support and expand RE and advance the energy transition. Firms that find it easier to adjust to policy and market developments that impede or slow the transition to RE with limited costs will quite simply have less reason to oppose such developments and vice versa. Concretely, I argue that developers and manufacturers of RE technology have the highest asset specificity, that asset specificity is moderate in the RE electricity generation segment, and that final consumers of RE have low asset specificity.

Beginning with the developers and manufacturers of RE technologies, these firms rely exclusively on the technology in which they have specialised for their competitive advantage and their revenue streams. This is true for both small start-ups that aim to commercialise new technologies such as wave or floating wind energy and for large companies like Vestas and Goldwind that invest vast sums of money in staying at the technological frontier of their industry. The waves of bankruptcies that regularly affect specific RE manufacturing industries attest to the very high levels of asset specificity that make this industry segment totally dependent on the success of RE and their particular technological niche (e.g. Schultz 2012). The core interest of RE manufacturers is therefore the national and global expansion of (their specific type of) RE, whether it comes in the form of increased overall electricity consumption ('growing the pie'), gains in market share relative to fossil fuels ('getting a larger piece of the pie'), or both. It is this aim that we should expect to drive the political behaviour of firms from the manufacturing RE industry segment and the actors that have a structural interest in its economic success.

Utility companies and independent power producers also make large investments into RE technologies when they build, own, operate, and maintain wind, hydro, solar, or other RE power plants. Once they have made these large investments, they develop a structural interest in continued political support for the energy transition. As Nina Kelsey describes in her work on 'the green spiral':

> An industry actor that makes multihundred-million-dollar investments into production facilities must get a return on those investments. Therefore it is, from an interests perspective, a different actor than it was before building those

[16] In developing this definition and the broader argument, I draw on Colgan, Green, and Hale (2021).

> facilities. It has gone from being an actor that perhaps could produce a new product to one that must produce that product. These changes in turn change its preferences in regulatory policy making (Kelsey 2021, 70).

Still, in contrast to the manufacturers and inventors of RE technologies, RE electricity generating firms are not *existentially* tied to these technologies. Their core business model is the generation and distribution of electricity, and they typically, though not always, have diversified portfolios that include various renewable and non-renewable energy sources (S. E. Kim, Urpelainen, and Yang 2016; Kelsey and Meckling 2018; IEA 2022b). Even Iberdrola, for instance, which is often highlighted (and highlights itself) as a champion of the energy transition, has a diversified energy mix that includes combined cycle fossil gas power plants as the second largest category (Iberdrola 2024, 15). They may, of course, incur large losses if their expectations for the pace of the energy transition are not met, but they have a realistic prospect of readjusting their business and political strategy in light of such developments (e.g. Reuters 2022).

The core climate political interest of this RE industry segment is therefore electrification. Electrification refers broadly to the conversion of energy consumption from non-electrical to electrical forms of energy, such as in the switch from gas boilers to heat pumps, from internal combustion engines (ICE) to EVs, and from blast furnaces to electrical arc furnaces in steel production. This expansion in the use of electricity has unequivocal benefits for renewables-based utilities and does not threaten any part of their asset portfolio. Importantly, low-carbon utilities share this core interest in electrification with fossil fuel-reliant utilities. This implies that the growth of RE interests in the utilities sector does not affect its fundamental interest.

However, this segment of the RE industry can produce a politically powerful dynamic of intra-industry conflict. Those actors that are relatively more dependent on RE generation have an interest in gaining market share through stringent climate regulation (S. E. Kim, Urpelainen, and Yang 2016; Kennard 2020). Because they compete so directly with fossil fuel-reliant utilities, any regulation that harms these competitors will relatively directly benefit utilities reliant on RE sources. Borrowing a metaphor from Amanda Kennard (2020), they may support climate policies because they are the enemy of their enemy. However, this dynamic is limited in scope to those policies that change the relative competitiveness of high- and low-emission electricity generation, not broader policies that seek to phase out fossil fuel technologies in other sectors.

Lastly, the final consumers of RE also have some degree of structural interest in the energy transition. The literature on demand-side dependency on fossil fuels has long been interested in the role of private and corporate fossil energy consumers in obstructing climate policy, including in the notion of

'carbon lock-in' (Unruh 2000; Seto et al. 2016). Underlying this large body of work is the implicit recognition that consumers of fossil fuels have a relatively high degree of asset specificity. It is costly for them to adjust to climate policies either by replacing or updating their fossil energy consuming assets – whether it is a heavy industrial plant, an ICE vehicle, or a gas boiler – or to incur the additional costs associated with continued use. However, the striking and important difference between this end-user dependency and that of RE consumers is that the consumption of RE is always easily replaceable because it is consumed in the form of electricity. This means that, as opposed to fossil fuel consumers, RE electricity consumers have low levels of asset specificity. This greatly reduces their economic incentives to support the promotion of RE through ambitious climate policies. Rather, their core climate policy interest is the availability of cheap and stable electrical energy, whatever the source. Only to the extent that the energy transition and climate policies aid this core interest can we expect these interests to show genuine support. As such, these actors are unlikely to be vocal adherents of climate policies that advance the RE industry indirectly by restricting the availability of fossil fuels or increasing their price.

In summary, I conceptualise the strength of domestic RE industries in structural economic terms and as consisting of sub-segments. These segments have different levels of asset specificity and different core interests in climate policy. This implies that the most plausible champions of ambitious climate policy, including efforts to phase out fossil fuels, are the inventors and manufacturers of RE technologies. That is why this sub-sector is the primary empirical focus of this dissertation (see Chapters 4, 5, 6, and 7).

However, to fully leverage these arguments and to theorise the impact of RE industries on national climate policy in a nuanced and comprehensive way, we must also consider how to define and disaggregate the outcome of interest, namely national climate policy.

2.3.2 National climate policy

This dissertation is concerned with explaining climate policy. Apart from the empirical detour to EU policy in Paper 2(EU Lobbying), my focus is on national climate policy. At the most aggregate level, I define national climate policy as *policies and related official bureaucratic decisions made by states with a clear and/or explicit intention of mitigating climate change directly or indirectly*. This definition excludes policies targeting climate change adaptation and policies for loss and damage. It also excludes policies that are neither officially nor prominently described as climate policy and for which the climate policy impact is unclear, indirect, or plausibly unintended (such as changes in

monetary or fiscal policy that affect GHG emissions through general economic effects).

In contrast, this definition does include policies that have non-climate objectives, but which have a clear, relatively direct and intended impact on climate change mitigation. An example of this would be the IRA. It also includes policies that are officially intended to mitigate climate policy without regard for their actual effectiveness. US corn ethanol subsidies, which are intended to mitigate climate change but are inefficient and plagued by unintended consequences, is an example. Finally, although my conceptual definition includes all sectoral aspects of climate change mitigation policy, my empirical focus and theoretical applicability is mostly centred on energy-related climate policies. These are policies that concern the replacement of fossil fuels with low-carbon alternatives in the energy, transport, building, and industrial sectors. I do not try to explain climate change mitigation policies in the agricultural and forestry sectors.

However, more important than this overall definition is the key distinction that I draw between types of climate policies. The climate politics literature is already overflowing with conceptual climate policy distinctions and schemas (e.g. Kivimaa and Kern 2016; F. Green and Denniss 2018; Meckling 2021; Hochstetler 2020; Hughes and Urpelainen 2015). I build on and modify existing work and suggest that the most important distinction for the purposes of this dissertation is the one between GIP and FFP. Definitions and examples of these two types of climate policies are provided in Table 2.3.

Table 2.3 Climate policy typology: Definitions and examples

	Green industrial policy (GIP)	**Fossil fuel phaseout policy (FFP)**
Definition	Policies that directly incentivise or otherwise directly aid the development and/or deployment of low-carbon technologies	Policies that directly disincentivise or otherwise directly inhibit the production and/or use of high-emission products and behaviours
Examples	RE feed-in tariffs, EV purchase subsidies/tax exemptions, easing of RE permitting rules, low-carbon research and development funding	Coal mining ban, carbon pricing, fossil fuel subsidy removal, stricter rules for monitoring of methane leakage in fossil fuel production

As is clear from the definitions, the central distinction I make in this typology is based on what a policy targets directly, i.e., whether policies in the first instance seek to help the emerging low-carbon economy or harm the incumbent high-carbon economy. This distinction is therefore independent of and

crosscuts the type of policy instrument used (e.g. economic or regulatory; see Breetz, Mildenberger, and Stokes 2018), and whether producers or consumers are targeted (as in F. Green and Denniss 2018; Finnegan 2022).

The motivation for focusing on this dichotomy is partly that current global developments in climate policy can be described as a move from a singular focus on FFP towards a much greater emphasis on GIP (Allan, Lewis, and Oatley 2021). More importantly, this distinction clarifies a potential ambiguity in – and thereby highlights a plausible limitation of – our understanding of the effect of RE industries on climate policy. It is important first to underscore that RE and other low-carbon interests do have an economic interest in FFP on a fundamental level. This is clear from the observation that they explicitly support these policies. But it is also corroborated by studies that document the effect of various FFPs on the expansion of RE (e.g. Johnstone, Haščič, and Popp 2010; Van Den Bergh and Savin 2021; Xu and Yang 2024). However, as I theorise in more detail in Paper 1(Decarbonization Policy) and Paper 2(EU Lobbying), there are various more specific structural, informational, and institutional reasons to expect a weaker *willingness* and *ability* on the part of actors whose structural material interests are tied to RE industries to influence FFP compared to GIP. Others have hinted at this possible limitation on a general level (Hughes and Urpelainen 2015; Meckling 2021). Here, I provide greater theoretical detail and restate my main arguments from the individual articles by focusing on the ways in which the core mechanisms of preference formation and aggregation outlined in section 2.2 are likely to differ across GIP and FFP.

For corporate interests, the mechanisms of preference formation concern their relative size, consolidation, and ties to the wider business community. The mechanisms of preference aggregation centre on financial and informational resources for lobbying and institutional access to policy-makers. I argue that the key differences across types of climate policy here consist of fewer informational resources, less institutional access, and stronger counter-mobilisation in relation to FFP compared to GIP. RE firms and business associations trying to influence FFP do not have the type of proprietary technical information that regulators seek to nearly the same extent as when lobbying for GIP. No one understands the intricacies of offshore wind permitting reform better than wind energy manufacturers and project developers. But these actors have no special knowledge of the regulatory feasibility of banning ICE vehicles at certain dates and with certain exemptions. Therefore, their information is of much less help to regulators in the latter case. In addition, whereas they are likely to be invited into newly formed institutional venues where GIP is debated and developed, their access to key FFP fora is much more limited due to historical ties between fossil fuel interests and elites (Moe 2015; Mildenberger 2020) and partly as a result of their lack of critical

informational resources. Finally, built into the theoretical arguments for climate policy sequencing and the political strategy of GIP is the notion that incumbent interests resist these policies less than they do FFP (Stokes and Mildenberger 2020; Kupzok and Nahm 2024). Conversely, this means that RE interests trying to influence FFP meet greater counter-mobilisation than when lobbying for GIP.

For citizens, the mechanisms of preference formation concern their structural dependence on RE industries, whether personal, familial, local, or national. The mechanisms of preference aggregation centre on voting, protesting, and subtler forms of government responsiveness. Here, the differential effect on GIP and FFP hinges on informational barriers, individual cross-pressures, and aggregate-level differences in counter-mobilisation. First, it is generally true that citizens often do not perceive the link from public policies to their downstream impacts, especially when these links are distant or complex (Soss and Schram 2007; Hamel 2024). The link between a GIP subsidy that directly supports and underpins an RE industry on which citizens depend in some way should be relatively clear. In contrast, the indirect, positive spillovers from ambitious FFPs to RE industries are much more complex and opaquer. This limits not only the strength of citizens' material interest in promoting ambitious FFP but also their awareness of that potential interest.

Second, whereas the negative impacts of GIP are diffuse and come in the form of higher public debt and potential future tax increases for most citizens,[17] the negative impacts of FFPs are, in many instances, direct and strongly felt. For instance, even people employed in the solar industry experience increased gasoline prices when they drive to work. As a result, people who may otherwise have structural reasons to support policies that aid the RE industry are cross-pressured when it comes to FFP. Compared to GIP, the effect of stronger RE industries on peoples' enthusiasm for FFP should, therefore, be weaker. Lastly, the argument about different levels of corporate counter-mobilisation is also mirrored among citizens. Existing research has shown that GIP is generally more popular than FFP, especially in its more stringent forms (Drews and van den Bergh 2016; Egan and Mullin 2017; Marlon et al. 2022). Those citizens that advocate for ambitious climate policy will, therefore, likely face stronger opposition in the case of FFP compared to GIP.

[17] This is of course not true for citizens employed in or with other dependencies on fossil fuel sectors harmed by GIP. Yet, the only study to have investigated this directly finds that workers in Norwegian oil and gas are much less supportive of FFP but no less supportive of GIP compared to the general population (Tvinnereim and Ivarsflaten 2016).

Finally, to the extent that political elites act autonomously from these societal pressures, very similar arguments apply to them and suggest that their support for GIPs should be more affected by the growth of RE industries compared to FFPs. As means to advance private or national strategic interests, subsidies for low-carbon industries provide more direct and immediate effects compared to stringent regulatory measures (that may also conflict with other strategic goals pursued by elites, such as energy security or industrial price competitiveness).

In summary, the core theoretical contention of this dissertation is that the strength of domestic RE industries, especially the manufacturing segment, should have a positive probabilistic effect on national climate policy due to its impact on the distribution of climate policy preferences among domestic business interests and citizens but that this effect should be weaker for FFPs compared to GIPs. Having presented this overarching theoretical argument, I now turn to the general methodological approaches used to test it.

3 Overarching methodological reflections

In this chapter, I explain the reasoning behind the overarching methodological approach of the dissertation and reflect on its limitations. I focus on three fundamental choices (and the alternative paths not taken): the use of quantitative methods, the reliance on observational data, and the choice of cases. Subsequent chapters present the specific research designs of each of the four self-contained articles. For now, to provide the necessary context for these overarching methodological reflections, I provide a descriptive overview of the four empirical studies in Table 3.1 below. It recapitulates the units of analysis, main explanatory and outcome variables, countries and years covered, and statistical methods used in the main analysis in each article.

3.1 Why Quantitative Methods?

As Table 3.1 makes clear, all four self-contained articles in this dissertation investigate aspects of the overarching theoretical framework by applying descriptive and inferential statistics to quantitative data sources. Qualitative case studies are one obvious alternative for how to study climate politics (Purdon 2015; Steinberg 2015). Indeed, such methods are being used to good effect in the closely related literature on the politics of GIP (Kelsey 2021; Stokes 2020; M. Lockwood 2022; Allan and Nahm 2024; Kupzok and Nahm 2024). Mixed methods research that combines statistical analysis with qualitative interviews is also showing an impressive potential to improve our knowledge of the micro level political dynamics of climate policy (Bolet, Green, and González-Eguino 2024; Gazmararian 2024a). Despite this, my two primary reasons for relying purely on quantitative methods are, first, that the probabilistic, structural nature of my theoretical argument lends itself well to large-N approaches and, second, that the existing literature has primarily used single case studies.

Table 3.1 Overview of the four empirical studies

Article	Paper 1 (Decarbonization Policy)	Paper 2 (EU Lobbying)	Paper 3 (Green Jobs)	Paper 4 (Low-carbon Investments)
Unit of analysis	Country-years (n ≤ 4,279)	Stakeholder-consultation dyads (n ≤ 220,242)	Precinct-years (n = 6,440)	County-years (n = 1,404)
Main explanatory variable(s)	RE patents per capita (RE exports share, RE electricity share)	Stakeholder camp (low- or high-carbon) interacted with policy type (GIP, MPP, or FFP)	Local presence of significant wind industry site (3 nearest polling stations, binary)	Announced low-carbon investment within county (binary)
Main outcome variable(s)	Carbon price enactment, fossil fuel subsidies per capita	Responding or not responding to consultation (binary)	Pro-climate voting index, right-wing populist party vote share	Two-party vote share of the Democratic party
Cases (years)	Global or OECD and G20 (1990–2019, 2010–2020)	European union (2017–2022)	Denmark (2007–2022)	United States (2020–2024)
Statistical method	BTSCS logistic or OLS regression (pooled, LDV, year FE, TWFE) with controls	Logistic regression with stakeholder-, consultation-, and policy-level controls	OLS regression with controls, municipality and election FE	Propensity score matching and two-period difference-in-differences OLS regression

Note: This table only covers the main analyses of each article. Consult the original articles for further details and descriptions of additional mechanism tests and robustness checks. BTSCS = Binary time-series cross-sectional, LDV = lagged dependent variable, FE = fixed effects, TWFE = two-way fixed effects, MPP = Mixed policy package.

The first reason relates to the nature of my theoretical argument and the relationship I investigate. The theoretical propositions advanced in this dissertation are probabilistic statements about how a structural-economic phenomenon – RE industry strength – can shape the policy preferences and resources of domestic actors and, in turn, affect national policy outputs. This argument is neither mechanical nor deterministic, and it relies on a long and complex causal chain. In fact, many of the 'near' explanatory factors that scholars of comparative climate politics study can be said to operate on the path from this

structural cause to its political effects. This includes electoral (Finnegan 2023) and interest group institutions (Mildenberger 2020), cultural and ideational factors (Eckersley 2016), and party-political dynamics (Abou-Chadi 2016; N. Carter and Little 2021) that interact with contingent events like economic crises (Abou-Chadi and Kayser 2017; Tørstad et al. 2023), protests (Schwörer 2024), or natural disasters (Rowan 2023). All these factors can play contingent roles in explaining the climate policy dynamics of each individual case. Studying one case means that its climate politics and policy will almost certainly be influenced by a myriad of other factors and that these may overrule, amplify, attenuate, or obscure the potential effect of domestic RE industries on national climate politics and policy.

In one country, the growth of the domestic RE industry might have played a pivotal role. In another, it might not have made any difference. One firm or business association might prioritise lobbying on FFP. Another might focus its attention narrowly on GIP instead. In one local area home to an RE firm, citizens may have changed their climate policy preferences and pro-climate voting substantially. In another, this might not have made a difference. In such a research context, inferences from single cases become highly tenuous.[18] Although it would be valuable to investigate the cause of such heterogenous effects (if they exist) (Seawright and Gerring 2008), my claim is that it is more logical to begin by looking for systematic patterns and ask the following question: Is there, on average and across a large number of cases (be they countries, firms, or local areas), an association or effect? This is what I try to answer.

This logic mirrors Craig Parsons' propositions about 'supporting structural claims' in his book on argument types in political science (Parsons 2007, 62–64). Among the types of evidence that Parsons highlights as important in testing a structural claim (i.e., a theory of how exogenous material factors shape the behaviour of rational actors) are 'evidence of some sort of pattern of structural constraints and incentives' and 'evidence that patterns of behaviour matched position vis-à-vis patterns of structure'.[19] These are types of evidence

[18] Of course, a more sophisticated theoretical framework could integrate all or some of these factors into a more complex argument about the interaction effects between the 'deep' force of RE industry strength and 'nearer' explanatory factors. Yet, with so many potentially relevant factors, the framework would quickly become impossible to integrate satisfactorily in a qualitative case study analysis.

[19] The other two types of evidence that Parsons mentions are 'logical claims about how the combination of certain preferences with a given structural position dictated observed behaviour as the most rational course of action', and 'at least some evidence of the right kind of [rational] decision-making process' (Parsons 2007, 63).

that quantitative methods are particularly well-suited to produce. Had my theory fallen into the more contingent analytical categories that Parsons calls institutional or ideational explanation, different types of evidence would have been more important (see Parsons 2007, 91–92, 130–31), and my methodological priorities would have shifted accordingly.

In addition, because I am studying two phenomena that have generally been increasing in parallel, there is a heightened risk of seeing causality where there is mere correlation and epiphenomenal developments. In Denmark, for example, all the causal process elements for confirming the theoretical argument of a broad influence of RE industries on climate policy are present (Nygård 2014). The domestic RE industry has expanded and consolidated from an early start in the 1970s to become a major industry of national importance, its lobby groups are explicitly in favour of ambitious climate policies including carbon taxation (e.g. Plechinger 2019), and Danish climate policy has become more and more ambitious over time. Yet, the counterfactual remains unobservable, i.e., we do not know how Danish climate policy would have developed in the absence of the growth of the domestic RE industry and its attempts to shape policy. Indeed, as I show at the end of Chapter 4, climate policy stringency has increased at a similar pace in comparable neighbouring countries. This makes it very challenging to separate parallel developments from actual causal impacts in qualitative case studies, and it increases the relevance of the general methodological advantages of large-N comparisons like the ones employed in this dissertation. These allow me to look for systematic evidence of a relationship between RE industries and climate policy (at the national, firm, and local levels, respectively) while accounting for potential confounding factors. Such patterns provide important insights into both the general ability of RE industries to overcome the many obstacles on the causal path to influencing national climate policy and the general functioning of the underlying micro level dynamics.

The second main argument for using quantitative methods throughout this dissertation concerns the current state of the literature. Put crudely, what we know so far about 'climate policy sequencing' and the ability of RE industries to impact broader climate policies comes mostly from theory-generating or illustrative case studies (Meckling, Sterner, and Wagner 2017; Pahle et al. 2018; Kelsey 2021; Leipprand, Flachsland, and Pahle 2020), supplemented by descriptive statistics concerning the relative timing of policies (Meckling et al. 2015; Linsenmeier, Mohommad, and Schwerhoff 2022) as well as two quantitative studies of wind turbines and voting in the United States (Urpelainen and Zhang 2022) and EV charging stations and climate policy preferences in Switzerland (Montfort et al. 2023). Hence, the main argument at the core of this body of work – that stronger RE industries lead to more stringent climate

policy – has never been tested directly at the unit of analysis at which it should apply, namely countries.

However, it is also important to acknowledge the general and unavoidable limitations of statistical analyses at the country level. Their ability to detect small effects is limited by inherently restricted sample sizes (Doucette 2024), and the country level presents a complex causal environment in which perfectly unbiased causal estimation is infeasible. Although the country level is still an important starting point, this is a central reason why three of four empirical studies in this dissertation focus on the micro level causal channels. In particular, we know nothing systematic about the climate policy lobbying prioritization of RE firms and business associations and about the ability of low-carbon industries (as opposed to infrastructure) to boost popular climate policy support.

In general, research on topics like this one should arguably be approached through a combination of qualitative and quantitative studies that iteratively enrich each other. But the most closely related literature is at a state, I argue, where systematic, quantitative investigation is in shorter supply and more urgently needed than more case studies. In line with this argument, the quantitative findings presented in this dissertation will hopefully generate an impetus for further qualitative investigations.

Finally, it is important to acknowledge that one of the key drawbacks of my methodological approach is that I am unable to determine whether the RE industry has mattered for catalysing national climate policy in specific cases. To the extent that the main value of case-specific knowledge is considered to be its ability to either spark a process of diffusion of best practices or understand particular cases due to their inherent importance, the approach taken in this dissertation is at a comparative disadvantage.

3.2 Why Observational Data?

The second significant decision that crosscuts all four self-contained articles is the use of observational data and research designs. Reflections on this decision is warranted, especially in light of the 'credibility revolution' in political science and the increasing reliance on experimental data and naturally occurring quasi-experiments (e.g. Angrist and Pischke 2010; Dunning 2010). Besides the simple fact that I have been unable to identify good natural experiments with quasi-random treatment assignment, the two main positive arguments for observational data are that it enhances external validity and produces more descriptive insights compared to, e.g., survey experiments.

Scholars studying the effect of fossil fuel dependency on climate politics at the national and local levels have managed to exploit naturally occurring

quasi-experiments due to the exogenous nature of fossil fuel resource discoveries (Mahdavi, Alvarez, and Ross 2022; Gazmararian 2024b). Because of the endogenous nature of RE industry growth, similar occurrences seem much more unlikely in this case. The factors that impact the emergence and size of domestic RE industries tend to be very plausibly related to climate politics through other channels as well. Circumstances that create purely exogenous variation in the strength of RE industries across space would have been optimal and allowed me to design studies that maximise both internal and external validity. Unfortunately, I have not been able to identify any such events.

Survey experiments that expose a representative sample of citizens to different treatment conditions – such as the features of climate policy proposals – to test their effect on, e.g., climate policy support are both prominent and valuable instruments in the general political science toolbox (e.g. Bergquist, Mildenberger, and Stokes 2020; Beiser-McGrath and Bernauer 2024). However, in the context of this dissertation and the research question it seeks to address, their relevance is limited by two considerations. The primary unit of interest is the country level at which experiments cannot be administered. Even accepting a move to the micro level of individual citizens, it does not seem plausible that a structural aspect of domestic political economies such as the strength of RE industries can be manipulated in a realistic way that resembles the protracted and multifaceted ways in which citizens learn about such factors in real life, as theorised in more detail in Paper 3(Green Jobs). I therefore believe that the external validity of survey experiments would be quite limited in this particular research context (see also Barabas and Jerit 2010).

The more positive reasons for using observational data are, first, that there is a value in the 'mere description' (Gerring 2012) that observational studies generate. I provide novel and valuable descriptive information about, e.g., countries' changing positions in different parts of RE industry supply chains and the correlation between these in Paper 1(Decarbonization Policy); hitherto unknown sectoral patterns of EU climate and energy lobbying in Paper 2(EU Lobbying); and the fact that RE industries and infrastructure locations are entirely uncorrelated at the local level in Denmark in Paper 3(Green Jobs). Second, by focusing on the substantively important units of analysis and using real-world variation, I increase the external validity of my findings. The inferential leap from actually observed policy developments, lobbying patterns, and election results to either their future developments or current dynamics in other locations is shorter than from more artificial methods that prioritise internal validity above all else.

Finally, throughout the self-contained articles, I pursue methodological strategies to reduce the threats to internal validity that these observational studies entail. In the first three articles, the core of this approach is the use of

extensive robustness checks that vary all dimensions of the statistical analysis including outcome and explanatory variables, statistical model choice, samples, and control variables.[20] This is an imperfect solution to the complex problems of working with observational data, but one that nevertheless increases confidence in my results by limiting their sensitivity to specific modelling choices. In Paper 4(Low-carbon Investments), I am able to exploit the sudden appearance of low-carbon investment announcements made by private companies in response to a specific policy (the IRA) to employ a more causally credible difference-in-differences (DiD) identification strategy. Combined with propensity score matching, this research design reduces the complexity of statistical modelling and lessens concerns about internal validity compared to Paper 3(Green Jobs) – a point I expand upon in Chapter 7.

3.3 Why These Cases?

The final overarching decision that warrants attention is my choice of cases. Whereas Paper 1(Decarbonization Policy) is global in scope, the subsequent micro level investigations can be considered as single case studies of the EU, Denmark, and the United States, respectively. Rather than comparing across wider political and institutional contexts in the spirit of most-similar or most-different comparative research designs (see Seawright and Gerring 2008), these studies take the relevant context as given. This raises obvious questions about generalisability. How do the characteristics of these cases shape the inferential scope of the analyses? Three motives have been central in this case selection.

First, these cases are central in the closely related literature. In the series of books and papers through which the 'climate policy sequencing' hypothesis emerged, the cases of Germany, California, the EU, and Denmark all feature centrally (Meckling et al. 2015; Meckling, Sterner, and Wagner 2017; Pahle et al. 2018; Leipprand, Flachsland, and Pahle 2020; Nygård 2014). By emulating this case selection, I am better placed to directly engage with, speak to, and assess existing work.

Second, and more importantly, I chose the cases of Denmark and the EU in order to maximise the presence of domestic RE industries. This case selection took place after I knew the initial macro level null results from Paper 1(Decarbonization Policy), and I therefore wanted to maximise the chances of detecting any effects at the micro level. Finding no micro level effects in a least-likely

[20] This strategy is somewhat related to the practices advocated for in work on 'multiverse analysis' (Steegen et al. 2016) or 'specification curve analysis' (Simonsohn, Simmons, and Nelson 2020) and similarly seeks to guard against the researcher degrees of freedom that are inevitable in quantitative research.

case (e.g., Australia, Poland, or Indonesia) would have had a much weaker bearing on the overall interpretation of the absence of a macro level effect. Instead, this situation called for cases that are, in the terminology of this literature, 'far along the policy sequence' (Meckling, Sterner, and Wagner 2017), meaning that they already have large, consolidated, and well-established low-carbon industries as the result of early GIP and are now seeking to implement more stringent FFP. This follows the intuition of prior work. Quite explicitly, scholars have chosen to focus on the abovementioned cases because of 'their past successes in ratcheting up climate policy, as indicated by the increasingly more stringent climate and renewable policy targets implemented' (Pahle et al. 2018, 861).

Within this overarching logic, the choice of Denmark over, e.g., Germany for Paper 3(Green Jobs) was mostly based on the current status of the domestic RE industry. In Germany, the solar industry in particular has been in decline for the past decade due to increasing competition from Chinese manufacturers (Schultz 2012). Despite economic turbulence and Chinese competition, the Danish wind industry has fared significantly better during this period and is relatively more structurally important to the smaller Danish economy. Because this dissertation is not interested in the political effects of RE industry decline, the Danish case was preferable.[21]

The choice of the EU as a case for Paper 2(EU Lobbying), despite it being a supranational organisation as opposed to a state, follows a similar logic. The EU member states jointly encompass some of the leading low-carbon industries, electric utilities with vastly different energy mixes, structurally important heavy industries, and fossil fuel sectors. The EU also pursues a broad and diverse climate policy agenda. All this gives me a rare opportunity to study the causal dynamics of interest in a suitable and intrinsically important setting.

Finally, the choice of the United States as a case for Paper 4(Low-carbon Investments) follows a slightly different but related logic. While the US is not generally one of the frontrunners in terms of the size of its low-carbon industries, the IRA did provide a sudden and unprecedented boost to the size of these industries. So, while their overall structural importance is not as high as in other cases, this short-term increase in structural importance is uniquely suited to studying the causal processes that I am interested in.

Admittedly, pragmatic considerations of data availability also matter, especially in the study of corporate lobbying. Not all cases, especially those with

[21] The politics of RE industry decline is an important topic that warrants further attention, especially in light of China's increasing dominance of these industries, but also one that likely involves different causal dynamics (see e.g. Baccini and Weymouth 2021; Rickard 2022).

less transparent political systems, would have allowed me to investigate these micro level dynamics of lobbying and local electoral responses to RE industries. The most obvious omission in that regard is China, the most important global player in RE technology and uniquely important for global efforts to phase out fossil fuels and mitigate climate change. Yet, its political system presents numerous insurmountable barriers to studying the processes that are central to this dissertation.

The cases I study cannot, of course, represent the whole universe of polities to which I ultimately hope to infer. In particular, Denmark and the EU are more neo-corporatist, wealthier, and more democratic than the average country, and Denmark has a more consensus-oriented (climate) policy style and less polarised climate politics than other countries (Jahn 2016; Andersen 2019; Finnegan 2022). Speculations about unobserved generalisability across cases are of little value compared to actual empirical investigations, and studies of more pluralist, poorer, and less democratic countries should be a priority for future research. Still, at least two observations can be made here.

First, it seems somewhat plausible that RE industries will find it easier to influence broader climate policies through lobbying in contexts that are more pluralist and more dominated by financial and/or pressure-based lobbying. In the terminology of Paper 2$_{\text{(EU Lobbying)}}$, their *ability* to wield influence might be higher in systems where they are not excluded from long-running corporatist fora, although their *willingness* to do so remains uncertain. However, a more brute force lobbying system in which informational advantages matter less than in the EU may also have two other consequences. Firstly, it might require that the RE industry is much more structurally powerful and resourceful before it can wield broader influence. Secondly, it may also make it easier for fossil fuel interests to counteract the influence of RE interests on narrower GIPs, as exemplified by Leah Stokes' work on the US utilities sector (Stokes 2020). Future work on sectoral climate lobbying that takes advantage of the rich lobbying data available in the United States (e.g. I. S. Kim 2018) could therefore be of great value.

Second, it seems theoretically plausible that countries where climate politics is more polarised may make it more likely that local RE industries can boost support for the energy transition at the local level compared to the Danish case studied in Paper 3$_{\text{(Green Jobs)}}$. Greater elite-level polarisation may contribute to increasing the salience of the climate policy issue area (Dickson and Hobolt 2024). Compared to settings such as the Danish party system which is dominated by broad consensus agreements (Skjærseth et al. 2023) or the 'competitive consensus' that characterised UK climate politics until 2010 (N. Carter and Little 2021), more polarised settings should improve citizens' ability to distinguish party positions and the perceived significance of vote choice

for the direction of national climate policy. This might make it more feasible to detect the effect of local RE industries on support for the energy transition in voting behaviour when climate politics is more polarised. It is therefore simultaneously somewhat surprising and quite reassuring that my results are consistent across the Danish and US contexts studied in Paper 3(Green Jobs) and Paper 4(Low-carbon Investments), respectively. Still, countries with differently structured party systems, including where centrist green parties are present, could plausibly produce dynamics that differ from the ones I identify in these articles and summarise in Chapters 6 and 7.

4 Global country-level evidence

This chapter provides a brief summary of the theoretical argument, research design, and results of the first self-contained article in the dissertation entitled 'Domestic Renewable Energy Industries and National Decarbonization Policy'.[22] The article is situated in and contributes to the literature on climate policy sequencing and the broader subfield of comparative climate politics. One strand of research has documented the narrow effect of RE industries on further policy support for and expansion of RE (Aklin and Urpelainen 2013b; 2018). Another has investigated the structural, institutional, party-political, and ideational causes of restrictive climate policies like carbon pricing and fossil fuel subsidy reform without regard for the potential catalysing role of rising RE industries (e.g. Eckersley 2016; Finnegan 2022; Mahdavi, Alvarez, and Ross 2022; Schulze 2021). A third body of work – reviewed in the introductory chapter – has provided novel and important, but quite general, theoretical propositions about the possibility of such an effect, but only backed these up with most-likely case study evidence and descriptive statistics on policy enactment across countries (e.g. Meckling et al. 2015; Linsenmeier, Mohommad, and Schwerhoff 2022). This leaves us with very limited knowledge of the empirical veracity of those propositions.

With this article, I make three contributions. Most importantly, I provide the first systematic test of the influence of domestic RE industry strength on national FFP. My null results raise questions about the strength or existence of this relationship. Additionally, this article contributes with a new disaggregated conceptualisation of RE interests, proposals for ways to measure each, and empirical evidence that they are distinct (see also section 2.3.1). Finally, I add theoretical depth to the compelling, but perhaps overly optimistic, thesis on climate policy sequencing.

Within this dissertation, the purpose of this article is to directly investigate the main macro level relationship between RE industry strength and FFP with the best available data and a broad and pragmatic approach to statistical modelling. The results of this article thereby establish a baseline from which to

[22] In this chapter and the three following empirical chapters (5, 6, and 7), I focus on summarising the overall argument, research design, conclusions, and contributions of each self-contained article. To ease the reading experience, I cite only central references from the original article. I therefore ask readers interested in additional references to data sources, methodologies, and related scholarly work to consult the original article.

determine the most appropriate course of action for subsequent empirical investigations.

4.1 The Argument

My argument in this article emerges from the general premise that RE interests have strong reasons to support ambitious climate policy and that their structural importance to national economies should probabilistically determine their ability to shape national climate policy in accordance with these interests. More importantly, however, I argue that the *willingness* and *ability* of this sector to influence national climate policy should be lower for FFPs compared to GIPs (which we know from extant work they can influence). This proposition is underpinned by three arguments. First, although the benefits of GIPs and FFPs may, in the long run, be equally large, the benefits of the latter are more distant and uncertain. Second, RE firms and their allies may have less institutional access to those policy-making venues where FFPs are debated and formulated. Third, when attempting to influence FFPs, RE interests will face greater counter-mobilisation from those high-emission interests vulnerable to its impacts, and they are likely aware of this when they choose what policies to target with their finite resources.

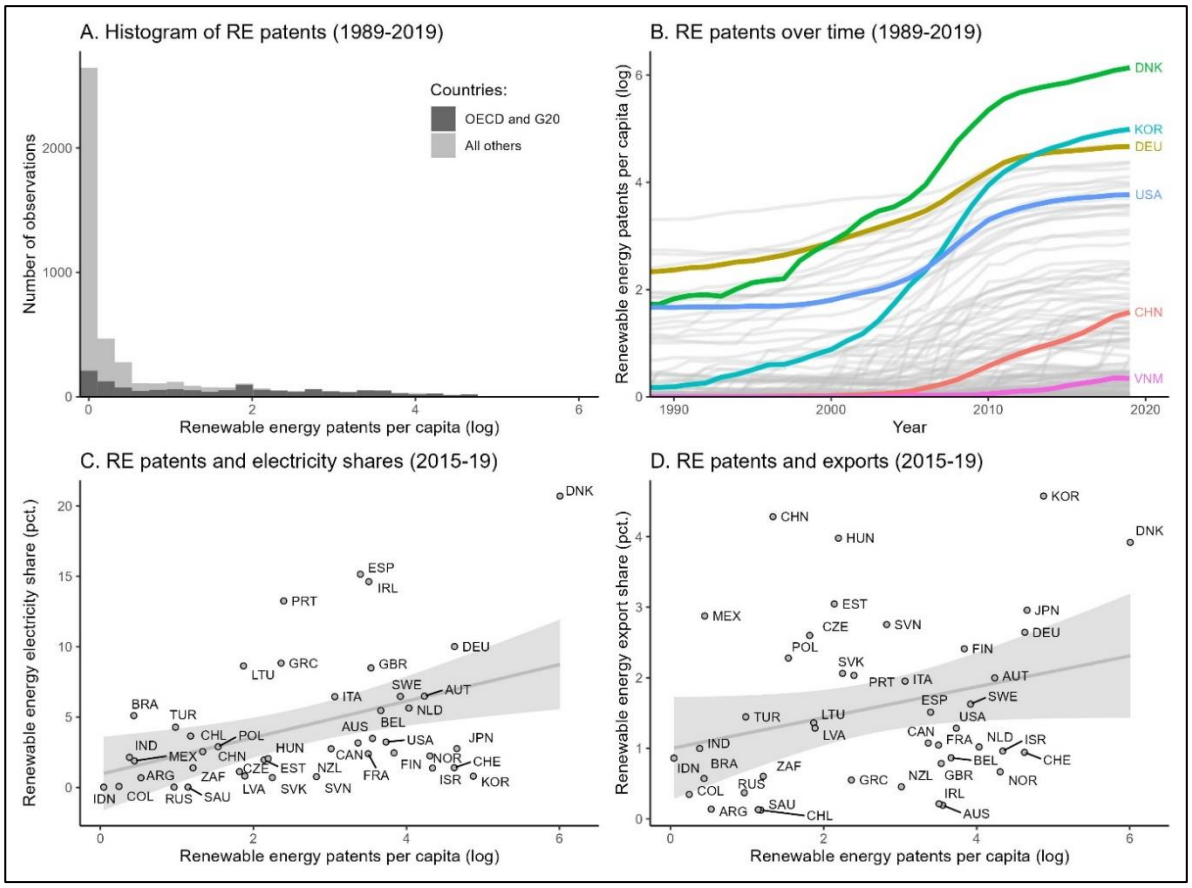
4.2 Research Design

To investigate whether the strength of domestic RE industries has systematically been associated with more stringent or ambitious FFPs, I rely on methods that closely resemble those used in the existing quantitative comparative climate politics literature. I compensate for the inherent limitations (in terms of internal validity and causal identification) of these observational, national-level time-series cross-sectional designs by using a broad array of measures of RE industry strength and FFP, varying sample restrictions, and using many different statistical model specifications. This strategy is imperfect but, I argue, the best given the importance of testing this theory directly at the appropriate level of analysis, i.e., in terms of country-level climate policy outputs.

To operationalise the strength of domestic RE industries in accordance with my conceptualisation of its sub-segments (see section 2.3.1), I devise new measures based on data on (i) RE technology patents and (ii) RE technology exports, and supplement this with more commonly measured (iii) RE electricity generation shares. My preferred operationalisation of the main explanatory variable is the per capita stock of RE technology patents with a three-percent annual depreciation rate (but my findings are robust to various modifications of this measure). In Figure 4.1, the graphical presentation of these

measures and their correlations is reproduced from the original article. This, I argue, demonstrates the face validity of the measures vis-à-vis existing knowledge of the distribution of RE industries across time and space. It also shows that these different segments of the RE industry are not just conceptually distinct but also empirically so. Importantly, by measuring the structural strength as opposed to the political resources of RE industries, my research design incorporates all the mechanisms theorised to link this explanatory factor to national climate policy, including its effects on public opinion and domestically contained cost reductions (see e.g. Meckling, Sterner, and Wagner 2017).

Figure 4.1 RE industry strength across countries, years, and indicators



Note: Panel A shows the distribution of the log of per capita RE patent stocks with a three percent annual depreciation rate for all country-year observations from 1989 to 2019 split by OECD and G20 (dark grey) and other countries (light grey). Panel B show the temporal development of this same measure of RE patents per capita and highlights selected countries for illustrative purposes. Panel C shows a scatterplot with this measure of RE patents per capita on the horizontal axis and the alternative explanatory variable of RE electricity generation shares on the vertical axis for OECD and G20 countries using mean values from 2015 to 2019. Panel D replicates panel C but with a measure of RE export shares on the vertical axis. The three-letter country abbreviations are official ISO alpha-3 codes. The grey lines in panel C and D are linear lines of best fit and the surrounding grey areas are 95 percent confidence intervals. Figure reproduced from the original article.

In measuring FFPs, I focus on policies that are substantially important and central to the existing literature. I therefore gather existing data on (i) the timing of carbon price enactments, (ii) carbon pricing stringency (i.e., emissions-weighted carbon prices), (iii) shadow carbon prices, (iv) fossil fuel subsidies (per capita and per GDP), and (v) net implicit gasoline taxes. I cast the net this widely with regard to outcome measures for two reasons: first, in acknowledgement that a perfect indicator of FFP does not currently exist, and second, to decrease the sensitivity of my findings to any one measure.[23]

Controlling for underlying confounding factors (i.e., those country characteristics that may affect both the strength of domestic RE industries and FFPs) is of statistical and substantive importance in this study. Its substantive importance stems from the fact that theories of climate policy sequencing have hitherto failed to take seriously the possibility that deep-seated country differences can act as scope conditions on this relationship or even make the observed policy correlations and case study dynamics epiphenomenal. In this study, I therefore seek to balance the need for a 'fair test' of the theory (an argument *against* too many control variables) with the need to account for the most pertinent confounders (an argument *for* many control variables). To achieve this balance, I control for three factors across all models:[24] economic development (measured as the natural logarithm of GDP per capita), bureaucratic quality (measured using the expert-coded indicator of 'rigorous and impartial public administration' from the Varieties of Democracy project), and dependency on fossil fuel income (measured as fossil fuel rents to GDP). Based on literature that links wealth, fossil fuel dependency, and good governance to climate politics and to the development of RE industries, I argue that these are the three most crucial and plausibly exogenous confounding factors to consider (e.g. Povitkina 2018; Levi, Flachsland, and Jakob 2020; Mahdavi, Alvarez, and Ross 2022; Mealy and Teytelboym 2022).

To model these relationships statistically, I fit various models that accord with the data structure of each dependent variable and model the key relationships in plausible ways. As De Boef and Keele once insightfully noted, '[t]heories about politics typically tell us only generally how inputs relate to processes we care about' (De Boef and Keele 2008, 186). With this intuition and the limitations of country-level observational data in mind, I use pooled OLS, first-

[23] The reason I do not include outcome measures of GIP instruments is that this narrower relationship has already been extensively studied in previous studies at the national and sub-national levels (Aklin and Urpelainen 2013b; 2018; Trachtman 2023; Gullberg 2013; Lyon and Yin 2010; Jenner et al. 2012; Cheon and Urpelainen 2013).

[24] Specific models include other control variables as described in the original article.

differenced dependent variables, lagged dependent variables, and two-way fixed effects models for the analyses of continuous outcome variables. In the case of carbon pricing enactments, a binary measure, I use the binary time-series cross-sectional (BTSCS) approach that is standard in the closely related literature (D. B. Carter and Signorino 2010; Schaffer and Bernauer 2014; Bayer and Urpelainen 2016).

Since the theorised relationship should arguably function across almost all countries,[25] data availability largely dictates the sample of each individual analysis. Some analyses are global in scale with up to 147 countries from 1990 to 2019, while others cover between 30 and 80 more developed countries (for details, see the original article).

4.3 Findings

Across all of these different model specifications, measures of RE industry strength, and indicators of FFP, I am consistently unable to identify a statistically significant catalysing effect once controlling for underlying confounding. This is true for carbon price enactments (as shown in Table 4.1), carbon pricing stringency, shadow carbon prices, fossil fuel subsidies per capita, fossil fuel subsidies to GDP, and net implicit gasoline taxes. Given the inherent uncertainties of statistical analyses of this type, it is, on the one hand, important to underscore that these results cannot fully rule out the existence of an effect but, on the other hand, reassuring that the null results are consistent across so many specifications that vary on all relevant parameters.

In addition to this main finding, the results include an additional insight that speaks directly to the methodological problem in extant work that relies on illustrative case studies and descriptive statistics about policy timing. Specifically, in models that do not control for economic development, bureaucratic quality, and fossil fuel dependency, countries with large RE industries appear much (and statistically significantly) more likely to enact a carbon price, as shown in Table 4.1). Without these controls, the coefficient estimate from the main BTSCS specification is 0.904 ($p < 0.001$). Once these controls are added, the coefficient estimate is reduced by more than two thirds to 0.202 ($p > 0.1$). This indicates that qualitative and quantitative investigations can easily misinterpret bivariate associations in the causal chain from GIP via RE industry growth to FFP as causal if they do not carefully consider the underlying forces that make all these phenomena more likely to occur independently of each other.

[25] Except very poor and very small countries, which I exclude from all analyses.

Table 4.1 RE industry strength and national carbon pricing policies

Dependent variable:	**Carbon pricing policy enactment (y = 1)**					
Sample:	**All countries**				**OECD and G20**	
	(1)	(2)	(3)	(4)	(5)	(6)
RE patents (log)	0.904***	0.557***	0.289	0.202	0.343*	-0.247
	(0.131)	(0.156)	(0.187)	(0.214)	(0.171)	(0.268)
GDP per capita (log)		0.749***	0.551**	0.796**		0.679
		(0.188)	(0.203)	(0.307)		(0.647)
Bureaucratic quality			0.508*	0.433+		0.736**
			(0.201)	(0.223)		(0.283)
Fossil fuel rents to GDP				-0.039		-0.061
				(0.030)		(0.054)
Countries	147	144	143	141	43	43
Observations	4,279	3,926	3,882	3,811	1041	994

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Note: BTSCS logistic regression models. Coefficients show the expected change in log odds of policy enactment (y = 1) from a one-unit increase in the explanatory variable. Standard errors clustered by country shown in parenthesis. Model also includes cubic time polynomials, intercept, and 'Other carbon pricing policy' the coefficients for which are not shown. 'Other carbon pricing policy' is a binary indicator of whether a sub- or supra-national carbon pricing policy is in place in each country-year. All explanatory variables except 'Other carbon pricing policy' are lagged by one year. All years from 1990 to 2019 included. See original article or Carter and Signorino (2010) for details on the BTSCS logistic regression modelling technique. Table reproduced with modifications from the original article.

4.4 An Illustrative Example

To illustrate this conclusion, we can consider the Scandinavian countries of Denmark, Norway, and Sweden.[26] These countries are often used in comparative case studies due to their many similarities. As summarised in Table 4.2, they are relatively similar in terms of economic development and bureaucratic quality, with Norway being the only one dependent on fossil fuel rents to a considerable extent. Where they differ is in terms of the strength of their domestic RE industries. Denmark has a unique leadership position in green industries that is the result of decades of GIP. Norway and Sweden do have some

[26] This illustrative example is not part of the original article.

RE industries, but these are younger and much less economically significant measured in exports or patents. This illustrative comparison therefore resembles the canonical most-similar systems design in which only the explanatory variable of interest varies across cases.

Table 4.2 Determinants of climate policy in Scandinavian countries

	Country		
Variable	**Denmark**	**Norway**	**Sweden**
Fossil fuel phaseout policy (0–10 scale)	5.76	5.86	6.02
GDP per capita (thousand USD)	67.9	87.9	56.3
Bureaucratic quality (0–4 scale)	3.85	3.50	3.74
Fossil fuel rents (% of GDP)	0.33	10.0	0.03
RE patent stock per capita (log)	6.14	4.36	3.97
RE export share (% of exports)	4.12	0.57	1.41

Note: The sources for this table are the following: RE export share and RE patent stock per capita are 2019 values from the measures developed in the original article (Møller 2024). Fossil fuel rents is 2021 data summing coal, oil, and natural gas rents from the World Bank (World Bank 2022d; 2022c; 2022a). GDP per capita is 2023 values of current GDP in USD from the World Bank (World Bank 2022b). Bureaucratic quality is 2023 values of the 'Rigorous and impartial public administration' indicator (on the original scale) from the Varieties of Democracy project (Coppedge et al. 2021). Fossil fuel phaseout policy is based on the Climate Action and Policies Measurement Framework (CAMPF) developed and released by the OECD after I conducted the analysis for the original article (Nachtigall et al. 2022). To calculate it, I take the mean value for 2022 of the policy stringency of the following policy instruments (all 0–10 scales): Fossil fuel subsidies – Buildings; Speed limits on motorways; Ban and phase out of fossil fuel heating systems; ETS – Transport; Fossil fuel subsidies – Industry; Congestion charges; Ban and phase out of passenger cars with ICE; Carbon tax – Buildings; Ban and phase out on the construction of coal-fired power plants; ETS – Buildings; Carbon tax – Electricity; Mandatory energy labels for appliances; Fossil fuel subsidies – Electricity; ETS – Electricity; Fossil fuel excise tax – Transport; Fossil fuel subsidies – Transport; ETS – Industry; Labels for vehicles; Carbon tax – Transport; Carbon tax – Industry; MEPS Transport; MEPS of appliances; Building energy codes; Energy efficiency mandates; Fossil fuel subsidies producer support; Ban and phase out of fossil fuel extraction; MEPS for electric motors. This is the subset of all the indicators contained in the CAMPF database that I deemed to correspond to FFP, and which are available for all three countries in 2022.

If one just studied the Danish case over time (or another frontrunner like Germany, the EU, or California), it would be easy to reach the conclusion that the gradual rise of RE industries has causally impacted increasing climate policy stringency over time (Nygård 2014; Leipprand, Flachsland, and Pahle 2020).

Indeed, Danish FFP has become more and more ambitious over time in tandem with the increasing economic importance of the domestic wind industry and other low-carbon industries. Moreover, Danish RE interest groups do express their active support for ambitious FFPs (e.g. Plechinger 2019), and Danish citizens are highly supportive of such policies (e.g. Øyen 2023). This all fits the climate policy sequencing story.

However, this is challenged by the systematic comparative logic that underlies the statistical analyses summarised above and which this illustrative Scandinavian example makes explicit. Despite starkly different levels of domestic RE industry strength, these three countries have managed to achieve broadly similar levels of climate policy action in terms of fossil fuel phaseouts, including high carbon prices and strong regulatory efforts. In all three countries, climate policy efforts to disincentivise fossil fuels rank among the most ambitious globally, although they do remain ecologically insufficient (K. Anderson, Broderick, and Stoddard 2020; Tilsted et al. 2021). Norway and Sweden have not lagged behind, nor has Denmark been able to leverage its strong green industries politically to jump ahead and overcome the political barriers to even more ambitious climate policy.

This example is by no means a thorough comparative analysis, but it illustrates the main conclusions of this first article: other background characteristics are driving country-level differences in FFP while the influence of domestic RE industry strength – though it may *appear* significant – has hitherto been limited at best. The implication is not that the rise of RE and other low-carbon industries should be ignored. Rather, my findings in this study show that there is a need to take a step back. We need to reassess the scope conditions of this effect and directly scrutinise the micro level causal mechanisms assumed to link low-carbon industries to more ambitious national FFP. The rest of the dissertation is dedicated to this, beginning with evidence from corporate climate lobbying in the EU.

5 Corporate lobbying in the European Union

This chapter summarises the core argument, research design, and findings of Paper 2(EU Lobbying) entitled 'Climate Policy Strategies and Corporate Mobilisation in the European Union'. It follows chronologically and logically from the macro level investigation summarised in the previous chapter. In this second self-contained article, I provide the most comprehensive empirical evidence to date that low-carbon corporate actors prioritise lobbying on GIPs over FFPs and are therefore vastly outnumbered by high-carbon sectors when seeking to influence the latter.

This article draws on theoretical and methodological insights from the large literatures on interest groups (Klüver, Braun, and Beyers 2015), stakeholder consultations (Bunea 2020), and the European Commission (EC) 'consultation regime' (Binderkrantz, Blom-Hansen, and Senninger 2021) to make two main contributions. The first is descriptive. We currently have very limited knowledge of the patterns of corporate climate lobbying in the EU and beyond, including which corporate interests lobby which climate policies (but see Culhane, Hall, and Roberts 2021). My extensive data collection, coding, and analysis reveal new and important information about the European climate lobby landscape. The second contribution is more theoretical and inferential in scope. I develop and test a new argument about the ability of regulatory targeting to shape sectoral patterns of lobbying among directly targeted versus indirectly affected corporate actors by shifting informational advantages as well as the uncertainty and temporal distance of regulatory impacts. Together, these contributions provide a theoretical explanation for why different climate policy strategies mobilise different corporate actors and the most comprehensive empirical evidence of this.

Within this dissertation, the purpose of this article is to investigate one of the central unanswered micro level questions that follows from my general theoretical framework: to what extent do RE and other low-carbon firms actually try to influence broader climate policy developments? This is a – if not *the* – key link between the structural rise of RE industries and climate policy. Low-carbon businesses and the business associations that represent them politically have the strongest and clearest interest in ambitious climate policy and the organisational and financial resources to seek political influence. The corporate causal channel thus plays a key role in determining how to interpret the macro level null results from Paper 1(Decarbonization Policy) and more generally

in our understanding of the prospect that green industries can catalyse national climate policy.

5.1 The Argument

In this article, I conceptualise the distinction between GIP and FFP as partially substitutable *climate policy strategies* from the perspective of policy-makers interested in mitigating climate change (Genovese, Kern, and Martin 2017). The key conceptual difference between these two strategies from the point of view of understanding interest group behaviour is *who a policy targets*. In line with my overall theorising, FFPs directly target incumbent high-emission technologies and behaviours whereas GIPs directly target their emerging low-carbon alternatives (see section 2.3.2). I argue that in the climate politics context of concentrated winners and losers, these policy strategies cannot change the fundamental constellation of interests. Policies that benefit one camp will also have negative consequences for the other. For instance, more heavily subsidised fossil fuels ultimately mean less RE, and faster RE permitting ultimately means more rapid phaseouts of coal and fossil gas. This is the unavoidable distributional nature of the energy transition. However, these climate policy strategies can affect corporate lobbying through more subtle mechanisms.

Starting from the premise that all interest groups are ultimately resource constrained and must engage in 'issue prioritization' (Fraussen, Halpin and Nownes 2021), I theorise that climate policy strategies can affect corporate climate policy mobilisation by shifting regulatory targeting, which makes stakeholders from the directly targeted sector(s) more likely to mobilise compared to those indirectly affected. This effect occurs through two mechanisms.

The first way regulatory targeting does this is by shifting informational advantages towards the directly targeted sectors and away from the indirectly affected. This influences how effectively actors from each sector can lobby. Information is a central aspect of lobbying because regulators need expert (often proprietary) knowledge about the inner workings of highly complex sectors, firms, factories, and products to assess regulatory impacts and feasibility (Chalmers 2013). High-information inputs are more likely to be considered by policy-makers and influence policy outcomes. Interest group scholars have often conceptualised interest groups' informational capacity as a general characteristic that is inherent to their level of resources and their organisational structure (e.g. Klüver 2012). I argue that corporate interests' informational capacities are policy dependent and highly sector specific. Firms and business associations possess or can easily acquire this kind of technical information about their own sector of operations but not about other sectors in which they

do not operate.[27] A proposed policy that directly targets (indirectly affects) a given stakeholder decreases (increases) the cost of producing valuable informational inputs. Corporate actors' own awareness of this shifting advantage in turn increases their propensity to mobilise when they are directly targeted.

The second mechanism through which regulatory targeting shapes the relative mobilisation of indirectly affected versus directly targeted sectors concerns perceptions of regulatory impacts. A sector may be strongly impacted (negatively or positively) by policies that affect it indirectly. But these indirect impacts materialise through a longer and more complex causal chain. This causal chain begins with the direct impacts on those competing sectors that *are* targeted directly which then spill over and produce indirect impacts in other sectors. This spillover is mediated by complex factors such as cross-price elasticity of demand and substitutability. This all implies that the expected regulatory impacts of proposed policies are both more temporally distant and more uncertain for the indirectly affected compared to the directly targeted. Borrowing Stokes' (2020) terminology, the 'fog of enactment' is denser for the indirectly affected, which makes them less likely to mobilise.

Stated differently, my overall argument is that when an interest group decides which climate policies to lobby, it will be more likely to mobilise on policies that target its sector more directly because it will possess policy-specific informational advantages that increase the expected effectiveness of its lobbying. Moreover, the interest group's perceived interest in doing so will be higher as a result of more certain and immediate regulatory impacts. In the original article, I summarise these theoretical arguments in two hypotheses:

> Targeted mobilisation hypothesis: *Corporate stakeholders that are directly targeted by a policy proposal are more likely to mobilise and lobby compared to indirectly affected stakeholders*.
>
> Policy strategies hypothesis: *Compared to fossil fuel phaseout policy proposals, green industrial policy proposals are associated with a relatively higher mobilisation of low-carbon stakeholders compared to high-carbon stakeholders*.

Although this dissertation is primarily concerned with the actions and influence of low-carbon corporate actors, Paper $2_{(\text{EU Lobbying})}$ expands the focus to include high-carbon corporate actors for two reasons. First, expectations

[27] For instance, a solar panel manufacturer may be dependent on a high carbon price for its future profitability and survival, but it does not have experience with or possess any special knowledge of the intricate workings of the EU Emissions Trading System (EU ETS) because it benefits *indirectly* from this policy.

about the lobbying behaviour of high-carbon sectors follow logically from my theoretical arguments, and their inclusion therefore improves my ability to test these theoretical propositions. Second, counter-mobilisation from high-carbon interests plausibly conditions the ability of low-carbon interests to influence climate policy and are therefore important to understand (Böhler, Hanegraaff, and Schulze 2022; Trachtman and Meckling 2022).

5.2 Research Design

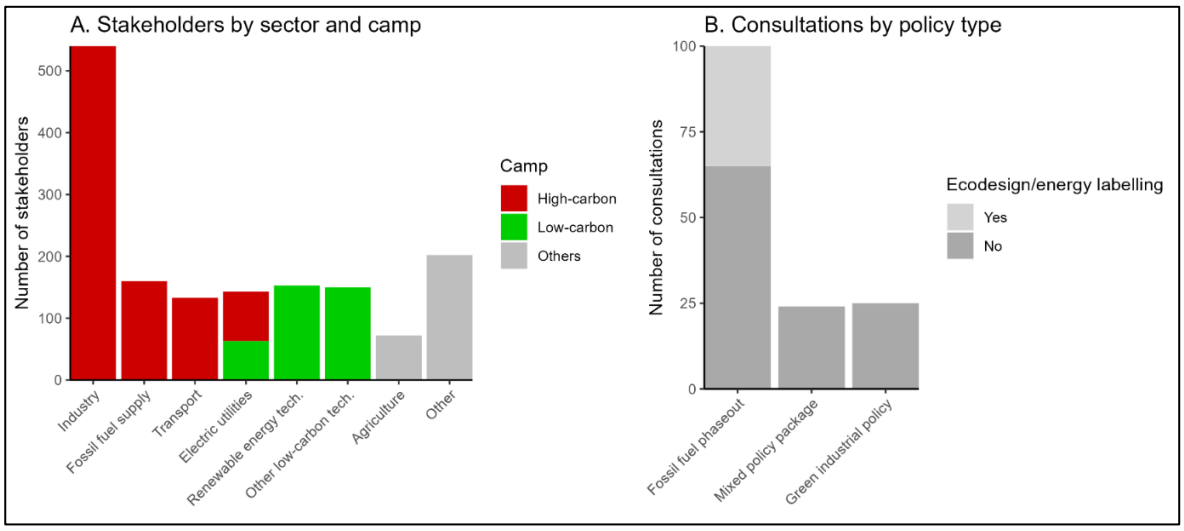
I investigate these propositions in the context of the EU – more specifically, the EC 'consultation regime' in which stakeholders are systematically consulted on regulatory proposals across multiple consultation formats (Binderkrantz et al. 2021). I focus on the EU because of its substantive real-world importance as well as three pragmatic considerations: (i) it uses a broad climate policy mix including FFP and GIP; (ii) the diverse sectoral compositions of EU countries ensure sufficient (potential) representation of all relevant sectors, including mature and consolidated RE industries; and (iii) its engagement with stakeholders is structured and transparent. These are the three key prerequisites for systematically investigating both the specific theoretical argument presented in Paper $2_{\text{(EU Lobbying)}}$ and the corporate causal channel in my overarching theoretical framework.

More precisely, I investigate corporate climate lobbying from 2017 to 2022 in two formal venues of stakeholder consultation, namely open online consultations (OOCs) and expert groups (EGs). In the former venue, all interested stakeholders can submit written consultation responses that are subsequently published online. Hence, it is a low-cost and public form of lobbying that is not constrained by gatekeeping. In the interest group terminology of *mobilisation*, *access*, and *influence*, responses to OOCs represent the first stage of mobilisation. Memberships of EGs represent interest group access and are much more influential but also very limited in scope. By focusing on both of these venues, and by showing that OOC responses correlate positively with the number of meetings these stakeholders have with relevant EC officials, I go some way towards addressing concerns that OOCs are symbolic and of limited importance (see Binderkrantz et al. 2021) or are used as a last resort by those who failed to wield early influence in private venues. Still, it is important to acknowledge that I measure lobbying in terms of the sheer number of OOC responses and EG memberships but not as policy positions or influence.

To gather information on the sectoral affiliation of all stakeholders (firms and business associations) and the policy type of all consultations, I undertake a large data collection, cleaning, and coding of all OOC responses and EG memberships related to the EC topic categories 'Climate Action' and 'Energy'.

This results in a main data set of 5,421 consultation responses from 1,551 unique stakeholders to 142 OOCs and an additional data set of 204 memberships of 12 EGs among 147 unique stakeholders. All consultations and expert groups are coded as GIPs, FFPs, or mixed policy packages (MPPs) based on the underlying policies they deal with. The precise regulatory target of each consultation is also inductively coded. All stakeholders are coded into 79 subsectors and eight sectors that are used to construct three camps: a low-carbon camp, a high-carbon camp, and a residual other category. The distribution of stakeholders and policies across coding categories is shown in Figure 5.1. Additional stakeholder-, consultation-, and policy-level controls are obtained from the EU Transparency Register and consultation websites or are coded manually.

Figure 5.1 Distribution of stakeholder camps and policy types



Note: Panel A shows the distribution of stakeholder across manually coded sectors and camps. Panel B shows the distribution of manually coded policy types among all OOCs. 'Ecodesign/energy labelling' policies set energy efficiency rules for specific appliances. Figure reproduced from the original article.

In the first instance, this allows me to descriptively map the intersection of policy types and sectoral lobbying in both OOCs and EGs. Additionally, it enables me to perform statistical analyses that model the propensity of each stakeholder to mobilise on each OOC (or gain access to each EG) as a function of either the interaction of its sectoral affiliation and the policy type, or whether each stakeholder is directly targeted or indirectly affected by a specific proposal.[28] To do this, the OOC data is set up as 220,242 stakeholder-

[28] This binary indicator of being directly targeted or indirectly affected is constructed by matching policy targets that are inductively coded for each policy proposal to the

consultation dyad observations and is analysed using logistic regression models.

Finally, to probe the veracity of my argument that informational lobbying capacities are policy specific and that regulatory targeting shifts informational advantages towards the directly targeted, I use various quantitative text analysis techniques to estimate the technical information provision of each of the 5,421 consultation responses. I then model these measures of information provision as a function of the binary dyad-level indicator of being directly targeted or indirectly affected along with key control variables using OLS models with consultation fixed effects (and with or without stakeholder fixed effects).

5.3 Findings

My core findings strongly support the *policy strategies hypothesis*, which proposed that GIP is associated with a relatively higher mobilisation of low-carbon stakeholders compared to high-carbon stakeholders and vice versa for FFP. Both descriptively and when controlling for potential confounding factors and accounting for statistical uncertainty, low-carbon interests are more likely to mobilise on GIP compared to FFP in absolute terms and relative to the high-carbon camp (for which the opposite pattern is observed). Figure 5.2 shows this in the form of the total count of consultation responses (in panel A) and as statistically estimated predicted probabilities of mobilising (in panel B) split by camp and policy type. Stakeholders from the low-carbon camp are about three times more likely to mobilise on GIP proposals compared to FFP proposals and more than twice as likely compared to high-carbon stakeholders.

It is relevant to note, as can be gauged from Figure 5.2, that the larger size of the high-carbon camp means that equal mobilisation propensities at the level of individual stakeholders do not translate into an equal overall balance in interest representation. Descriptively, the high-carbon camp still dominates GIP mobilisation when measured in total number of consultation responses; their dominance of FFPs and MPPs is just even greater.

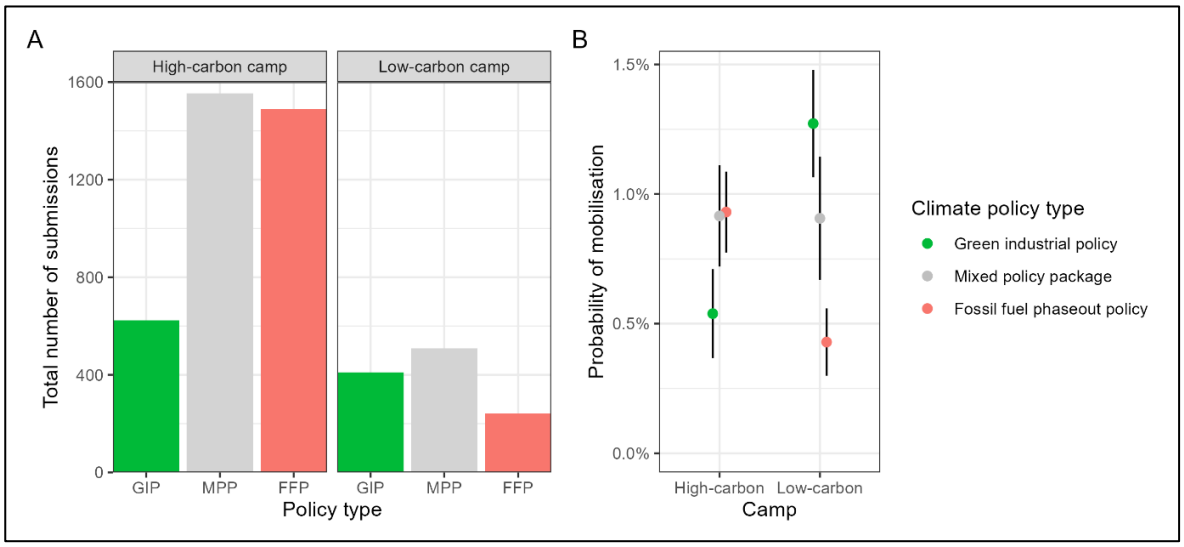
The role of MPPs is also interesting, even though these policies constitute a residual category in relation to my overarching theoretical framework. This category includes both policies that set overarching frameworks and targets for climate and energy policy as well as policies that combine elements of GIP and FFP in a single proposal. These proposals clearly matter to corporate stakeholders since they devote a large share of their total lobbying efforts to

---

sector and subsector categories into which all stakeholders are coded. Consult the supporting information to the original article for details.

these policies (see panel A in Figure 5.2) despite their limited number (see panel B in Figure 5.1). Moreover, they mobilise low-carbon and high-carbon camps equally (see panel B in Figure 5.2). This is in line with my theoretical argument and expectations since these MPPs target both camps equally directly. This finding suggests that the corporate interest group struggle over the pace and course of decarbonisation chiefly plays out at the level of overarching frameworks and key policy packages that combine elements of GIP and FFP. In contrast, the more technical and sector-specific policies (that may be equally important but where technical knowledge plays a larger role and is less widely distributed) are dominated by direct regulatory targets in terms of stakeholder-level mobilisation probabilities.

Figure 5.2 Corporate mobilisation across camps and policy types

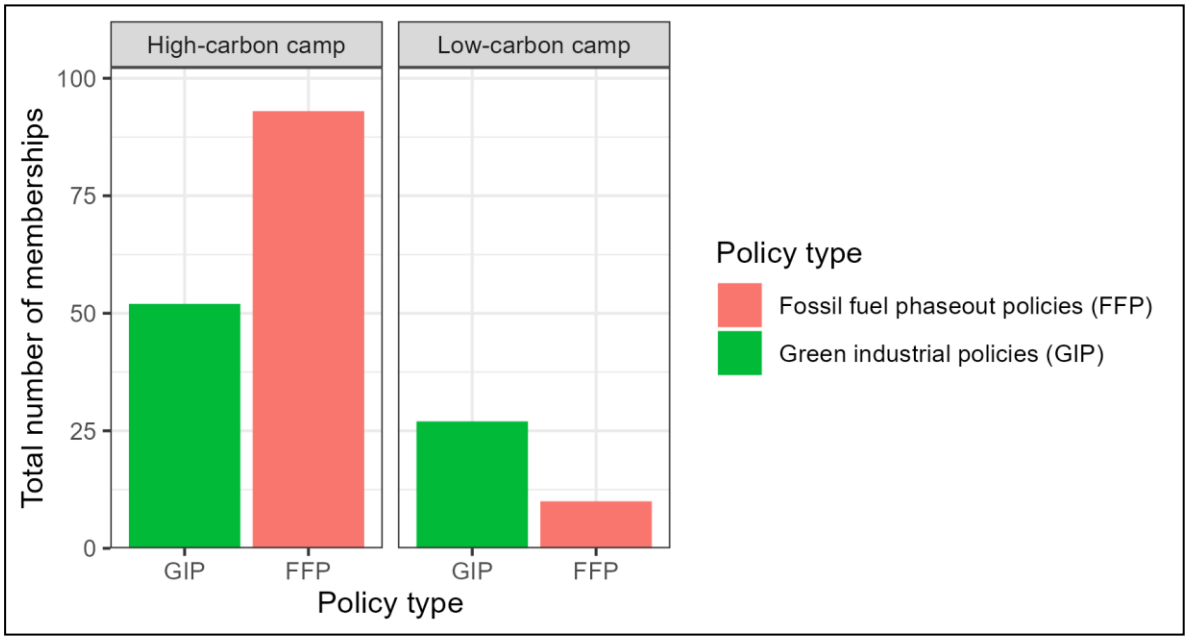


Note: Panel A shows the total number of submissions to climate and energy policy-related OOCs split by the policy type of each consultation and the camp of participating stakeholders. Panel B shows the average adjusted predicted probability of mobilising (i.e., submitting a consultation response) for each camp across the three policy types. Calculated based on a logistic regression model specification (n = 220,242) with controls for the consultation stage (early or late), the stakeholder type (firm or business association), each stakeholder's previous number of consultation responses, total number of corporate responses to each consultation (log-transformed), the geographic reach of each stakeholder (European or global versus sub-European), and the type of regulatory instrument of each policy proposal (regulatory, economic, informational-procedural, or mixed/strategy). The vertical lines represent 95 percent confidence intervals calculated based on standard errors clustered by stakeholder and consultation. The original article contains further information on the control variables, model specification, and details regarding the calculation of predicted probabilities. Figure reproduced from separate figures in the original article.

This theorised dynamic centred on regulatory targeting is further supported by my finding that the binary dyad-level indicator of being directly targeted (versus indirectly affected) strongly predicts mobilisation. As I show in the

original article, corporate stakeholders are about four times more likely to mobilise when directly targeted. This lends strong support to the *targeted mobilisation hypothesis*. This holds even when I limit the sample to only the core sectors with the highest stakes in climate politics. However, in line with my argument that indirect effects can be substantial given the zero-sum nature of the energy transition, these predicted probabilities imply that lobbying by indirectly affected stakeholders makes up a large share of total lobbying (because only a small share of stakeholders are directly targeted by each policy proposal). In the original article, I also show that stakeholders produce responses with greater informational content measured according to the number of words, the number of multidigit numbers, the mean rarity of words used, and the number of terms that match entries in an issue-specific dictionary. This lends support to my argument about context-specific informational advantages that are the result of regulatory targeting.

Figure 5.3 Expert group access across camps and policy types



Note: This figure shows the total number of climate and energy policy-related expert group memberships split by the policy type of each expert group and the camp of member stakeholders. Figure reproduced from the original article.

Finally, my main results are mirrored in the supplementary analysis of EG memberships. In that analysis, I place more emphasis on descriptive patterns and qualitative assessments than inferential statistical techniques due to the limited number of EG memberships. Figure 5.3 shows the total number of memberships across camps and group types. This corroborates the findings from the main OOC analysis and shows that the high-carbon camp dominates in general but especially in EGs that deal with issues related to FFP. The low-

carbon camp is almost entirely absent from these groups. Moreover, my qualitative investigation of the 204 EG memberships indicates that the few low-carbon camp memberships of FFP-related groups that could appear to be potential levers of pro-climate lobbying actually represent instances where stakeholders from certain low-carbon sub-sectors are vulnerable to specific aspects of FFP.[29] In contrast, the many high-carbon camp memberships in GIP-related groups typically represent instances where the EC grants policy-vulnerable incumbents access. The substantive dominance of the high-carbon camp in climate and energy EGs is therefore even greater than indicated by the quantitative analysis.

In summary, this article enriches this dissertation and provides part of the answer to my overarching research question by showing the following three things. First, different types of climate policy lead to systematically different mobilisation patterns among corporate interests due to regulatory targeting and shifting informational advantages. Second, low-carbon interests are highly mobilised by and gain access to GIP debates that affect them more directly, but they remain largely disengaged and excluded from FFP debates (while the opposite is true for high-carbon interests, albeit to a lesser extent). Third, due to differences in the absolute size of the high-carbon and low-carbon camps, these individual-level mobilisation propensities translate into different degrees of high-carbon dominance, ranging from a slight upper hand in lobbying on GIPs to a large dominance for MPPs and an overwhelming one for FFPs.

All this supports my theoretical arguments about (i) low-carbon interests being faced with higher levels of counter-mobilisation from fossil fuel interests when trying to influence FFP compared to GIP, (ii) low-carbon interests having limited access to the institutional fora in which FFP is formulated, and (iii) lower levels of low-carbon corporate lobbying on FFPs compared to GIPs. This article thereby provides a key piece of the puzzle of why the rise of RE industries has yet to systematically catalyse governments' direct political efforts to disincentivise and phase out fossil fuels.

The other central piece of the puzzle concerns the citizen causal channel. It is the focus of two final empirical studies that I summarise next.

[29] One example is heat pump manufacturers that are threatened by stringent F-gas regulations.

6 Local wind industries and voting behaviour in Denmark

This chapter provides a summary of Paper 3(Green Jobs) entitled 'Green Jobs in the Backyard: Do Local Renewable Energy Industries Increase Support for the Energy Transition?'. In summarising this self-contained article, I focus on the core argument, the most important aspects of the research design, and the findings that inform the dissertation as a whole.

This article draws theoretical and methodological inspiration from the large literature on local context or 'geotropic' effects (Reeves and Gimpel 2012; Newman et al. 2015) to develop and test a detailed theoretical argument regarding the ability of locally present low-carbon industries to shape people's climate policy preferences and drive pro-climate voting behaviour. Theoretically, I argue that such an effect is plausible but depends on the activation of the three sequential causal steps of *information*, *interpretation*, and *importance*. Empirically, I test this argument using the most-likely case of the Danish wind turbine manufacturing industry. In showing empirically that the local presence of this archetypical 'green' industry has not been associated with more pro-climate voting even in this most-likely case, I make an important empirical contribution to the literature on strategic climate policy sequencing and positive reinforcement, which has hitherto lacked direct evidence of the link between low-carbon industries and popular support for ambitious climate policy.[30] Furthermore, by theorising the demanding causal steps necessary for such effects to occur and by providing empirical indications of the breakdown of that causal chain in this specific case (using data on media coverage, online search activity, and individual policy preferences), I further contribute to our understanding of the contextual conditions and political strategies that may undermine or activate such effects.

This article contributes to the wider dissertation by theorising and investigating the citizen mechanism. It thereby expands our understanding of the micro level dynamics that can explain the results from Paper 1(Decarbonization Policy). Alongside corporate interests, citizens play an important role in my theoretical framework as translators of the structural force of RE industry strength

[30] The only attempt to investigate this relationship that I am aware of operationalises wind industry presence in terms of the number of installed turbines in an area (Urpelainen and Zhang 2022). Despite the many strengths of that article, it is an indirect test at best. Moreover, I show in Paper 3(Green Jobs) that the concentration of installed wind turbines is, at least in the Danish case, uncorrelated with the location of significant wind industry production sites.

into concrete pressures on national politics. However, because citizens generally have more diffuse material interest in climate policy and RE and devote less of their attention to these topics, the operation of this causal channel is also arguably more tenuous. It is therefore crucial to establish whether it operates as theorised, and if not, why not. No single research design can capture all the numerous aspects of how citizens' views might be affected by the rise of RE industries *and* the many ways they can channel these preferences into national politics (as described in section 2.2.2). By studying this dynamic at the local (as opposed to individual or national) level and focusing mainly on voting behaviour, I strike a balance between two important research aims. First, the *local* effects of industry presence can affect a sufficient number of citizens to be politically consequential. Second, voting data at this very local level is well-suited to actually detecting a systematic effect if it exists. Along with Paper 4(Low-carbon Investments), this article therefore tests a core part of the overall theoretical framework in a highly relevant, albeit non-exhaustive, way.

6.1 The Argument

The core theoretical argument of this article consists of two parts. First, I argue that the presence of RE industries in a given area can increase local residents' climate policy support and pro-climate voting because it creates a local structural dependency on this industry and because it acts as a tangible cue of the benefits of ambitious climate policy action. Second, this effect will only materialise to the extent that citizens receive enough *information* about the local presence of this industry, *interpret* its presence as linked to climate policy, and ascribe sufficient *importance* to this for it to drive their policy preferences and vote choice.[31]

The starting assumptions for this argument are the following. Citizens form their climate policy preferences based (at least in part) on their understanding of how climate policies will affect them economically (Beiser-McGrath and Bernauer 2024). They vote with a view to forward-looking considerations of what party will best represent their interests. But they are information constrained and use salient cues to make up their minds about these issues. This means that the local presence of a 'green' industry can become an important element in shaping people's climate policy preferences. In a structural sense, these industries create direct and indirect jobs and other positive spillovers in the local area, including housing price increases and store openings. This makes it valuable and salient for local residents to support the

[31] This three-step causal chain is inspired by Niels Nyholt's work on the political effects of local school and hospital closures (Nyholt 2024).

continued expansion and success of these highly policy-dependent low-carbon industries. In addition, the presence of RE industries provides local residents with a strong and tangible cue that the otherwise highly abstract narrative of 'green growth' is credible. It illustrates to locals that ambitious climate policy does not only have negative impacts but can also benefit them and their community economically.

But as the literature on local context effects informs us, it cannot be taken for granted that each element of people's local context shapes their views and political behaviour (Newman et al. 2015). The first step in this causal chain is information. Citizens need to be continuously and saliently aware of the presence of local RE industries and their economic benefits. I argue that it is theoretically plausible that such information reaches citizens through social networks (e.g. when people know someone who works for local RE firms), through local media, and even through personal observation (such as regularly driving by a local RE factory).

The second, and more demanding, causal step concerns interpretation. If citizens think of local RE industries like any other large local employer and do not perceive this industry to be highly dependent on ambitious climate policy, their climate policy preferences will remain unaffected. RE industries present a hard case for this causal step to operate. Compared to RE infrastructure like wind turbines, which are often approved or blocked by local governments in a single, concrete policy decision (Stokes 2016), the link from climate policy to RE industry success involves a much longer and more complex causal chain. This likely reduces citizens' perception of the role of government policy (Hamel 2024).

Finally, local RE industries and their climate policy dependency must be important enough to citizens that it affects their overall climate policy preferences and, ultimately, their vote choice. In shaping climate policy preferences, local RE industry presence comes up against other salient impacts like increased fuel and electricity prices and local job losses in high-emission industries (Brännlund et al. 2024; Gazmararian 2024b). And even if citizens do become more supportive of climate policy when they live close to a large RE industry site, voting for a more pro-climate party will typically entail a trade-off with their non-climate policy preferences because parties' climate policy positions are strongly correlated with the broader left–right dimension.[32]

Under the assumption that these three causal steps do operate, I derive the following main hypothesis:

[32] In the original article, I show this to be the case in terms of both expert assessments and Danish voters' own perceptions.

Pro-climate voting hypothesis: *the local presence of renewable energy industries has a positive effect on pro-climate voting*.

In addition, I formulate a more specific hypothesis concerning the part of the political spectrum where I consider these effects most likely to materialise. While political parties' climate policy positions and their general left–right orientation are generally highly correlated, right-wing populist parties do adopt uniquely clear anti-climate stances (Dickson and Hobolt 2024). If the causal mechanisms describe above operate, it should therefore be particularly plausible that:

Right-wing populist voting hypothesis: *the local presence of renewable energy industries has a negative effect on the vote share of anti-climate right-wing populist parties*.

6.2 Research Design

To test this theoretical argument empirically, I turn to the case of the Danish wind industry. It represents a unique, most-likely case because of its historically rooted structural importance, its clear association with climate policy in Danish politics and society, and its spatial concentration. This 'most-likely' nature makes it suitable for an initial investigation of a hitherto largely untested theoretical argument.

To measure the local presence of wind industry production sites, I undertake an extensive data collection and processing effort that iteratively combines systematic searches in the official Danish corporate registry with qualitative searches among industry reports; corporate websites; local, business, and industry news media; and other sources.[33] This ultimately produces a data set of 49 large wind industry production sites (with 100 or more employees) in existence in some or all years from 2007 to 2022.

For the main analysis, I combine this with data on vote counts in national parliamentary elections (*Folketingsvalg*) in 2007, 2011, 2015, 2019, and 2022 at the level of electoral precincts. There are almost 1,300 electoral precincts in Denmark, each representing one polling station and an average of approximately 3,300 eligible voters. I create two outcome measures: a pro-climate voting index (PCVI), which assigns a time-invariant pro-climate score to each party and calculates a weighted mean of these scores using vote shares for each

[33] This complicated data gathering is necessary because RE and other low-carbon industries are poorly incorporated into official statistical industry nomenclature. The original article describes my data gathering procedures in more detail.

precinct-year, and a simpler indicator of right-wing populist party vote share (RWPP%).

Using the exact geographical location of each polling station and each wind industry factory, I create a binary explanatory variable that defines the three closest polling stations as 'treated' by the presence of a significant local wind industry production site. I vary this operationalisation of local wind industry presence in several additional ways (described in detail in the original article) to ensure the robustness of my findings.

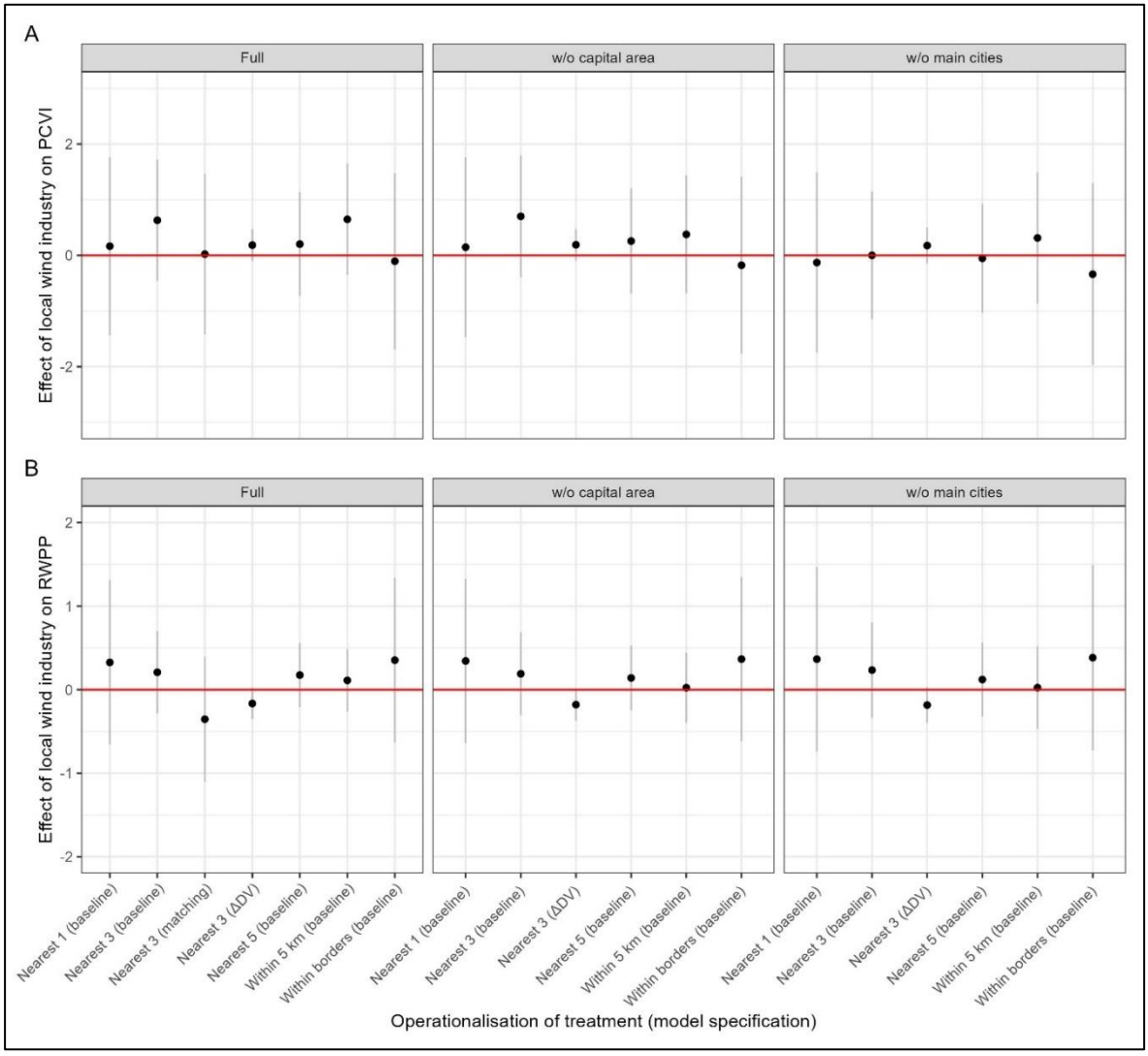
I then estimate the partial association between local wind industry presence and PCVI or RWPP% using OLS regression models with election and municipality fixed effects. This means that I compare treated to untreated precincts within each municipality while accounting for common election-specific developments.[34]

The location of wind industry production sites is non-random. I do two things to guard against the resulting issue of confounding. First, I control for various demographic factors and the local presence of wind turbines. Second, I conduct robustness tests using propensity score matching to derive a more comparable control group (Ho et al. 2007).

The three main drawbacks of this case and research design are, first, that Danish climate politics is not highly polarised, possibly reducing the perceived climate policy implication of one's vote choice; second, that Denmark is a relatively small country, making it possible that all Danish voters are 'treated' by the *national* structural importance of the wind industry; and third, that unbiased causal estimation is complicated by the gradual and non-random emergence of these wind industry locations, which precludes the use of precinct fixed effects. Still, the advantages of studying the single most structurally important RE industry in the world with rich local data outweigh these drawbacks. In addition, Paper 4(Low-carbon Investments) makes up for several of these limitations, as described in the next chapter.

[34] I also conduct robustness tests with constituency (*storkreds*) fixed effects instead of municipality fixed effects. Since Denmark is divided into 98 municipalities but only 10 constituencies, these models pool more electoral precincts. This increases the risk of unobserved confounding but reduces concerns with geographical spillovers within municipalities. Like the main specifications, these models do not provide any evidence of a positive effect.

Figure 6.1 The effect of wind industry presence on local voting behaviour in Denmark



Note: This figure shows estimated regression coefficients of local wind industry presence (black dots) with 95 percent confidence intervals clustered at the precinct level (grey bars) across 38 OLS model specifications with election and municipality fixed effects. Panels A and B show estimates for the PCVI and RWPP% outcome measures, respectively. The title of each facet indicates the geographical sample restriction (all of Denmark, excluding the capital area, or excluding the four largest urban municipalities). The x-axis contains information on the operationalisation of the explanatory variable (and the model specification in parentheses). 'Baseline' means that all precincts (except those excluded based on the geographical sample restriction) are included and the dependent variables are measured as levels. 'ΔDV' means that the outcome measure has been first-differenced and is measured as changes. 'Matching' means that propensity score matching has been used to identify a more demographically similar control group. All models include election and municipality fixed effects and the following control variables: median household income, car ownership rate, the share of people under 30, share of people above 60, non-Western immigrant share, female share, log number of wind turbines in operation, and a binary indicator of whether one or more turbines were constructed within the past election cycle. The original article

contains further information on control variables, sources, and model specifications, as well as full model results. Figure reproduced from the original article.

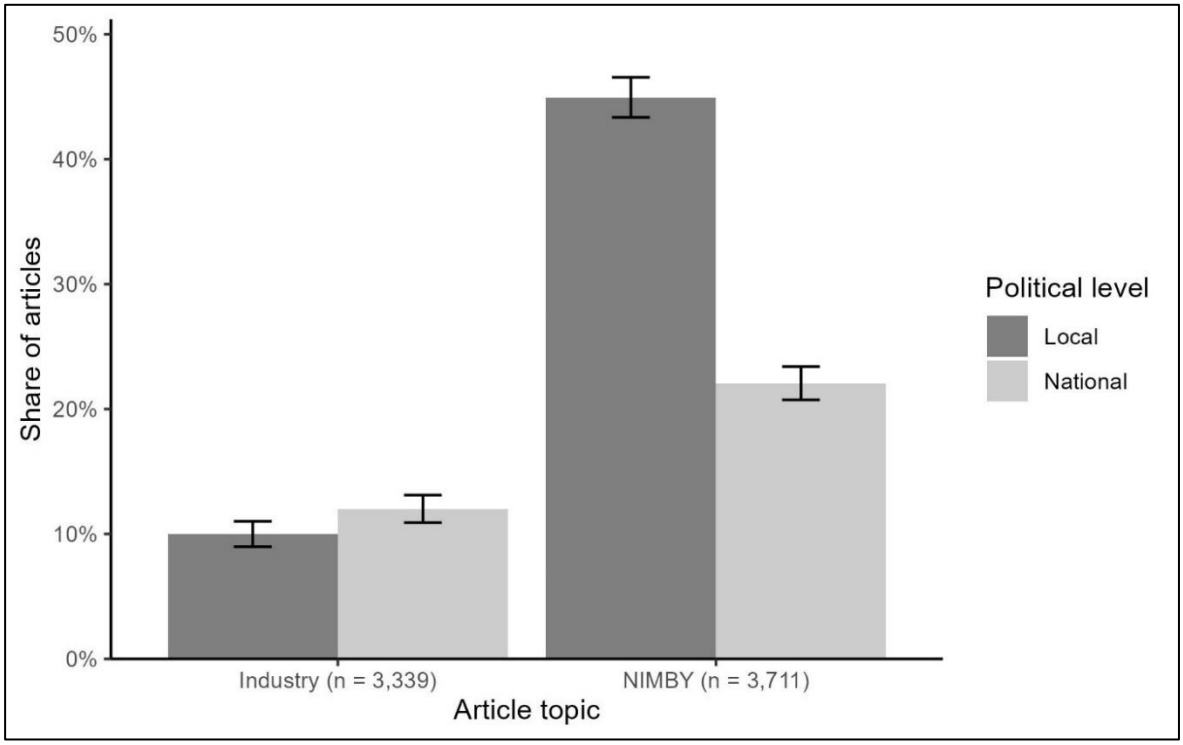
6.3 Findings

The main results provide no support for either the *pro-climate voting hypothesis* or the *right-wing populist voting hypothesis*. Instead, they show a consistent and relatively precisely estimated null effect. Figure 6.1 plots the key coefficient estimate across 38 different model specifications that vary in terms of the dependent variable (PCVI in panel A and RWPP% in panel B), the operationalisation of the explanatory variable (nearest 1, 3, or 5 polling stations, all polling stations within 5 km, or only precincts with a wind industry site within its borders), the sample (all precincts, excluding the capital area, or excluding the four largest cities), and the model specification (baseline, first-differenced dependent variable, or matching). There is no indication that the local presence of this prominent RE industry has increased (or reduced) popular support for pro-climate (or anti-climate) parties. Although these statistical estimates are associated with some uncertainty, they do allow me, with a high degree of confidence, to rule out meaningfully large effects comparable to, e.g., the incumbent penalties resulting from wind turbine construction (Stokes 2016; Otteni and Weisskircher 2021) or the anti-climate electoral effect of local fossil fuel dependencies (Egli, Schmid, and Schmidt 2022; Gazmararian 2024b).

I replicate this analysis at the municipal level and find identical results (see the appendix to the original article for details). I then conduct a series of additional empirical tests that probe each of the causal steps of information, interpretation, and importance. First, I find evidence that local newspapers publish more news stories about the wind industry in areas where it is locally present. Second, I show that citizens living in towns that are home to significant Vestas facilities show much greater interest in this particularly important wind industry firm as measured through Google search activity from 2007 to 2023.[35] These two tests suggest that the information causal step is indeed operating.

[35] Vestas is the largest and most significant Danish wind industry firm. My analysis of Google Trends data is limited to Vestas because it is the only firm for which there is sufficient online search activity.

Figure 6.2 Salience of national and local politics in Danish news coverage of the wind industry and of wind turbine construction



Note: This figure shows the percentage of news articles that mention political actors or institutions either at the local level (mayor, city council) or national level (parliament, government, ministers) among all articles identified as being about either the wind industry ('Industry') or wind turbine construction ('NIMBY') in local Danish newspapers from 2007 to 2023. The total number of articles in each group is shown in parentheses on the horizontal axis. Error bars are 95 percent confidence intervals. The original article contains details on data sources and operationalisations. Figure reproduced from the original article.

Next, I conduct a simple analysis of all Danish local newspapers from 2007 to 2023 and show that their coverage of the wind industry rarely highlights the connection to national political actors (measured as mentions of the Danish terms for parliament, government, minister, etc.).[36] As Figure 6.2 shows, only about one in ten articles make this connection. The comparison to coverage of wind turbine construction (i.e., NIMBY-ism)[37] in the same figure illuminates this further by showing that mentions of national and especially local political

[36] I obtain very similar results when including all Danish news media as opposed to only local outlets.

[37] NIMBY is an abbreviation of 'not-in-my-backyard' and refers to opposition to local projects or developments of a kind that citizens are otherwise supportive of in general. Wind turbines are a classic example (see e.g. Stokes 2016; Urpelainen and Zhang 2022).

actors are more frequent there. This suggests that the interpretation step of the causal chain is operating very weakly, at least in terms of media coverage.[38]

Lastly, because policy preferences can change (and might have a political impact) in the absence of a change in vote choice, and because the electoral outcome measures do not allow me to focus specifically on support for FFP, I conduct a final additional test by linking responses to nationally representative surveys from 2019 and 2022 (see Hansen and Stubager 2023) to a municipality-level measure of wind industry presence. Again, I find no evidence that citizens become more supportive of carbon taxation, ICE phaseouts, or ambitious climate policy more generally when they live in areas that experience the economic benefits of rising low-carbon industries.

Taken together, these results strongly suggest that voters do not contribute meaningfully to translating the (local) rise of RE industries into popular pressure for more climate policy action. My findings also indicate that a plausible explanation is the complex link between these industries and national politics, including climate policy, which is therefore not salient.

[38] Although a more direct test would investigate citizens' sense-making directly, the media is likely to play a particularly important role in this causal step because citizens cannot make these *interpretive* connections through their personal experiences and social networks in the same way as with *information* about local industry presence.

7 Low-carbon investments and voting behaviour in the United States

In this last of the four empirical chapters, I summarise the argument, research design, and findings of Paper 4(Low-carbon Investments) entitled 'Big Investments, No Electoral Reward: The Inflation Reduction Act, Low-carbon Investments, and the 2024 US Presidential Election'. This short article builds theoretically and methodologically on Paper 3(Green Jobs) and provides an important additional empirical test of the citizen causal channel in my overarching theoretical framework.

The IRA of 2022 is perhaps the most well-known and widely discussed single instance of GIP. Its immense economic size and the sudden and local economic benefits it generated in the form of private sector investments in low-carbon manufacturing makes it a unique opportunity to study the causal channel from GIP via the growth of low-carbon industries to public support for ambitious climate policy. The recent 2024 presidential election in the United States is the first obvious occasion to investigate the ability of the IRA to shift the mass public towards more pro-climate positions. By combining data on the local benefits derived from the IRA and county-level election results, I can provide a causal estimate of the effect of low-carbon investments on electoral support for the pro-climate political party. Even though this only allows me to capture the short-term effects of the IRA on an indirect indicator of climate policy support, it is nevertheless an important test that gets to the core of the Democratic Party's political strategy as well as scholarly work on strategic climate policy sequencing. By showing that the local low-carbon investments derived from the IRA have not led to meaningful increases in support for the Democratic Party at the county level, I make an novel contribution to current policy and scholarly debates about the political merits of GIP.

Within this dissertation, this short article plays an important role by expanding and improving the empirical investigation of the citizen causal mechanism. The main disadvantages of the Danish case studied in Paper 3(Green Jobs) are the difficulty of achieving unbiased causal estimation, the small size of the country, and the limited party polarisation on climate policy. The US case makes up for all these weaknesses, albeit at the cost of more nascent low-carbon industries. This greatly improves my ability to draw general conclusions about the role of citizens in translating the rise of low-carbon industries into political pressure for climate action.

7.1 The Argument

The IRA was enacted by the Democratic Party in August 2022 without any support from Republican policy-makers (Bang 2024). In relation to the IRA and the 2024 presidential election, Democrats represent the policy-responsible incumbent. Moreover, in the two-party US political system, the Democrats clearly represent the pro-climate party vis-à-vis the Republicans. Whereas the 2024 Democratic presidential candidate, Kamala Harris, claimed credit for and defended the IRA, her Republican counterpart, Donald Trump, explicitly opposed and promised to scrap it.

This means that theories of retrospective local economic voting (Reeves and Gimpel 2012; De Benedictis-Kessner and Warshaw 2020) would lead us to expect that the Democrats, as incumbents, are rewarded electorally for providing these local economic benefits (without regard for their low-carbon nature or their relation to climate policy). At the same time, theories of mass policy feedback and prospective voting (Campbell 2012; Hamel 2024) would lead to an identical prediction of increasing electoral support for the Democrats – as the pro-climate party – in areas benefitting from low-carbon investments. This is because forward-looking voters whose economic fortunes depend on low-carbon industries will vote for pro-climate parties that promise to protect or expand these benefits (Urpelainen and Zhang 2022). These theoretical perspectives converge and lead to the following hypothesis:

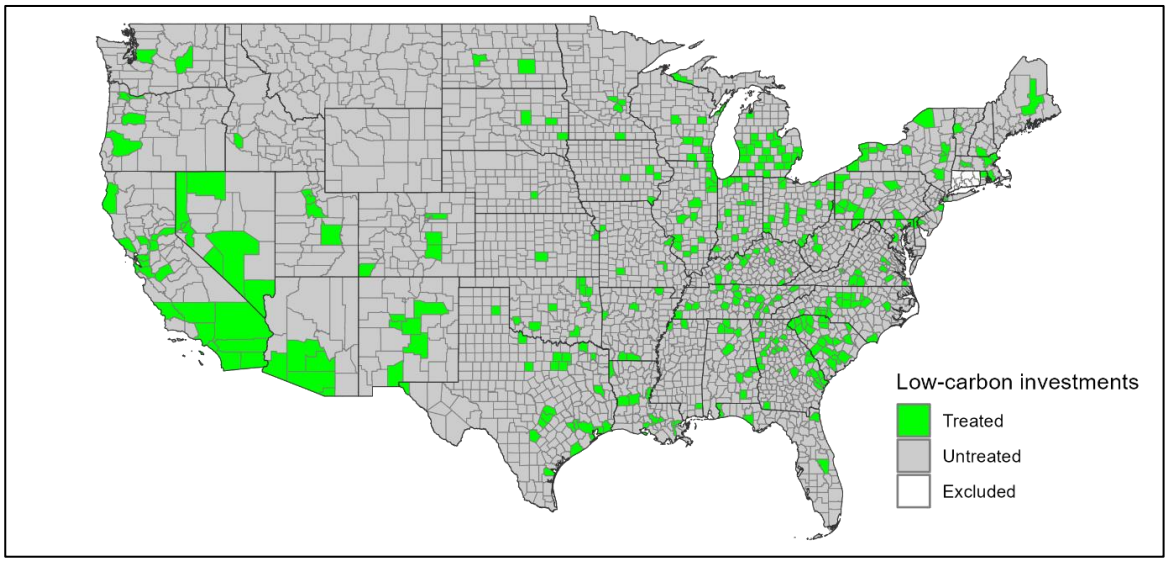
> Hypothesis 1: *Low-carbon investments have a positive effect on local electoral support for pro-climate incumbent parties*.

7.2 Research Design

To investigate this, I combine data on the county-level location of IRA-derived investments in low-carbon manufacturing made by private companies with county-level presidential election results from 2008, 2012, 2016, 2020, and 2024. I operationalise low-carbon investments as a binary indicator (one or more investments = 1, no investment = 0), as shown in Figure 7.1. Support for the pro-climate incumbent party is measured as the two-party vote share of the Democratic Party.[39]

[39] This is a standard operationalisation in the closely related literature (Gazmararian 2024b; Urpelainen and Zhang 2022). It divides the number of votes for the Democratic Party candidate with the sum of votes for the Democratic and Republican Party candidates.

Figure 7.1 Counties with and without low-carbon investments



Note: This map shows all counties on mainland United States. The counties are coloured green if one or more low-carbon investments have been announced within their borders between the passage of the IRA on August 16, 2022, and the 2024 presidential election according to Climate Power (2024), and grey if not. All counties in Connecticut are coloured white because they are excluded from the analysis due to changing administrative boundaries between the 2020 and 2024 elections. Figure reproduced from the original article.

I then combine propensity score matching with a DiD design to identify a suitable control group and plausibly estimate counterfactual levels of Democratic support in the treated counties had they not been treated. I match the 351 treated counties to control counties based on a range of demographic and socio-economic factors (measured pre-treatment in 2020), and I achieve good covariate balance (i.e., very similar treatment and control groups). I then identify the average treatment effect on the treated (ATT) using the canonical two-period DiD regression specification and comparing the elections right before (2020) and after (2024) the treatment occurred.

Two central assumptions of this identification strategy are parallel trends – that treatment and control counties would have followed identical trends in 2024 in the absence of treatment – and the absence of geographical spillovers. I assess the parallel trends assumption graphically and using pre-treatment placebo outcomes and event study analysis. All these tests show parallel pre-treatment trends, increasing the plausibility of this assumption. I guard against geographical spillovers by replicating the main analysis at the larger commuting zone level.

To be clear, what this design allows me to investigate is the ability of announced low-carbon investments (that, in many instances, have yet to produce actual employment) to produce a shift from the Republican to the Democratic Party. This is an effect that would occur at the centre of the political

spectrum (i.e., among moderates and swing voters) and in the first national election after the passage of the IRA. In other words, this test does not directly measure climate policy preferences, does not capture effects among pro-climate progressive voters,[40] and concerns short-term feedback effects. Nevertheless, given the significant climate policy consequences of this specific election outcome, the explicit emphasis among policy-makers and observers on these potential short-term electoral rewards of the IRA (Meyer 2024b), and the increasingly short time horizon of climate policy action, this focus is highly pertinent.

7.3 Findings

The results reveal strong evidence against the central hypothesis. Both descriptively and in the DiD models that include control variables, I estimate a statistically insignificant causal effect of announced low-carbon investments on the two-party vote share of the Democratic Party of about 0.15 percentage points. The limited statistical uncertainty of the main DiD estimate ($\beta = 0.153$, se = 0.129, 95% CI = [-0.100;0.405]) allows me to rule out true positive effect sizes larger than 0.41 percentage points with a high level of certainty. The plausibility of this causal estimate is buttressed by the remarkably parallel trends in the pre-treatment period, as shown in panel A of Figure 7.2. This figure also visually demonstrates the small magnitude of the DiD effect. The blue triangles (representing the treatment group) and the red circles (representing the control group) remain almost the same distance from each other in 2024 as in all the preceding elections.

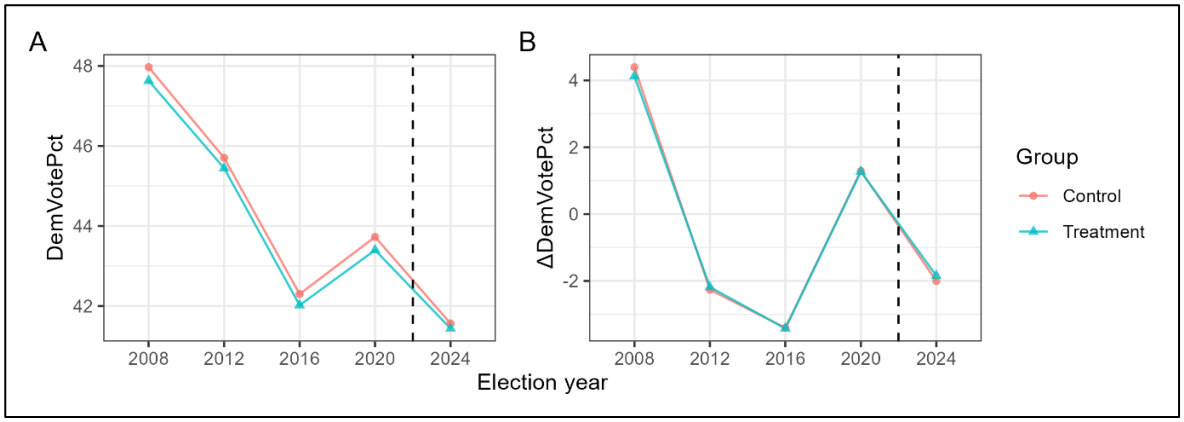
My main result remains substantively unchanged when I measure *changes* in two-party Democratic vote share (see panel B of Figure 7.2), when I include all untreated counties in the control group, and when I conduct the same analysis at the more aggregate commuting zone level. Event study regression models also confirm both the main result and that the pre-treatment trends are parallel.

---

[40] Progressive voters may become even more supportive of climate policy when they experience the local economic benefits of GIP. But they would vote for the Democrats with or without these investments, and their opinion shifts are, therefore, not captured by a measure of the Democratic two-party vote share. However, the IRA and GIP in general, as well as the wider narrative of 'green growth', are not intended to convince these segments of voters, who already tend to strongly support climate policy for ideological reasons (and due to comparatively low individual fossil fuel dependencies). Rather, these strategies are intended to expand support beyond this group and convince the median voter, blue collar workers, etc. I therefore do not consider this a major limitation of the research design.

For perspective, other studies in the same country context that use almost identical research designs and the same unit of analysis have found effects ten or twenty times larger than this for, e.g., relocations of corporate headquarters (Yang 2024) or loss of coal jobs (Gazmararian 2024b).

Figure 7.2 Democratic support in treated and control counties



Note: Panel A shows the unweighted average two-party Democratic vote share separately for treatment (n = 351) and matched control (n = 351) counties from 2008 to 2024 (total n = 3,510). The vertical dotted line indicates the timing of the treatment. Panel B shows the same but with election-to-election percentage-point vote share changes. Figure reproduced from the original article.

This finding supports and expands the conclusion from Paper 3(Green Jobs) summarised in the preceding chapter. Across two very different contexts, I consistently find that the citizen causal channel of my theoretical framework does not operate. The local benefits of RE and other low-carbon industries do not cause citizens to vote more for pro-climate parties. Unlike the Danish case study, this study of the US does not bring us closer to understanding *why* this is the case, but it provides more robust causal evidence *that* it is the case. Interestingly though, my contention from Paper 3(Green Jobs) that this null effect is the result of a weak perceived connection between local benefits and public policy is corroborated by Jennifer Granholm, the outgoing Democratic Secretary of Energy. When asked in the aftermath of the 2024 presidential election about ordinary citizens' perceptions of the IRA, she gave the following response:

> Do people have any idea about the amount of factories that are coming to America or expanding in America? [They have] no clue. So that is a question about how do you do that; How do you get the word out? I have been across the country, in almost every state, trumpeting this. But it still does not rise to the level of consciousness. Maybe it is because people are not so interested in it, but the economy was the number one issue, and if you have a factory coming to your

> area, that should be a positive thing. But people don't necessarily attribute it to the Biden administration.[41]

This mirrors my finding that Danish media very rarely highlights the link between local wind industries and national politics.

Of course, neither of the cases I have studied are 'most-likely' in every respect, and citizens may be affected in ways that these studies cannot detect (i.e., on an individual or national scale, or in terms of specific policy preferences that do not translate into voting behaviour). But there is good reason to believe that local-level voting behaviour should be a core empirical manifestation of the theorised citizen causal channel, and I have provided strong evidence that this dynamic is not functioning as intended.

[41] I have transcribed and simplified this quote based on oral remarks made by Jennifer Granholm between 25:38 and 26:13 minutes during an episode of the podcast *Shift Key* entitled 'Energy Secretary Jennifer Granholm on What Comes After Biden's Climate Agenda' that was broadcast on December 18, 2024 (Meyer 2024a).

8 Discussion

Across Chapters 2 to 7, I presented my theoretical framework, methodological approach, and empirical results. In this chapter, I pull all this together and discuss the overarching conclusions, implications, scope, and blind spots of the dissertation. This discussion is divided into three parts. First, I ask where the findings of the four individual empirical investigations leave us in our understanding of the politics of the energy transition and the role of RE industries herein. I argue that the growth of RE industries remains a latent structural force in the political economy of fossil fuel phaseouts and that political activation might be needed to overcome the structural, institutional, and informational barriers that undermine its impact on national climate politics and policy. Second, I reflect on the inferential limits of my findings in relation to both future developments, sectoral climate policies, and other low-carbon sectors. Finally, I reflect on the possibly underappreciated role of political elite agency in the dynamic I investigate, and I propose a theoretical synthesis between my structural perspective and a more elite-oriented one.

8.1 Where Does This Leave Us?

I began this dissertation by proposing a theoretical framework in which citizens and firms can translate the deep, structural force of growing RE industries into concrete pressure on domestic politics for more ambitious climate policies. I built on and expanded existing work on 'climate policy sequencing' (Meckling et al. 2015) and 'positive reinforcement' (Aklin and Urpelainen 2013b) and provided a detailed theoretical account of why the positive effect of RE industry strength on climate policy should be relatively weaker for FFPs compared to GIPs. Still, in line with the optimistic perspective that is dominant in prior work on this question, I did expect that the growth of RE industries would act as a catalyst of this broader, restrictive type of climate policy (Meckling, Sterner, and Wagner 2017; Pahle et al. 2018; Breetz, Mildenberger, and Stokes 2018; Leipprand, Flachsland, and Pahle 2020; Kelsey 2021; Urpelainen and Zhang 2022; Montfort et al. 2023). I have then provided empirical evidence that (i) the increasing size of domestic RE industries is *not* systematically associated with more stringent FFP, (ii) low-carbon corporate interests seldom prioritise lobbying on FFP (on which they face stronger counter-mobilisation from high-carbon interests and have less institutional access), and (iii) pro-climate voting and popular support for ambitious climate policy is not boosted by the local presence of RE industries nor by significant low-carbon investments.

My initial expectations were, therefore, not met empirically. My systematic and direct tests of both the core macro level relationship between RE industry strength and FFP and the central underlying causal channels contradict the more indirect and descriptive findings from the extant literature. Where does this leave us? Put differently, what is the answer to the overarching question of how the growth of domestic low-carbon industries impacts national climate politics and policy?

I propose that the overall story of this dissertation is the following: the rise of RE and other low-carbon industries represents an important structural transformation in the political economy of climate change, but its potential catalysing political effects are watered down through the long and winding road from structural cause to political effect. Its effects are not felt because the actors who have the potential to translate it into broader political outcomes largely lack the means and motivation to do so. Most importantly, RE firms and business associations are – as some have speculated they might (Hughes and Urpelainen 2015; Meckling 2021) – fighting a narrower fight over GIP and are vastly outnumbered when seeking broader influence. For citizens, the rise of RE industries does not become strongly linked to politics, nor is it salient enough to drive voting behaviour. The rise of RE industries has, therefore, impacted national climate politics only in the sense that it has created a significant *potential* constituency for ambitious climate policy aimed at phasing out fossil fuels. But it has yet to actually catalyse these broader aspects of national climate policy meaningfully and systematically.

The barriers to translating this structural change into more ambitious climate policy action are informational, institutional, and structural. Informational barriers were highlighted first in Paper 2(EU Lobbying). I argued that there are context-specific informational advantages in lobbying and provided matching empirical evidence that firms supply less technical information to regulators when they lobby on policies that indirectly affect them. This implies that low-carbon corporate interests are at an informational disadvantage when lobbying FFPs, and this reduces their incentives to lobby and their ability to do so successfully. The informational character of these barriers was also highlighted in Paper 3(Green Jobs). I argued that citizens might not perceive the connection between ambitious climate policy and local RE industries because the causal chain connecting the two is long and complex, and I showed that political actors are rarely mentioned in media coverage of the wind industry in Denmark. This gives an indication that there are informational barriers for the rise of RE industries to translate into stronger popular support for ambitious climate policy.

The institutional nature of these barriers was highlighted in Paper 2(EU Lobbying), where I showed that in the case of the EU, low-carbon interests are

severely underrepresented in the closed institutional venues where FFP is debated. Others have shown that fossil fuel and high-carbon industrial interests enjoy strong, historically rooted access to political elites and corporatist institutional arrangements (Moe 2015; Meckling and Nahm 2018; Mildenberger 2020). This puts emerging low-carbon industries at an institutional disadvantage vis-à-vis the societal actors most likely to seek to obstruct ambitious climate policy.

Finally, my empirical analyses have pointed to the structural barriers for the translation of growing RE industries into stronger climate policy action. At the national level, my novel indicators of RE industry strength in Paper 1(Decarbonization Policy) revealed that these industries have only attained a high level of structural significance in a relatively low number of highly developed countries. At the level of corporate interests, Paper 2(EU Lobbying) provided descriptive evidence that high-carbon corporate interests remain numerically dominant in all aspects of climate lobbying, a dominance that is especially pronounced when it comes to broader climate policies beyond GIP (see also Trachtman and Meckling 2022). My data collection of wind industry sites in Denmark for Paper 3(Green Jobs) provided a similar picture among citizens. Even in the case of the single most structurally important RE industry in the world, only a small fraction of the population lives in the vicinity of meaningfully large production sites. And even in these locations, it is rare for wind factories to be the single largest employer. All this indicates that although the structural and economic importance of RE industries is increasing rapidly, it has not yet reached levels where it can be considered the dominant structural force in climate politics. In most places, the incumbent fossil-fuel based economy (broadly understood) remains more structurally central locally and nationally in terms of corporate resources and employment.

All these barriers suggest that the catalysing climate policy effect of growing RE industries is not automatic but contingent. Although the rise of RE and other low-carbon industries does produce the structural conditions for a substantial political coalition with material interests in climate policy action to emerge, the political activation of this coalition cannot be taken for granted, and its potential political power is not sufficient to guarantee policy influence. The contingency of the catalysing climate policy effect of rising RE industries therefore consists of whether this potential coalition is activated and whether it will be able to influence policy in the face of counter-mobilisation. Both aspects are uncertain and could depend on political, institutional, and contextual idiosyncrasies. For firms, my results suggest that both these aspects of contingent *activation* and *influence* are key: it is not guaranteed that low-carbon firms decide to lobby for broader climate policies, and they remain at a numerical disadvantage relative to high-carbon corporate interests. For

citizens, the mere *activation* of their latent political interests in promoting low-carbon industries through ambitious climate policy appears to be the primary barrier. This interpretation is supported by recent remarks from a leading observer of US climate politics, Jesse Jenkins, who is worth quoting at length:

> There is a pretty large and growing economic constituency around the continuation of the clean economy transition. Building that constituency was a deliberate strategy of the Inflation Reduction Act. [...] What I have yet to see is a political organising effort to make that constituency coherent. [...] If you live in a community in Georgia or Michigan where you are seeing a major new construction project to build a large battery manufacturing plant or something like that, you may or may not associate that with the need for sustained policy. [...] There needs to be a political effort if that economic constituency is going to see itself as a political unit to, first of all, draw the connection between the investments that people are seeing and policy action [...] and to organise this group as a political constituency to protect and defend and ideally expand the kinds of policies that support their economic interests.[42]

Only once such a process of political activation has occurred does the subsequent question of the ability of citizens with material interests in RE to win climate policy fights become pertinent. Even then, the translation of structural forces into policy outcomes is contingent.

In summary, I have tried to make the case here that what this dissertation leaves us with is not simply that the growth of RE industries fails to transform climate politics and catalyse climate policy. Rather, my theorising and empirical findings point to key informational, institutional, and structural barriers that have been overlooked in previous literature on this topic and which have undermined this structural potential from being systematically translated into policy outcomes. This interpretation raises two questions. First, will this conclusion hold up across different contexts? Second, what are the political dynamics that can take us from unrealised structural potential to political activation? In the rest of this chapter, I address these questions in turn.

8.2 Inferential Limitations

In this section, I discuss two particularly important potential inferential limitations of my work. Chapter 3 covered considerations regarding the

[42] I have transcribed and simplified this quote based on oral remarks made by Jenkins between 41:03 and 43:16 minutes during an episode of the podcast *Shift Key* entitled 'This Isn't the Same Kind of Climate Election' that was broadcast on August 21, 2024 (see Meyer and Jenkins 2024).

methodological dimension of this discussion. In this section, I focus instead on some of the principal scope conditions relating to time and to different sectoral climate policies and low-carbon industries that may affect the general applicability of my conclusions beyond the empirics I have actually studied. My intention is to emphasise central contextual factors that should be considered before my findings are assumed to be applicable more generally.

8.2.1 Temporal limitations

The first important and plausible inferential limitation concerns the temporal dimension. Climate politics and policy is a rapidly developing field. Any assumption that theoretical and empirical dynamics remain constant over time is tenuous. In particular, three ongoing developments that can be expected to become more central in the future could cast doubt on the continued applicability of my conclusions.

First, and most obviously, RE and other low-carbon industries are, as a whole, very likely to continue to grow at an accelerated pace. Globally, most low-carbon industries still arguably represent niche industries. But some are already turning into challenger industries at the global level and seriously threaten incumbents. There are even more examples of serious low-carbon challengers at the national and local levels. This is particularly the case for wind and solar power in the electricity sector and for EVs in the auto industry. For instance, EVs made up 93 percent of car sales in Norway in 2023 (IEA 2024). And while Tesla, the electric vehicle manufacturer, opened a factory employing more than 8,000 people in Germany in 2021, incumbent automaker Volkswagen has recently announced plant closures affecting 'thousands of jobs' (Ziady 2024). Electric heating is closing in on this status of seriously threatening incumbent technologies, while hydrogen, green steel, non-fossil plastics, and various other low-carbon transportation technologies remain niche technologies (Cullenward and Victor 2021, 5).

Why is all this relevant? Because of the potential for threshold effects. Stated differently, it cannot be ruled out that the effect of RE industry strength on climate policy is not linearly increasing with its size but remains negligible until it reaches a certain threshold after which its impacts are felt strongly. As Colgan, Green, and Hale suggest with regard to climate policy, 'For collective bodies—for example, states, industry associations—preferences are determined by which group of actors dominates internal decision-making processes' (Colgan, Green, and Hale 2021, 15). Despite large national differences, RE interests can hardly be said to dominate national climate politics anywhere. The micro level foundation underpinning such a threshold dynamic could be that firms initially only seek to narrowly influence those policies

(GIPs) that directly support their niche and allow them to expand until they reach a level of structural power at which it makes strategic sense to pick a broader fight with the incumbent (over FFP). For citizens, it is possible to imagine that their policy preferences are only shaped by the few most dominant industries in the national economy, such that only very high levels of RE industry strength affect their political behaviour. If this threshold logic is correct, the positive effects that this dissertation has consistently been unable to detect may materialise in the future, underpinned by more encompassing low-carbon lobbying and greater citizen support.

However, a counterargument may dampen expectations that these thresholds will be passed and render my conclusions irrelevant in the near future. Firstly, I have deliberately chosen to study cases that are among the leaders globally in terms of the structural importance, consolidation, and political organisation of their RE industries, namely the EU and Denmark (in Paper 2(EU Lobbying) and Paper 3(Green Jobs), respectively). These cases were chosen based on the initial null finding in Paper 1(Decarbonization Policy), with the purpose of maximising the change of finding broad positive effects (i.e., to maximise the generalisability of any negative findings). These cases are not representative of all other countries, as discussed in Chapter 3. But the findings of limited low-carbon lobbying on broader climate policies in the EU and of no local effects of wind industry presence on pro-climate voting behaviour in Denmark, backed up by the additional null results from the United States in Paper 4(Low-carbon Investments), do strongly suggest that most other contexts should not expect patterns more conducive to catalysing effects before their domestic RE industries have become considerably stronger. We can, in other words, expect the 'climate advocacy gap' (Meckling and Trachtman 2022) to remain a reality in climate politics for some time. Hence, even if the continued growth of domestic low-carbon industries does threaten the continued validity of my conclusions due to threshold effects, this threat seems relatively distant in temporal terms.

The other major development that is well underway and will almost certainly become even more central in the future is price-competitive low-carbon technologies. IRENA finds that '[i]n 2023, around 81% (382 GW) of newly-commissioned, utility-scale renewable power generation projects had costs of electricity lower than the weighted average fossil fuel-fired cost by country/region' (IRENA 2024, 41). Since 2010, IRENA estimates that the levelised cost of electricity of solar photovoltaic has decreased by 90 percent, and that figure is 48 percent for offshore wind (IRENA 2024, 34–36). EVs have more recently been on a similar development path in terms of technological advancements and price decreases (Ritchie 2023). This means that we can soon expect some of the key low-carbon industries to be placing products on the global market

that can match incumbent fossil fuel-reliant technologies without direct support from government policy.[43] What impacts might this have on the catalysing political potential of RE and other low-carbon industries?

Although this is inherently uncertain, I will highlight three factors. Most obviously, this is likely to increase the speed at which these industries grow and increase their structural and instrumental power resources even further. This might help them reach relevant thresholds above which they are willing and able to push for stringent FFP as just discussed. Second, with a waning dependence on government GIP subsidies, citizens' perceptions of the policy–industry link may become even more obscured, which will reduce the potential of low-carbon industry growth to generate public enthusiasm for ambitious climate policy. Third, unless these firms manage to protect or 'lock in' existing policies that benefit them directly (Meckling 2021, 142), their improved competitiveness will likely close off their preferred forms of direct government support in the form of GIP. For example, in 2017, a Danish expert commission highlighted the need to phase out subsidies for RE when it became cost competitive (DR 2017). And in the summer of 2024, a large funding gap in the German feed-in tariff similarly led to calls for its reform in light of the increasing competitiveness of renewables (Radowitz 2024). This might, in fact, incentivise RE industries and their allies to reorient their attempts to influence national climate policy towards FFP.[44] Combined with an increasing structural importance, such a pivot in lobbying efforts would potentially be enough to bring about broader climate policy action, such as the removal of fossil fuel subsidies that politically uphold the competitiveness of fossil fuels.

Finally, current developments suggest that low-carbon industries may become increasingly intertwined with geopolitics in the future. China's growing dominance of key aspects of many of the most important green industry supply chains (IEA 2023b) has sparked significant concern among Western governments (Demarais 2023; Schäpe 2024). This is reflected in, e.g., the many provisions in the IRA meant to encourage domestic production. The EU has also emphasised 'reshoring' of key nodes in low-carbon supply chains, such as battery production and lithium mining. Key policies in this respect include the Green Deal Industrial Plan and the Carbon Border Adjustment Mechanism. These climate and energy policy developments are also tied to the more general political pivot towards protectionism and so-called re-shoring or friend-shoring of strategically important sectors (McNamara 2024).

---

[43] A recent auction held by Danish authorities for offshore wind projects in the North Sea without state support did not attract any bids (WindEurope 2024). This demonstrates how fragile this idea remains.

[44] I thank Eric Biber for suggesting this dynamic to me.

On the one hand, such a process of securitisation might increase the salience of RE industries among citizens and provide RE industries with a stronger bargaining position in domestic politics. This could facilitate their institutional access to policymakers and their policy impact. Yet, geopolitical struggles to attract or retain green industries could also significantly expand the room for further direct GIP subsidies, which would limit firms' incentives to pick a broader political fight over FFP. That prioritisation would simply not be necessary under those conditions. In such situations, fossil fuel phaseouts may actually become less politically feasible. One example that illustrates this is the policy agenda of the Biden administration. From a climate policy perspective, it pursued a self-contradictory policy platform of expanding subsidies for RE while simultaneously easing and encouraging the production of oil and gas (The Economist 2024). The latter was largely motivated with reference to geopolitics (Tooze 2024b), and the availability of plentiful GIP subsidies meant that low-carbon industries had little reason to emphasise the need for, e.g., carbon pricing or other restrictive climate policies. Moreover, this process of securitisation might detach RE industries even further in political and discursive terms from climate policy since it morphs into a matter of security policy. That is not likely to help citizens and interest groups make the connection between RE expansion and the need for wider climate policy action.

In summary, inferences from my findings to the future of climate politics are complicated by the continued growth of low-carbon industries combined with potential threshold effects, by the prospect of price-competitive low-carbon technologies, and by the increasing geopolitical role of these industries. But the effect of the latter two factors is ambiguous, and the former seems a relatively distant prospect.

8.2.2 Sectoral limitations

The second important inferential question is whether my insights about the absent catalysing effect of growing RE industries on climate politics and policy travel across sectors. This dissertation mostly focuses on the emergence of low-carbon challengers in the form of RE technologies. Although these technologies used in electricity generation are increasingly relevant in sectors like transportation (due to EVs) and buildings (due to heat pumps and solar heating), my empirics are, nevertheless, mostly centred on the energy sector. This focus is particular in two ways in relation to the politics of climate change mitigation as a whole. First, my theoretical arguments about the effect of RE industries on climate policy can be nuanced further by an appreciation of the sectoral scope of that effect. Second, the rise of RE represents a dynamic of

niche actors challenging incumbents (Kelsey and Meckling 2018; Geels 2014). As other sectors begin to decarbonise in earnest, they will likely follow a somewhat different dynamic of sectoral transformation in which low-carbon technologies are developed and promoted by incumbents rather than by novel challenger firms. I discuss the inferential implications of each aspect in turn.

8.2.2.1 The sectoral scope of RE interests

The issue of sectoral scope is about the ability and willingness of RE interests in particular to impact climate policy across different sectors. In this dissertation, I have largely treated broader climate policies as one under the term 'fossil fuel phaseout policy'. However, climate change mitigation and decarbonisation can be disaggregated into a range of sectoral transformations across energy, industry, transportation, buildings, agriculture, and forestry and land use (UNEP 2024). Is my main conclusion – that the rise of RE industries have not catalysed climate policy due to structural, institutional, and informational barriers – equally applicable across all these sectoral policies if investigated separately? In this case, I think there are strong reasons to believe that the answer is yes. Abstracting from country idiosyncrasies, my theoretical logic leads me to expect that the potential for a catalysing effect of RE industry strength is highest in the electricity sector, lower in the industrial, transport, and building sectors, and negligible in the agriculture and land-use sectors.

The first thing to note is that my conclusions stem from empirical investigations that have focused on various policies including cross-sectoral instruments (e.g. fossil fuel subsidies), instruments focused on the electricity and industrial sector (e.g. carbon pricing), and instruments from the transport sector (e.g. efficiency standards for or bans on ICE vehicles).[45] Beyond reasons of data availability, I have chosen these diverse foci in an attempt to balance an emphasis on electricity sector policies with broader sectoral coverage. This

[45] In Paper 1(Decarbonization Policy), I include a combination of measures that are primarily or partly targeting electricity sectors (including carbon pricing, electricity sector carbon pricing, shadow carbon prices, and fossil fuel subsidies per capita) and measures that target other sectors (net implicit gasoline taxes). In Paper 2(EU Lobbying), I include almost all policies categorised by the European Commission under the topics of 'Climate Action' and 'Energy'. This includes policies targeting fossil fuel extraction, the transport sector, the manufacturing sector, the electricity sector, buildings, and all sectors at once. In Paper 3(Green Jobs), my main empirical focus is on election outcomes, but the mechanism test of individual climate policy preferences includes survey questions about banning ICE vehicles and imposing carbon pricing on heavy emitters as well as more general questions about public resources and technological solutions. Readers interested in further details can consult the original articles.

focus is important because there is good reason to expect electricity sector FFP to be the most-likely case for observing a catalysing effect of RE industry growth. The reason is that RE interests only benefit from FFPs when those policies have positive spillover effects on the profitability and expansion of low-carbon electricity. The intensity of these spillovers is determined by the closeness of competition between different high-carbon technologies and their low-carbon alternatives. This argument can be reformulated in explicitly sectoral terms. In electricity, RE is operating in very close, direct competition with coal and fossil gas. Reduced competitiveness for one energy source translates directly into an improved competitive position for the others (although exactly which energy source will benefit is uncertain). This should increase both the willingness and ability of RE interests to affect policy.

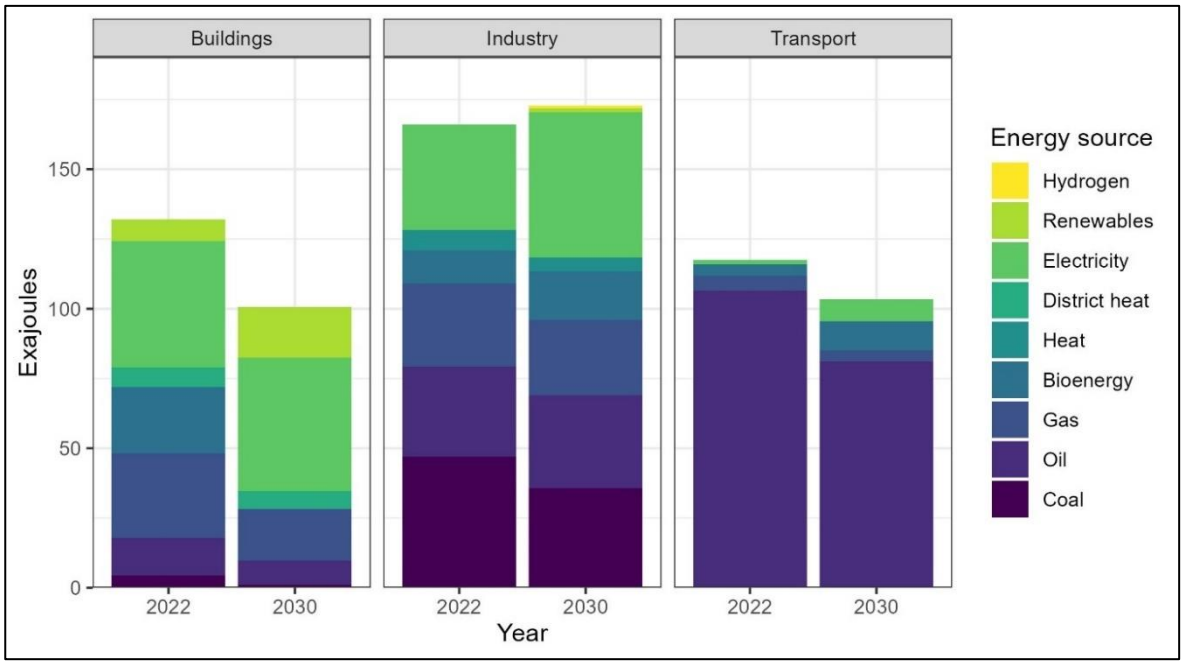
In the energy-use sectors of industry, transport, and buildings, the gains to RE interests from ambitious climate policies rest on the potential for electrification or direct use of RE technologies. Figure 8.1 provides an illustrative overview of current and projected global energy consumption in these three sectors based on data and analysis from the IEA. Many industrial processes already use electricity, which makes up about 23 percent of total global industrial energy consumption. Other sub-sectors like cement, iron, and steel involve very high temperatures and are considered 'hard-to-abate' because they do not lend themselves to electrification. In the transport sector, the move towards electrification in especially light-duty vehicles is well-known, but it remains marginal in aggregate terms (the figure below includes aviation, waterborne transportation, and rail and heavy-duty vehicles). In buildings, electricity-reliant solutions are already mature and compete with oil and gas-based alternatives. Direct applications of renewables are also becoming more important here.

Logically, it is in the interest of RE industries to expand the light green bars (direct RE use) and to expand and capture a larger share of the clear green bars (electricity use) including by shrinking the three blue bars at the bottom of the figure (coal, oil, and fossil gas use). Across all these sectors, RE industries are therefore plausible beneficiaries of restrictive climate policies that seek to phase out fossil fuel use, but these benefits are more uncertain and more indirect because only a minority of energy is consumed as electricity.[46]

[46] It is possible to disaggregate further and add additional nuance to this argument by moving from the sectoral to the instrument-specific level of analysis. Some of the required policy developments to decarbonise other sectors besides electricity fall under the broad umbrella of electrification, i.e., the replacement of direct fossil fuel combustion with electrified alternatives (that may or may not rely on low-carbon electricity). But other parts of this challenge are independent of electricity. Examples

In line with my theoretical argument, this means weaker material interests in, fewer institutional opportunities to, and worse informational conditions for affecting policies, as well as stronger counter-mobilisation from entire sectors of fossil fuel-reliant incumbent interests (in addition to the fossil fuel producing interests that are likely to mobilise against climate action across all sectors).

Figure 8.1 Global energy consumption by sector and energy source



Note: This figure shows global final energy consumption across sectors and split by energy source for 2022 and projected 2030 estimates. Author's calculations based on data from the IEA (IEA 2022a; 2023a; 2023c).

Finally, in the sectors where fossil fuel use is a limited source of sectoral GHG emissions and where RE is therefore unlikely to play large a role in reducing emissions, the catalysing political potential of RE industry growth is even weaker. Specifically, the RE industry's structural interests do not logically

include reductions of methane leakage in fossil fuel extraction, energy savings in buildings, emissions reductions from enteric fermentation in farm animals, and the deployment of carbon capture, utilisation, and storage (CCUS) technologies. At the level of material interests (though perhaps not at the level of policy impact), it is plausible to expect RE industries to have instrument-specific preferences within each of the main sectors of climate policy. In this way, they may prefer and support policies that further electrification but not those that promote alternative paths to decarbonisation. For instance, a ban or fee on coal use in industrial plants may lead to the adoption of CCUS technology as opposed to electrification if it only applies to *unabated* coal use.

extend to agricultural and land-use climate policy. It therefore seems highly implausible that by not focusing empirically on these sectoral aspects of climate policy, this dissertation has overlooked any positive political effects of growing RE industries.

To summarise, the potential of growing RE industries to catalyse national climate policy is generally greatest in the electricity sector, more limited in the industrial, transport, and building sectors, and very weak in the agriculture and land-use sectors. My negative findings therefore represent a 'least-likely' scenario with strong inferential potential to be applicable more broadly. In other words, RE industry strength is unlikely to have positive effects on non-electricity sector FFP that I have overlooked.

8.2.2.2 Sectoral decarbonising through challengers or incumbents

With the above discussion in mind, the second way in which the conclusions of this dissertation have potential sectoral limitations is highly relevant. I have just argued that, given my results, there is limited reason to expect the rise of RE industries to catalyse climate policy across all sectors. But it is also worth asking whether my theoretical and empirical insights are likely to apply to the rise of sector-specific low-carbon interests in these other pivotal sectors. Can we, in other words, expect the rise of low-carbon firms in manufacturing, buildings, transport, agriculture, and forestry to follow a similar dynamic and thus *fail* to drive the phaseout of fossil fuels (or other high-carbon technologies) in their respective sectors? Can we, at the micro level, expect similar dynamics of narrow lobbying and unaffected citizen preferences in these other sectors?

Climate politics is increasingly expanded in scope to include a focus on all sectors of the economy that emit GHGs. This also includes the ambition to develop domestic low-carbon champions. Some examples of emerging low-carbon technologies include electric cars and ships as well as renewable fuels in the transport sector; green steel and low-carbon cement in heavy industry; heat pumps, advanced insulation, and solar thermal heating in the building sector; and biochar in agriculture. Will the emergence and growth of these low-carbon technologies remove the political obstacles to stringent regulations that phase out high-emission technologies in their respective sectors? Or will the firms manufacturing these technologies focus their lobbying efforts on narrow subsidies and popular support for stringent climate regulation remain unaffected by their emergence?

To answer that question, we must consider the nature of these nascent industrial transformations and how they differ from the more progressed

transformation in the energy sector. Specifically, whereas the rise of RE industries represents the gradual ascendancy of new market players that are clearly distinct from the fossil fuel-producing incumbents, the low-carbon transformation of industry, transportation, buildings, and agriculture is much more likely to involve the gradual diversification and conversion of incumbent actors (Kelsey 2018; Kupzok and Nahm 2024). Oil, fossil gas, and coal companies are clearly structurally and politically distinct from RE firms, even if some are making marginal investments into wind and solar. In contrast, a subset of incumbent auto manufacturers, steelmakers, and construction firms are arguably the most plausible leaders in the development of low-carbon products in their respective industries. There are examples of disruptive challengers (e.g. Tesla, Stegra, and Solar Foods), but they often ally themselves with incumbents, and many of the firms leading in these sectoral transformations are nationally significant legacy actors (e.g. Nissan, Saint Gobain, and Maersk).[47] The theoretical implications are, first, that we move from inter- to intra-sectoral climate policy conflict between sectoral leaders and laggards, and second, that the key low-carbon interests are well-established firms.

Intra-sectoral competition between, e.g., producers of ICE vs EVs or high- vs low-carbon cement means two things politically. On the one hand, there will not be a united low-carbon industry to push for climate policy action. Each industry will be in a state of 'business conflict' (Falkner 2008). But on the other hand, it means that competition between low- and high-carbon interests will be very close. Low- and high-carbon cement are near-perfect substitutes, as are ICE vehicles and EVs. For that reason, low-carbon interests will have a very strong interest in promoting policies that hurt the competitiveness of their competitors (Kennard 2020). Moreover, they will have the necessary informational advantages to engage in high-quality informational lobbying and the pre-existing institutional access and political connections to facilitate influence (Mildenberger 2020). This could increase the likelihood that initial GIPs that successfully spur low-carbon industry development will pave the way political for more stringent subsequent FFPs.

But this dynamic also brings a different scenario into play. One can imagine sectors composed of many diversified actors that have all 'hedged' and produce both high- and low-carbon goods and therefore all want to maximise subsidies and minimise stringent regulation across their product portfolio (Meckling 2015; J. Green et al. 2021; Kupzok and Nahm 2024). An example could

[47] Admittedly, this characterisation glosses over sectoral specificities and significant uncertainties. Still, for the purposes of this discussion, the juxtaposition of RE as a challenger-led transformation and the (more nascent) transformations in other sectors as incumbent-led is useful.

be if many agricultural conglomerates all produce roughly equal shares of emission-intensive animal-based products and low-emission alternatives. Such a constellation is unlikely to spark intense intra-industry climate policy conflict or support for stringent regulation of the high-emission products. In addition, it seems plausible that the gradual transformation of incumbent sectors will make it even more unlikely that voters perceive pro-climate business interests as tied to ambitious climate policy and use their presence as a strong cue for the benefits of climate action. As an illustration, voters are unlikely to associate a thriving local cement factory with the economic benefits of ambitious climate policy even if it has, in fact, converted to producing low-carbon steel and would benefit from stringent regulation that hurts its competitors and expands its market share. For those reasons, it is not given that an incumbent-led decarbonisation path will produce a political economy more conducive to stringent climate policy compared to the one studied in this dissertation.

In summary, I have made two broad arguments in this part of the discussion. First, there are strong reasons to expect that the breakdowns I have uncovered in the causal path from RE industry strength to broad climate policy action apply across all sectors. This is because the catalysing potential of growing RE industries on FFP is strongest in the electricity sector, somewhat weaker for transport, industry, and buildings, and weakest for agriculture and forestry. Second, the emergence of sector-specific low-carbon technology leaders in each of these other sectors is more likely to create the political preconditions for ratcheting up stringent climate regulation in each of those sectors. But this is highly uncertain because these sectoral decarbonisation paths will likely be more incumbent led than in the RE industry, thereby producing different political dynamics. As these sector-specific decarbonisation processes begin to unfold in the coming years, researchers should therefore reassess the potentials and pitfalls of these processes sector by sector. The theoretical mechanisms this dissertation highlights as crucial for whether such effects materialise or not could be a useful starting point for this undertaking.

In the final part of this chapter, I turn to the question of political elites and their role in activating these theoretical mechanisms.

8.3 The Role of Political Elites

This dissertation has not paid a lot of attention to political elites. Despite their inclusion in my overarching theoretical framework (see Chapter 2), none of the empirical investigations directly concern party-political or bureaucratic elites, and I do not theorise their role and potential for strategic agency in great detail. My initial theoretical focus was more structural and centred on

societal interests external to the policy-making system. But my empirical findings have indicated the limitations of a purely structural perspective on the domestic political effects of the rise of low-carbon industries. In acknowledgment of this, a greater emphasis on the agency of political elites and a discussion of how they might condition the functioning of the corporate and citizen causal channels is warranted.

Diverse strands of political science literature argue that political elites have an independent causal effect on public policy outcomes, including through their ability to set agendas (Green-Pedersen and Mortensen 2010), influence public opinion (Slothuus and Bisgaard 2021), combine policy packages in strategic ways (Wenzelburger et al. 2020), and assemble coalitions in support of their policy goals (Sabatier 1988). As attested to by countervailing political science perspectives that emphasise the external constraints on party strategy (Korpi and Palme 2003; Beramendi et al. 2015), this is a fundamental debate about agency versus structure in public policy.

Climate policy scholarship also contains theoretical and empirical examples of elites that seemingly act strategically and with agency. For instance, the Spanish socialist government managed to close 19 coal mines without being punished by voters in affected areas due to clever policy design and stakeholder engagement (Bolet, Green, and González-Eguino 2024). This type of work does, however, tend to take the motives of political elites for granted, sometimes seemingly assuming that all governments are interested in climate action (Meckling and Nahm 2022; Meckling and Strecker 2023). As I have suggested in the theoretical framework in Chapter 2, political elites do not operate in a vacuum but also act based on the opportunities provided for and the constraints imposed on them by structural factors, voters, institutions, and exogenous events. The importance of political economy structures for elite behaviour is most clearly demonstrated by research on the role of fossil fuel dependencies in shaping governments' and politicians' positions and actions (e.g. Cooper, Kim, and Urpelainen 2018; Genovese 2019; Mahdavi, Alvarez, and Ross 2022).

However, this does not rule out that political elites can have an independent causal effect on national climate policy within this dynamic space. In fact, paying greater attention to these dynamics may hold part of the key to understanding my empirical findings and more broadly when the structural force of growing RE industries is translated into policy outputs and when it is not. Indeed, one of my original theoretical observations was that a deep structural explanatory factor like the growth of RE industries can only influence policy when it is translated into political forces by concrete actors and actions. Although this line of reasoning informed my decision to focus mainly on citizens and firms, it also logically extends to political elites. In light of my empirical

findings, the hitherto largely ignored role of elite agency takes on added importance. In this section, I highlight some of the ways that elites can plausibly moderate or condition the effect of RE industry strength on national climate politics. After having made these arguments, I point towards a possible theoretical synthesis of structural and elite-oriented perspectives on climate politics.

8.3.1 Elite-level dynamics and RE industry strength

The key question here is how elites can condition the effect of RE industry strength on national climate policy, i.e., how the corporate and citizen causal channels may be activated or remain dormant as a result of elite-level dynamics. Extant work provides clues to at least four different ways in which this might happen – timing, party-system dynamics, framing, and interest group alliances – and I provide a brief sketch of each.

First, the timing of elite influence may condition this relationship. Which parties enter into government is clearly not independent of exogenous forces like voter preferences. However, it is quite arbitrary who is in government when a country is hit by exogenous shocks such as economic crises, natural disasters, or a disruption of energy supplies. We know that the partisan composition of government matters for climate policy outputs (e.g. Schulze 2021; B. Lockwood and Lockwood 2022) and that it plausibly shapes how governments react politically when crises open a window of opportunity (Tørstad et al. 2023). Countries with larger RE industries should generally be more likely to respond to such situations with ambitious climate policy that positions these industries as part of the solution (be it economic growth, climate change mitigation, or energy independence). But elites might also be able to steer the framing of appropriate crisis responses. As such, the potential effect of RE industry strength may only be activated if parties that have greater ideological affinities for or are under greater pressure from RE interests are in government at the right moment. As an example, in 2020, Hungarian Prime Minister Victor Orban 'blamed the EU's carbon price for the surge in electricity prices – when in fact most of the increase was due to high natural gas prices, which mainly resulted from strong demand during the economic recovery from the Covid-19 pandemic' (Nagy 2024). This framing strategy may, of course, partly reflect the Hungarian economy's structural dependence on imported natural gas. But the equally plausible alternative argument that the EU should have pursued more ambitious climate policies to build domestic green industries and reduce fossil fuel import dependencies was also available in a context of relatively high domestic support for climate policy (Nagy 2024). Indeed, this alternative logic was invoked by the Danish Social Democratic government

when announcing a large increase in the national carbon tax in 2022 (Regeringen 2022).

Second, party system dynamics may also condition the relationship between RE industry strength and climate policy. One manifestation of inter-party dynamics that speaks directly to the first point is the formation of coalition governments. Whether pivotal parties choose to enter coalitions with pro- or anti-climate parties and parties with or without strong ties to high-emission industries may matter for the ability of RE interests to get a say on broader climate policies (Mildenberger 2020). In the same vein, mainstream parties have taken very different approaches to right-wing challengers across countries, ranging from accommodation to a 'cordon sanitaire' (Krause, Cohen, and Abou-Chadi 2023). Which strategy national elites have chosen might condition the policy influence of even systematically important RE industries over general climate policy. Finally, scholarship suggests that the entry of green parties into parliament and their probability of being pivotal for government formation can affect environmental politics and policy (Abou-Chadi 2016; Kayser and Rehmert 2021; Farstad and Aasen 2023). Similarly, it is plausible that conducive party system dynamics in which parties fight to outbid each other on climate policy (N. Carter and Little 2021) can be accentuated by and can themselves accentuate the influence of RE industry strength, both in terms of lobbying and the industry's salience among voters.

Third, political elites can frame climate policy in different ways. In some contexts, climate change mitigation is debated mostly on moral grounds (Eckersley 2013). In others, it is centred on economic considerations of costs and benefits. Elites do not have full control over these narratives, and different frames do not necessarily change citizen policy preferences (Aklin and Urpelainen 2013a; Bernauer and McGrath 2016). However, they may well affect the structure of public debates and the associations citizens draw between climate policy and various other factors. In a morally oriented climate policy debate, the relevance of domestic RE industries is not obvious. By contrast, economically oriented climate policy debates are more likely to bring these industries to the fore. This should give greater political voice to RE business associations and help citizens make the connection between ambitious climate policies and the economic benefits delivered by RE industries.

Fourth, elites have some degree of agency in choosing their allies. Elites may be able to mobilise corporate interests by 'granting selective access and facilitating collective action among supportive interests' (Meckling and Nahm 2022). Neo-pluralist theories have long argued that a state of business conflict reduces the structural power of business and gives policy-makers strategic leeway (Falkner 2008). For most governments, the competing pressures from high- versus low-carbon interests may well produce such a situation. They are,

therefore, not entirely compelled to ally themselves with either of these camps but can, to some extent, choose which one they empower politically. Hence, while a strategy that seeks to empower low-carbon industries politically does become more probable in a context of already strong and resourceful RE industries, it is not guaranteed and may depend on elites' strategic decisions.

Empirically, it is extremely challenging to ascertain the causal role of elite agency independent of the societal forces acting upon their decision making. But the above arguments and examples do point to the possibility that political elites make contingent, strategic choices that can accentuate or undermine the key causal channels that have been the focus of this dissertation. This elite agency, as well as discontinuities in the influence of specific political elites, may act as trigger causes of (or hindrances to) the latent effects of the structural rise of RE industries on national climate policy.

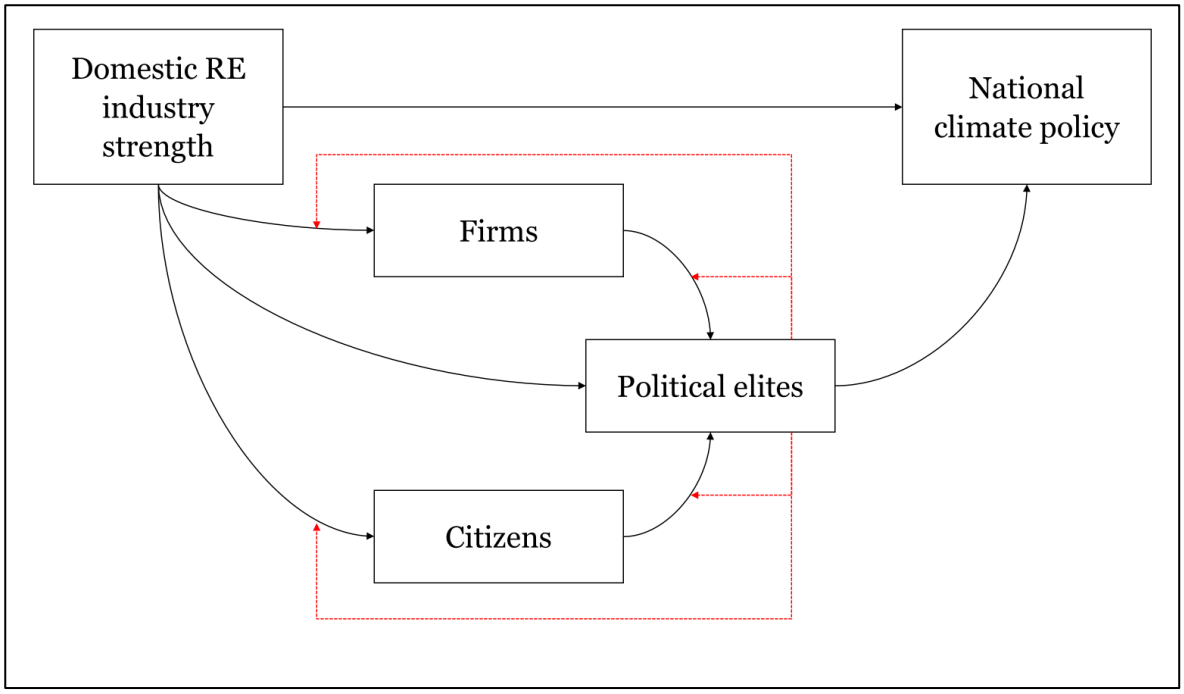
8.3.2 Towards a theoretical synthesis

Having considered the possible independent causal role of political elites in the translation of RE industry strength into national politics and policy from different angles, I conclude this discussion chapter with a tentative sketch of a theoretical synthesis. It is beyond the scope of this dissertation to test its empirical veracity, but it may serve as a basis for future work and as an alternative lens through which to view the overall conclusions of this dissertation. The core modification from the original theoretical formulation presented in Chapter 2 and in the four self-contained articles is that political elites can actively shape the processes of corporate and citizen preference formation and aggregation as they relate to the rise of RE industries. A schematic representation of this modification is shown in Figure 8.2. The four dotted red lines represent the addition of this strategic elite agency to shape corporate policy preferences, curb or bolster corporate influence, shape citizen policy preferences, and mobilise or demobilise citizens.

In this theoretical synthesis, the basic structural foundation remains. The rise of RE industries still means that increasingly large groups of domestic actors have a concentrated material interest in rapid climate policy action (because it benefits them economically). More firms and citizens therefore have the potential to be enrolled in a pro-climate policy coalition, seeking not just to ensure further GIP support but also to speed up the policy-led phaseout of fossil fuels. RE and other low-carbon corporate actors still lobby for ambitious climate policy. However, the strategies of political elites can influence the focus of their lobbying efforts. Policy strategies that bundle GIP and FFP instruments together in 'green bargains' (Meckling and Strecker 2023), political processes that include low-carbon interest groups in key negotiation venues

to 'recruit allies' (Meckling and Nahm 2022), and credible limits on the possibility of further direct GIP subsidies may all contribute to channelling low-carbon corporate lobbying towards broader climate policies that penalise polluters.

Figure 8.2 Schematic representation of theoretical synthesis



Note: Solid black lines represent causal relationships included in the original theoretical framework. Dotted red lines represent the modifications added in this theoretical synthesis developed after the empirical investigations. See the text for clarification.

In this revised model, citizens may also still benefit economically from ambitious climate policy when it leads to new low-carbon jobs, tax revenues, and positive spillovers in their personal or local economies. However, they do not automatically perceive the increasing alignment between their economic interests and ambitious climate policy that the growth of domestic RE industries generates. It first needs to be politicised. The communicative and policy strategies of political elites are therefore decisive for whether this latent interest leads to political mobilisation and preference updating among citizens.

The growth of RE industries can still tilt the balance of corporate lobbying towards ambitious climate policy and boost popular enthusiasm for it, which, all else equal, increases the probability of such policies being enacted. But all else is not equal. This will only translate into policy change if parties that broadly share these policy goals and are susceptible to these societal pressures are in power and if conducive exogenous economic, environmental, or other conditions open windows of opportunity for climate policy reform. This

narrows the scope for structural and political forces to align in such a way that the latent catalysing potential of RE industries is activated.

This revised theoretical framework can be distilled into a tentative hypothesis about the interaction between political economy structure and elite dynamics. In Table 8.1, I present an attempt to summarise the arguments made here into predictions about the likely interaction of structural and political conduciveness.[48]

Table 8.1 Hypotheses about the conditional impact of structural and political conduciveness on national climate policy

		Political conduciveness	
		High	Low
Structural conduciveness	High	Policy expansion	Policy protection
	Low	Policy uncertainty	Policy retrenchment

The upper-left quadrant represents high structural and political conduciveness. This might be a context of a pro-climate government in a country with a strong RE industry at a time where climate policy is highly salient. Here, structural and more contingent political factors interact to make climate policy expansion likely. In such a situation, political elites are more likely to strategically utilise the existence of strong domestic low-carbon interests discursively and politically. An example could be Denmark after the 2019 'climate election' (Hansen and Stubager 2021) that saw the formation of a left-wing government consisting of parties that had made ambitious and salient climate policy pledges and which was indeed followed by a raft of ambitious new GIP and FFP initiatives.

The opposite lower-right quadrant represents low structural and political conduciveness. Here, one can imagine a country ruled by an anti-climate government and with weak or absent RE industries, perhaps even in times of economic crises. This constellation interacts to make climate policy retrenchment probable. Australia in 2014 could fall in this category. After running a successful anti-climate election campaign, Tony Abbott of the Liberal Party repealed the carbon pricing policy enacted by the previous Labour government (Farstad

[48] This argument resembles that proposed by Aklin and Urpelainen (2013), with the notable differences that they focus narrowly on RE expansions and test this using data on electricity generation shares (hence ignoring FFP), and that they do not consider the differential effect of government conduciveness across levels of industry strength or the qualitative differences between retrenchment, protection, and more or less robust policy expansions.

2019). The absence of a strong low-carbon industry meant no constituency existed to fight this decision and the accompanying political narratives.

The combination of high structural but low political conduciveness in the upper-right quadrant makes the expansion of climate policy unlikely but increases the ability of low-carbon interests to protect existing policies (see also Aklin and Urpelainen 2018). Germany in the era of Covid-19 and the Russian invasion of Ukraine fits this categorisation. The political climate has not been conducive given the high salience of non-climate concerns (energy price spikes and security policy) and the budget constraints imposed on the German government by the constitutional court. However, Germany does have a strong pro-climate industry and lobby in, e.g., solar, wind, and heat pumps. When the government's proposal for the Building Energy Act (Gebäudeenergiegesetz or GEG) that would phase out fossil fuel boilers became highly politicised and was attacked by anti-climate political elites and citizens, these industries defended it and, according to the European Heat Pump Association, managed to retain a policy in which 'exemptions and delays may weaken the impact' but 'the overall direction has been maintained' (EHPA 2023).

Finally, the effect on climate policy of a combination of highly conducive political conditions but low levels of structural conduciveness shown in the lower-left quadrant is more uncertain. This interaction may well lead to short-term policy expansions that are vulnerable to shifting political winds. One example of this could be the 'competitive consensus' on climate policy that developed among British political elites from 2005 and culminated in the Climate Change Act of 2008 due to a dynamic of parties outbidding each other on this issue (N. Carter and Jacobs 2014). However, in the absence of strong structural interests protecting the policy developments of this period, many were rolled back once the post-financial crisis era of austerity shifted popular priorities and produced a dynamic of 'competitive disagreement' and an openly anti-climate Conservative government (N. Carter and Little 2021).

This sketch of a conditional theory of when rising RE industries is translated into more stringent climate policies in interaction with political elite dynamics may hold potential in understanding why a general, systematic effect of RE industry strength on national policy is absent and why citizens' climate policy support appears to be unaffected by locally important RE industries. Whether the structural force of ever more economically important RE industries will ultimately prevail over the contingencies of political elite agency, or whether the need for political activation is so essential that it will continue to trump these structural political economy developments is an empirical question. As I argue in the concluding chapter, research that builds on my findings and adds this causal complexity is an important next step in our understanding of this complicated but important question.

9 Conclusion

How does the growth of domestic low-carbon industries impact national climate politics and policy? Through the eight preceding chapters and the four self-contained articles that make up this dissertation, I have attempted to answer this research question with a particular focus on RE industries. In this concluding chapter, I briefly summarise the theoretical and empirical answers I have arrived at, before I discuss the implications of these answers for future research and policy.

9.1 Main Arguments and Findings

The core theoretical propositions of this dissertation can be summarised into three parts. First, the growth of domestic RE industries represents a structural transformation in the political economy of climate politics because it gives rise to actors with concentrated material interests in ambitious climate policy. Second, to impact policy, the structural force of domestic RE industry strength must be translated into national politics by affecting the political power of pro-climate corporate interests and the climate policy preferences of citizens. These groups in turn exert pressure on the national political system by lobbying, voting, and otherwise fighting for more ambitious climate policy. Third, these causal channels function more strongly for GIPs and are weaker for FFPs like carbon pricing and fossil fuel subsidy removal. This is due to various barriers that make corporate actors and citizens less willing and able to influence the latter type of climate policy.

These barriers to affecting broader FFPs take different forms. They are structural (RE interests face greater counter-mobilisation, are more cross-pressured, and expect more uncertain and temporally distant benefits), institutional (business actors have less access to policy-making fora), and informational (RE firms and business associations are at an informational disadvantage in lobbying, and citizens are less likely to perceive the link between public policies and the economic benefits of thriving RE industries). Still, at the outset, my overall contention was that we should expect a positive impact of RE industry strength on these broader climate policies aimed at disincentivising and phasing out fossil fuels.

To investigate this, I have conducted four empirical investigations. They have each been designed sequentially to build on the findings of the previous ones. These studies have drawn on different bodies of political science literature, involved separate data collection efforts, operated with different units of analysis, and employed diverse quantitative techniques. This empirical

diversity has enabled me to cover all the key aspects of my theoretical framework and most of the central dynamics of this complicated relationship.

Paper 1(Decarbonization Policy) starts from the observation that while there is considerable evidence of a positive association between RE industry strength and further GIP support and RE expansion, not a single study has directly and systematically investigated its relationship to broader climate policies. This is despite significant theoretical interest in this question (see *inter alia* Meckling et al. 2015). To remedy this, I combine data on some of the most important FFPs – including carbon pricing and fossil fuel subsidies – with novel measures of RE industry strength and conduct a plethora of time-series cross-sectional statistical analyses across many countries and over many years. The results consistently show that RE industry strength has yet to exert a statistically detectable, systematic influence on key national FFP instruments. Moreover, my findings reveal that the seeming association between these two phenomena is due to underlying differences in economic development and bureaucratic quality that prior qualitative and quantitative work has failed to account for.

Paper 2(EU Lobbying) builds on this first finding by zooming in on the role of corporate lobbying. This is the most important micro level dynamic that may enable or undermine the overall relation between RE industry strength and FFP. It can thereby help explain the macro level findings from the first article. Using the EU as a case and taking advantage of the European Commission's extensive and transparent consultations with stakeholders, I collect and manually code a large data set of corporate climate and energy policy lobbying. This data comprehensively covers corporate mobilisation in open online consultations and their access to expert groups. Using descriptive and statistical analyses, I show four things. First, RE and other low-carbon firms and business associations are about three times more likely to lobby for GIP compared to FFP. Second, because the reverse is true for high-carbon interests and because high-carbon interests are more numerous, low-carbon interests are vastly outnumbered when lobbying on FFP and policies that set overall climate targets. Third, corporate interests are more likely to lobby and provide more technical information when they are directly targeted as opposed to indirectly affected by a policy proposal. This can explain the observed sectoral lobbying patterns. Fourth, RE and other low-carbon stakeholders have some access to expert groups that deal with GIP but are almost entirely excluded from groups where FFP is debated behind closed doors. This all helps explain why the rise of RE industries has not yet led to systematically more stringent FFP at the national level.

Finally, Paper 3(Green Jobs) and Paper 4(Low-carbon Investments) investigate the other core micro level causal channel concerning citizens. These articles take

advantage of the fact that the economic benefits of domestic low-carbon industries are highly spatially concentrated. This allows me to study the effect of the local benefits of low-carbon industry development on citizen support for ambitious climate policy as expressed in voting behaviour.

In Paper 3(Green Jobs), I use the Danish wind industry as a case due to its unparalleled structural and historical importance. I combine novel data on the exact location of major wind industry sites and national parliamentary election results at the very local level for five elections from 2007 to 2022. Using a battery of regression model specifications, I show that local wind industry presence has not made citizens vote substantially more for pro-climate parties or reduced their support for the anti-climate populist right. Supplementing this main finding with various mechanism tests, I suggest that this is not because citizens lack information about the local presence of the wind industry, but because the connection between this industry and national politics is not salient.

In Paper 4(Low-carbon Investments), I study essentially the same relationship but in a very different case. I focus on the wave of private-sector low-carbon investments that have been announced across many counties in the United States since the passage of the IRA, a major piece of GIP legislation, in 2022. Using a DiD design, I provide strong evidence that these announced investments did not cause support for the Democratic Party to increase meaningfully in the 2024 presidential election. This is despite its clear position as the pro-climate party that promised defend these local benefits and as the incumbent party with direct responsibility for this legislation.

The consistency of these null results across the two vastly different contexts of Paper 3(Green Jobs) and Paper 4(Low-carbon Investments) significantly improves the generalisability of the central finding. Experiencing the local benefits of low-carbon industries does not make citizens exert greater electoral pressure for more ambitious climate policy. This conclusion further helps explain the absence of a strong relationship between domestic RE industry strength and stringent climate policy at the macro level.

Together, these findings give the central answer to my research question, which asked how the growth of domestic low-carbon industries impacts national climate politics and policy. The growth of domestic low-carbon industries has so far impacted national climate *politics* mostly in a latent sense by creating constituencies with material interests in ambitious climate policy. Only to a much smaller extent has it translated into active, sustained pressure from corporate interests and citizens for broader climate policy action. This explains why the growth of domestic low-carbon industries has so far failed to systematically catalyse national climate *policies* that directly seek to phase out fossil fuels.

These findings and conclusions enrich our understanding of climate politics and make an important contribution to the literatures on GIP and strategic climate policy sequencing (Meckling et al. 2015; Breetz, Mildenberger, and Stokes 2018; Allan, Lewis, and Oatley 2021; Kelsey 2021; Allan and Nahm 2024). They show that the widely promoted and intuitively plausible notion that GIP builds support for more stringent climate policy through the emergence of domestic low-carbon industries rests on a series of strong assumptions about the political behaviour of firms and citizens, and that these micro level causal channels are not operating as intended. As discussed in Chapter 8, this does not render the rise of RE industries politically irrelevant. But it should compel scholars and policy-makers to pay much greater attention to the contingency of these catalysing effects and the possible role of elite-driven activation of the underlying causal channels. By highlighting these issues, I hope to have contributed not to the rejection but to the maturation of these theories of the political effects of growing low-carbon industries. A crucial part of this maturation process will be a continued expansion of this research agenda.

9.2 Avenues for Future Research

Given the scope and complexity of the dynamics studied in this dissertation and the rapidly changing real-world dynamics of climate politics, several important questions remain unaddressed or only partially understood. Here, I highlight a number of different avenues for future research that I find particularly important in light of my findings.

Countries and the actual climate policies they (fail to) enact represent the most important, but also most methodologically challenging, level of analysis at which to study these questions. These policies are ultimately what matters for mitigating climate change. My macro level results in Paper 1(Decarbonization Policy) are an important first assessment, but future work is needed to ascertain the continued accuracy of my conclusions. Fruitful quantitative reassessments will become possible with better data. This includes more encompassing and granular measures of FFP that cover the post-Covid-19 period (e.g. Nachtigall et al. 2022) and more direct measures of the contribution of RE industries to national value added. If threshold effects play a role in explaining the absence of a systematic effect up to 2020, then a focus on more recent developments will be particularly important. A second wave of national-level case studies could also help bridge the gap between earlier optimism and my null findings. They should build on existing work (e.g. Meckling et al. 2015; Kelsey 2018; Zysman and Huberty 2014; Pahle et al. 2018; Leipprand, Flachsland, and Pahle 2020) but use more rigorous and comparative qualitative methods to

assess the causal contribution of RE interests to climate policy developments and the enabling conditions for such influences.

Second, much more work is needed at the level of corporate lobbying. One particularly important remaining gap concerns policy positions. As GIP expands beyond RE industries to focus on the transformation of incumbent sectors (like steel, auto manufacturing, building materials, and even agriculture), the assumption that climate lobbying is structured around two competing coalitions becomes increasingly tenuous. This is what Kupzok and Nahm (2024) describe as the 'fracturing' of the 'fossil coalition' and the 'expanding decarbonization bargain'. These developments raise the prospect of increasingly dynamic, cross-sectoral, pro-climate coalitions that could be highly politically influential (Junk 2019). The implication for research is that different sectors' amount of mobilisation or access becomes an increasingly noisy measure and must be supplemented with analyses of actual policy positions expressed in individual consultation responses and policy papers (and the inter-sectoral overlap in these). Fortunately, advances in quantitative text analysis will allow researchers to extract even more insights both from the data I have collected for Paper $2_{(\text{EU Lobbying})}$ and from the generally abundant textual material produced by interest groups trying to influence climate policy around the world.

The other important avenue for future research on the role of corporations in this dynamic concerns the contextual factors that may shape low-carbon firms and business associations' climate policy 'issue prioritization' (Fraussen, Halpin, and Nownes 2021). My work suggests that policy-specific informational advantages play a role in their prioritisation of lobbying GIP over FFP. This raises the question of whether less informational, more openly pressure-based lobbying environments would lead these low-carbon interests to broaden their lobbying focus. Another potentially important factor concerns the accessibility of GIP support. A context in which it is politically infeasible for low-carbon corporate actors to secure regulatory benefits through such measures (perhaps because fiscal constraints rule out subsidy-based climate policy) may compel them to redirect their lobbying towards broader FFPs. Research on cases where the feasibility of GIP shifts suddenly due to exogenous shocks could, for this reason, provide important insights about the general feasibility of and contextual conditions for sustained low-carbon corporate support for more stringent climate regulation.

The third strand of future research that I hope will be taken up concerns the effect of low-carbon industries on non-electoral indicators of citizens' climate policy support. Citizens can plausibly update their opinions of specific climate policies when they experience the personal, local, or national economic benefits of growing low-carbon industries, and this could have an impact on the feasibility of specific national climate policies even in the absence

of changing voting patterns. Future studies could link survey responses to either personal employment in low-carbon industries or the location of new low-carbon industry sites. That would help disentangle the underlying effects on policy preferences that lead to my null findings in the studies of local election results. Does this reflect generally unaffected opinions, narrow effects on specific policy preferences, or broad opinion changes that do not affect voting behaviour but may still affect climate politics in subtler ways?

Fourth, as highlighted by the theoretical synthesis I proposed in the previous chapter, I believe a new strand of research is needed that integrates more elite-oriented perspectives with what we know from this dissertation as well as past work on climate policy sequencing. One of the most promising recent strands of climate politics scholarship is work on the political and policy strategies that can overcome climate policy backlash from fossil fuel interests (Finnegan 2022; Gaikwad, Genovese, and Tingley 2022; Meckling and Nahm 2022; Meckling and Strecker 2023; Bolet, Green, and González-Eguino 2024; Gazmararian 2024a). I suggest that a similar focus on the political conditions and policy strategies that can activate the latent potential for growing low-carbon industries to enable stringent climate regulation should be a priority. If what this dissertation has shown is not that such effects are structurally infeasible but that they are not automatic and need to be activated, then the question of how to activate the underlying causal mechanisms becomes crucial.

One approach would be to take up my conditional conjecture about the interaction of structural and political conduciveness (see Chapter 8) and investigate its veracity through comparative case studies or country-level quantitative analyses (as in Aklin and Urpelainen 2013b; Tørstad et al. 2023). Another would be to investigate the changes brought about in political elites' climate policy discourses and behaviours when RE industries become more structurally important to the country or local area they represent. To what extent are politicians – especially those not traditionally highly supportive of climate policy, such as the centre-right – affected by these structural changes? And do they draw on 'green growth' narratives when communicating their stance on FFP to voters? A third approach would be to look more intensely at instances where this activation has occurred. Scholars may be able to identify specific cases where policy-makers have managed to strongly mobilise low-carbon interests in favour of stringent FFP reforms and where the support of these groups has plausibly been pivotal. In-depth analyses of such cases could provide the basis for new theorising, although it would require a careful consideration of the transferability versus idiosyncrasy of the dynamics that have led to such an activation.

In summary, I believe future research can build on this dissertation and take decisive steps forward by focusing on five research agendas: (i) updated

national-level data and case studies, (ii) possible threshold effects, (iii) the changing sectoral patterns of policy positions in corporate climate lobbying, (iv) effects on individual policy preferences, and (v) the role of elite-driven activation of the corporate and citizen causal channels. Especially the final point about the political activation of these latent causal channels also speaks directly to the policy implications of this dissertation.

9.3 Implications for Climate Policy

The explicit and rapidly spreading pivot to GIP is the most important development in climate policy in the past decade. For governments around the world, this embrace of GIP has been motivated by several goals, including stimulating economic growth, increasing energy independence, and reducing emissions through the deployment of low-carbon technologies (Meckling 2021). In addition to these aims, one of the core purposes of GIP is to remove the political obstacles to stringent climate regulations and rapid phaseouts of fossil fuels (e.g. Meckling et al. 2015; Breetz, Mildenberger, and Stokes 2018; Allan, Lewis, and Oatley 2021). This dissertation has not attempted to assess the merits of GIP as a tool for meeting various economic, security, and environmental objectives. Rather, my findings speak directly to and challenge its core political objective of 'winning coalitions for climate policy' (Meckling et al. 2015). In this section, I propose that the policy implications of my findings can be interpreted in three different ways. I describe and discuss these alternative interpretations of *abandon*, *retain*, or *activate* and argue in favour of the latter.

The core question is whether policy-makers interested in promoting the rapid phaseout of fossil fuels through public policy should or should not prioritise a sequencing strategy. Should they direct their legislative attention and finite government budgets towards building up domestic low-carbon industries through GIP and wait for this to increase corporate and citizen support for more stringent climate regulation?

The first stylised reading of the policy implications of my findings is to *abandon* this sequencing strategy. Strictly speaking, what I have shown in this dissertation is that the growth of domestic RE industries does very little to actually transform national climate politics and policy meaningfully. Therefore, the most brute interpretation of the policy implications would arguably be that governments need to stop pursuing this approach to building support for stringent climate regulation. Not only is it expensive and inefficient, but it is not working. Indeed, if 'the promise of green industrial policy is that it can help motivate political action for addressing climate change by reducing abatement costs and generating societal co-benefits' (Allan, Lewis, and Oatley

2021, 4), then one could argue that my findings at the national, corporate, and citizen levels provide cause for a general reassessment of its merits. Politicians could instead dedicate government budgets to alternative strategies for overcoming climate policy resistance, such as direct compensation to policy losers (Finnegan 2022; Bolet, Green, and González-Eguino 2024).

The case for GIP as a tool to build coalitions with strong material interests in climate action appears even bleaker when considering China's increasing dominance of most low-carbon industries. This development threatens to erode existing low-carbon industries and prevent their future emergence in most other countries. The recent high-profile failure of the Swedish battery manufacturer Northvolt, which was deemed strategically important by policy-makers and received significant subsidies from the EU, exemplifies the challenging reality of GIP in the face of Chinese competition (O'Carroll 2024; Tagliapietra and Trasi 2024). Moreover, if citizens' negativity bias kicks in, governments may experience a climate policy backlash from the closure of those green industries despite never having reaped any rewards for supporting them politically in the first place.

Such an interpretation of the implications of my findings may be countered by the polar opposite position that policy-makers should *retain* their focus on GIP as a primary political strategy to enable fossil fuel phaseouts. This dissertation has shown that the rise of RE industries does not aid national FFP through specific domestic mechanisms. But GIPs have broader political benefits. They provide the global public good of lowering prices of clean technologies. These price decreases have positive *global* effects on the political feasibility of stringent climate regulation because they make low-carbon alternatives feasible, increasing the elasticity of demand for high-emissions products (Rodrik 2014; Hale and Urpelainen 2015; Hale 2020). Moreover, we should not overlook that these GIPs can directly displace fossil fuel use through deployment subsidies (Bistline et al. 2023). From this stylised perspective, policy-makers interested in speeding up the pace of fossil fuel phaseouts can safely ignore the lack of domestic political feedback effects uncovered by this dissertation. They should retain a strong emphasis on GIP because it makes FFP more politically feasible everywhere.

Yet, this interpretation is also not entirely satisfactory. It is undoubtedly true that the rapid cost reductions that some low-carbon technologies have achieved over the past decade thanks in part to GIPs have had positive effects on the pace of the energy transition globally and plausibly increased the political viability of stringent climate regulations. However, relative technology costs are not sufficient to determine the pace of change (Christophers 2024). Indeed this stylised position overlooks the continued relevance of incumbent resistance in relation to the phaseout of fossil fuel technologies even in

situations of cost-competitive alternatives (Breetz, Mildenberger, and Stokes 2018).[49] Because of 'carbon lock-in' (Seto et al. 2016), these technologies may continue to be used and politically protected long after the strict economic case for doing so has disappeared. In a country without significant domestic low-carbon industries, a global reduction in the price of these technologies may reduce the intensity of resistance among certain industrial stakeholders because it lowers their adjustment costs to, e.g., a carbon pricing policy. But it does not create a strong and powerful constituency that actively pushes for such FFPs and is capable of countering opposition from incumbent fossil fuel interests.

I therefore think a third, more nuanced, interpretation of the findings of this dissertation is warranted. Policy-makers should neither abandon nor simply retain their focus on GIP as the solution to creating political support for FFP. Instead, this dissertation points to the need to *activate* the potential but largely untapped political benefits of increasingly economically important domestic low-carbon industries. The findings of this dissertation can, as I argued in Chapter 8, be read as questioning whether the potential positive political feedback effects of rising RE industries are being taken full advantage of.

The growth of these industries along with the increasing number of citizens who depend on them economically does represent a latent transformation of national climate politics. However, my findings at the national, corporate, and citizen levels all indicate that they have not been politically activated. Therefore, the main lesson for policy is that the positive political feedback effects of GIP – even when it is successful in spurring domestic low-carbon industrial development – cannot be taken for granted and do not appear automatically. A crucial task for policy-makers is to activate these latent forces. In other words, policy-makers that pursue a strategy of climate policy sequencing cannot rest on their laurels when they manage to get a GIP enacted or even when a local low-carbon industry has been successfully developed. For this to increase the political feasibility of passing subsequent FFPs, policy-makers must continue to think strategically about the political mobilisation and activation of the latent support base they have generated. Although this dissertation has not directly investigated the effectiveness of different activation strategies, my results do point to certain promising avenues.

The first is an institutional strategy for activation. I have shown that low-carbon corporate interests are almost entirely excluded from the key FFP venues in the European Commission. But policy-makers themselves decide who

[49] It also overlooks the protectionist aspect of GIP, which is directly counterproductive to reducing the cost of clean technologies globally (Lewis 2021).

to invite to the table (Binderkrantz, Christiansen, and Pedersen 2015). Depending on the broader context, it might be feasible to give indirect winners a larger institutionalised voice in these debates and break the 'double representation of carbon polluters' (Mildenberger 2020). One interesting example of this possibility comes from the recent Danish tripartite negotiation over a large agricultural reform that included the first ever carbon tax on biological processes. Here, the government gave both the peak Danish business association (Dansk Industri) and the Danish Metal Workers' Union (Dansk Metal) seats at the table alongside more directly affected interest groups. Both groups had an indirect interest in rapid agricultural emissions reductions because the burden of emissions reductions would otherwise fall more heavily on the manufacturing sector.[50] These negotiations led to a watered down but nevertheless landmark carbon price on agriculture. Although these two groups do not primarily represent the RE industry, this example illustrates the feasibility of an institutional strategy of including indirect winners of stringent climate policy.

The second strategy of activation is communicative. I have shown that news coverage of the wind industry in Denmark very rarely makes the connection to politics. If this lack of a salient connection between the economic benefits of low-carbon industries and national climate politics is a more general phenomenon, that helps explain why the latent potential of these industries to boost support for ambitious climate policy has not been activated. Policy-makers and other actors interested in mitigating climate change and with a platform for mass communication could do more to link climate policy to these individual, local, and national benefits. This might be particularly fruitful for actors on the centre-right that have weaker moral commitments to climate policy action but a strong ideological emphasis on business affairs and economic growth. Simple framing might not be sufficient to move the opinion of the general population (Aklin and Urpelainen 2013a; Bernauer and McGrath 2016). However, a more thorough and targeted effort to highlight the political sources of local low-carbon economic successes could plausibly shift public opinion in areas where low-carbon industries are present, which tend not to be the most highly supportive of climate policy.

The third plausible avenue for policy-makers to activate the latent political benefits of growing RE and other low-carbon industries is actual policy strategies. I have shown that low-carbon corporate stakeholders remain quite disengaged and excluded from FFP debates but are as likely as their high-carbon counterparts to lobby for MPPs that either set overall targets or combine GIP

[50] The head of the Danish Metal Worker's Union explicitly advocated that 'the agricultural sector must pay the same CO_2 price as the manufacturing sector' (my translation, cited in Ritzau 2024).

and FFP instruments. This suggests that a strategy of climate policy bundling might draw low-carbon interests into struggles over broader climate policy, including fossil fuel phaseouts. Somewhat reminiscent of the strategy of 'green bargains' proposed by Meckling and Strecker (2023), the financing of GIP instruments might even be linked to the revenue generated from taxes on emission-intensive products. This idea also shares certain similarities with the broader 'coalition-building strategy' of 'linking climate policy to other economic and social reforms' (Bergquist, Mildenberger, and Stokes 2020). A climate policy bundling strategy may not only activate the support of low-carbon firms for ambitious FFP but could also increase support among the general public, for whom policy bundling might make the link between ambitious climate policy and economic benefits more easily identifiable.

In sum, this dissertation has shown that the promise of rising RE industries acting as political catalysts for rapid and ambitious climate policy action has yet to be fully realised. The rise of low-carbon industries remains a latent structural transformation. More work from scholars and policy-makers is needed to unlock the transformative political potential of these industries and the GIPs that support them, possibly through the institutional, communicative, and policy strategies outlined here. In light of continued increases in global GHG emissions and the need for a rapid intensification of political efforts to phase out fossil fuels, this is an urgent task with significant ramifications.

References

Abou-Chadi, Tarik. 2016. 'Niche Party Success and Mainstream Party Policy Shifts – How Green and Radical Right Parties Differ in Their Impact'. *British Journal of Political Science* 46 (2): 417–36. https://doi.org/10.1017/S0007123414000155

Abou-Chadi, Tarik, and Mark A. Kayser. 2017. 'It's Not Easy Being Green: Why Voters Punish Parties for Environmental Policies during Economic Downturns'. *Electoral Studies* 45 (February):201–7. https://doi.org/10.1016/j.electstud.2016.10.009

Abou-Chadi, Tarik, and Thomas Kurer. 2021. 'Economic Risk within the Household and Voting for the Radical Right'. *World Politics* 73 (3): 482–511. https://doi.org/10.1017/S0043887121000046

Aklin, Michaël, and Matto Mildenberger. 2020. 'Prisoners of the Wrong Dilemma: Why Distributive Conflict, Not Collective Action, Characterizes the Politics of Climate Change'. *Global Environmental Politics* 20 (4): 4–27. https://doi.org/10.1162/glep_a_00578

Aklin, Michaël, and Johannes Urpelainen. 2013a. 'Debating Clean Energy: Frames, Counter Frames, and Audiences'. *Global Environmental Change* 23 (5): 1225–32. https://doi.org/10.1016/j.gloenvcha.2013.03.007

———. 2013b. 'Political Competition, Path Dependence, and the Strategy of Sustainable Energy Transitions'. *American Journal of Political Science* 57 (3): 643–58. https://doi.org/10.1111/ajps.12002

———. 2018. *Renewables: The Politics of a Global Energy Transition*. Cambridge, MA and London: The MIT Press.

Allan, Bentley, Joanna I. Lewis, and Thomas Oatley. 2021. 'Green Industrial Policy and the Global Transformation of Climate Politics'. *Global Environmental Politics* 21 (4): 1–19. https://doi.org/10.1162/glep_a_00640

Allan, Bentley, and Jonas O. Meckling. 2021. 'Creative Learning and Policy Ideas: The Global Rise of Green Growth'. *Perspectives on Politics*, April, 1–19. https://doi.org/10.1017/S1537592721000037

Allan, Bentley, and Jonas Nahm. 2024. 'Strategies of Green Industrial Policy: How States Position Firms in Global Supply Chains'. *American Political Science Review*, May, 1–15. https://doi.org/10.1017/S0003055424000364

Alt, James E., Amalie Jensen, Horacio Larreguy, David D. Lassen, and John Marshall. 2022. 'Diffusing Political Concerns: How Unemployment Information Passed between Social Ties Influences Danish Voters'. *The Journal of Politics* 84 (1): 383–404. https://doi.org/10.1086/714925

Andersen, Mikael Skou. 2019. 'The Politics of Carbon Taxation: How Varieties of Policy Style Matter'. *Environmental Politics* 28 (6): 1084–1104. https://doi.org/10.1080/09644016.2019.1625134

Anderson, Brilé, Tobias Böhmelt, and Hugh Ward. 2017. 'Public Opinion and Environmental Policy Output: A Cross-National Analysis of Energy Policies in

Europe'. *Environmental Research Letters* 12 (11): 114011. https://doi.org/10.1088/1748-9326/aa8f80
Anderson, Kevin, John F. Broderick, and Isak Stoddard. 2020. 'A Factor of Two: How the Mitigation Plans of "Climate Progressive" Nations Fall Far Short of Paris-Compliant Pathways'. *Climate Policy* 20 (10): 1290–1304. https://doi.org/10.1080/14693062.2020.1728209
Angrist, Joshua D, and Jörn-Steffen Pischke. 2010. 'The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con out of Econometrics'. *Journal of Economic Perspectives* 24 (2): 3–30. https://doi.org/10.1257/jep.24.2.3
Ansolabehere, Stephen, Marc Meredith, and Erik Snowberg. 2014. 'Mecro-Economic Voting: Local Information and Micro-Perceptions of the Macro-Economy'. *Economics & Politics* 26 (3): 380–410. https://doi.org/10.1111/ecpo.12040
Baccini, Leonardo, and Stephen Weymouth. 2021. 'Gone For Good: Deindustrialization, White Voter Backlash, and US Presidential Voting'. *American Political Science Review* 115 (2): 550–67. https://doi.org/10.1017/S0003055421000022
Bang, Guri. 2024. 'The U.S. Inflation Reduction Act: Climate Policy as Economic Crisis Response'. *Environmental Politics*, December, 1–22. https://doi.org/10.1080/09644016.2024.2437886
Barabas, Jason, and Jennifer Jerit. 2010. 'Are Survey Experiments Externally Valid?' *American Political Science Review* 104 (2): 226–42. https://doi.org/10.1017/S0003055410000092
Bartels, Larry M. 2005. 'Homer Gets a Tax Cut: Inequality and Public Policy in the American Mind'. *Perspectives on Politics* 3 (01). https://doi.org/10.1017/S1537592705050036
Bayer, Patrick, and Johannes Urpelainen. 2016. 'It Is All about Political Incentives: Democracy and the Renewable Feed-in Tariff'. *The Journal of Politics* 78 (2): 603–19. https://doi.org/10.1086/684791
Bechtel, Michael M., Federica Genovese, and Kenneth F. Scheve. 2019. 'Interests, Norms and Support for the Provision of Global Public Goods: The Case of Climate Co-Operation'. *British Journal of Political Science* 49 (4): 1333–55. https://doi.org/10.1017/S0007123417000205
Beeson, Mark. 2018. 'Geoeconomics with Chinese Characteristics: The BRI and China's Evolving Grand Strategy'. *Economic and Political Studies* 6 (3): 240–56. https://doi.org/10.1080/20954816.2018.1498988
Beiser-McGrath, Liam F., and Thomas Bernauer. 2024. 'How Do Pocketbook and Distributional Concerns Affect Citizens' Preferences for Carbon Taxation?' *The Journal of Politics* 86 (2): 551–64. https://doi.org/10.1086/727594
Beramendi, Pablo, Silja Häusermann, Herbert Kitschelt, and Hanspeter Kriesi, eds. 2015. *The Politics of Advanced Capitalism*. 1st ed. Cambridge University Press. https://doi.org/10.1017/CBO9781316163245

Bergquist, Parrish, Matto Mildenberger, and Leah C Stokes. 2020. 'Combining Climate, Economic, and Social Policy Builds Public Support for Climate Action in the US'. *Environmental Research Letters* 15 (5): 054019. https://doi.org/10.1088/1748-9326/ab81c1

Bernauer, Thomas, and Liam F. McGrath. 2016. 'Simple Reframing Unlikely to Boost Public Support for Climate Policy'. *Nature Climate Change* 6 (7): 680–83. https://doi.org/10.1038/nclimate2948

Binderkrantz, Anne Skorkjær. 2005. 'Interest Group Strategies: Navigating between Privileged Access and Strategies of Pressure'. *Political Studies* 53 (4): 694–715. https://doi.org/10.1111/j.1467-9248.2005.00552.x

Binderkrantz, Anne Skorkjær, Jens Blom-Hansen, and Roman Senninger. 2021. 'Countering Bias? The EU Commission's Consultation with Interest Groups'. *Journal of European Public Policy* 28 (4): 469–88. https://doi.org/10.1080/13501763.2020.1748095

Binderkrantz, Anne Skorkjær, Peter Munk Christiansen, and Helene Helboe Pedersen. 2015. 'Interest Group Access to the Bureaucracy, Parliament, and the Media'. *Governance* 28 (1): 95–112. https://doi.org/10.1111/gove.12089

Bistline, John, Geoffrey Blanford, Maxwell Brown, Dallas Burtraw, Maya Domeshek, Jamil Farbes, Allen Fawcett, et al. 2023. 'Emissions and Energy Impacts of the Inflation Reduction Act'. *Science* 380 (6652): 1324–27. https://doi.org/10.1126/science.adg3781

BloombergNEF. 2024. 'Global Clean Energy Investment Jumps 17%, Hits $1.8 Trillion in 2023, According to BloombergNEF Report'. https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report/

Böhler, Heike, Marcel Hanegraaff, and Kai Schulze. 2022. 'Does Climate Advocacy Matter? The Importance of Competing Interest Groups for National Climate Policies'. *Climate Policy* 22 (8): 961–75. https://doi.org/10.1080/14693062.2022.2036089

Bolet, Diane, Fergus Green, and Mikel González-Eguino. 2024. 'How to Get Coal Country to Vote for Climate Policy: The Effect of a "Just Transition Agreement" on Spanish Election Results'. *American Political Science Review* 118 (3): 1344–59. https://doi.org/10.1017/S0003055423001235

Brännlund, Anton, Jan Amcoff, Marcus Österman, Lauri Peterson, and Håkan Brännlund. 2024. 'Jolts at the Ballot Box: Electricity Prices and Voting in Swedish Manufacturing Communities'. *Energy Research & Social Science* 110 (April):103419. https://doi.org/10.1016/j.erss.2024.103419

Breetz, Hanna, Matto Mildenberger, and Leah Stokes. 2018. 'The Political Logics of Clean Energy Transitions'. *Business and Politics* 20 (4): 492–522. https://doi.org/10.1017/bap.2018.14

Brunner, Eric J., and David J. Schwegman. 2022. 'Commercial Wind Energy Installations and Local Economic Development: Evidence from U.S. Counties'. *Energy Policy* 165 (June):112993. https://doi.org/10.1016/j.enpol.2022.112993

Bunea, Adriana. 2020. 'Stakeholder Consultations'. In *The Palgrave Encyclopedia of Interest Groups, Lobbying and Public Affairs*, 1–7. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-13895-0_59-1

Campbell, Andrea Louise. 2012. 'Policy Makes Mass Politics'. *Annual Review of Political Science* 15 (1): 333–51. https://doi.org/10.1146/annurev-polisci-012610-135202

Carroll, David. 2022. 'New Australian Prime Minister Vows to Turn Nation into Renewables "Superpower"'. pv magazine. https://www.pv-magazine.com/2022/05/23/new-australian-prime-minister-vows-to-turn-nation-into-renewables-superpower/

Carter, David B., and Curtis S. Signorino. 2010. 'Back to the Future: Modeling Time Dependence in Binary Data'. *Political Analysis* 18 (3): 271–92. https://doi.org/10.1093/pan/mpq013

Carter, Neil, and Michael Jacobs. 2014. 'Explaining Radical Policy Change: The Case of Climate Change and Energy Policy under the British Labour Government 2006–10'. *Public Administration* 92 (1): 125–41. https://doi.org/10.1111/padm.12046

Carter, Neil, and Conor Little. 2021. 'Party Competition on Climate Policy: The Roles of Interest Groups, Ideology and Challenger Parties in the UK and Ireland'. *International Political Science Review* 42 (1): 16–32. https://doi.org/10.1177/0192512120972582

Chalmers, Adam William. 2013. 'Trading Information for Access: Informational Lobbying Strategies and Interest Group Access to the European Union'. *Journal of European Public Policy* 20 (1): 39–58. https://doi.org/10.1080/13501763.2012.693411

Chen, Jidong, Jennifer Pan, and Yiqing Xu. 2016. 'Sources of Authoritarian Responsiveness: A Field Experiment in China'. *American Journal of Political Science* 60 (2): 383–400. https://doi.org/10.1111/ajps.12207

Chen, Jidong, and Yiqing Xu. 2017. 'Why Do Authoritarian Regimes Allow Citizens to Voice Opinions Publicly?' *The Journal of Politics* 79 (3): 792–803. https://doi.org/10.1086/690303

Cheon, Andrew, and Johannes Urpelainen. 2013. 'How Do Competing Interest Groups Influence Environmental Policy? The Case of Renewable Electricity in Industrialized Democracies, 1989–2007'. *Political Studies* 61 (4): 874–97. https://doi.org/10.1111/1467-9248.12006

Christophers, Brett. 2024. *The Price Is Wrong: Why Capitalism Won't Save the Planet*. London and New York: Verso.

Clark, Richard, Roza Khoban, and Noah Zucker. 2024. 'Breadwinner Backlash: The Gendered Effects of Industrial Decline'.

Climate Action Tracker. 2024. 'Warming Projections Global Update November 2024'. https://climateactiontracker.org/documents/1277/CAT_2024-11-14_GlobalUpdate_COP29.pdf

Climate Power. 2024. 'Clean Energy Boom Report'. Climate Power. https://climatepower.us/research-polling/clean-energy-boom-report/

Colantone, Italo, Livio Di Lonardo, Yotam Margalit, and Marco Percoco. 2024. 'The Political Consequences of Green Policies: Evidence from Italy'. *American Political Science Review* 118 (1): 108–26. https://doi.org/10.1017/S0003055423000308

Colgan, Jeff D., Jessica F. Green, and Thomas N. Hale. 2021. 'Asset Revaluation and the Existential Politics of Climate Change'. *International Organization* 75 (2): 586–610. https://doi.org/10.1017/S0020818320000296

Cooper, Jasper, Sung Eun Kim, and Johannes Urpelainen. 2018. 'The Broad Impact of a Narrow Conflict: How Natural Resource Windfalls Shape Policy and Politics'. *The Journal of Politics* 80 (2): 630–46. https://doi.org/10.1086/694787

Coppedge, Michael, John Gerring, Carl Henrik Knutsen, Staffan I Lindberg, Jan Teorell, David Altman, Michael Bernhard, et al. 2021. 'V-Dem Codebook V11.1'. Codebook. Gothenburg: Varieties of Democracy Institute. https://www.v-dem.net/en/data/reference-material-v11/

Cory, Jared, Michael Lerner, and Iain Osgood. 2021. 'Supply Chain Linkages and the Extended Carbon Coalition'. *American Journal of Political Science* 65 (1): 69–87. https://doi.org/10.1111/ajps.12525

Crownhart, Casey. 2024. 'China Banned Exports of a Few Rare Minerals to the US. Things Could Get Messier'. MIT Technology Review. https://www.technologyreview.com/2024/12/12/1108568/china-export-bans/

Culhane, Trevor, Galen Hall, and J. Timmons Roberts. 2021. 'Who Delays Climate Action? Interest Groups and Coalitions in State Legislative Struggles in the United States'. *Energy Research & Social Science* 79 (September):102114. https://doi.org/10.1016/j.erss.2021.102114

Cullenward, Danny, and David G. Victor. 2021. *Making Climate Policy Work*. Cambridge: Polity Press.

Damsbo-Svendsen, Søren. 2021. 'How Weather Experiences Strengthen Climate Opinions in Europe'. *West European Politics* 44 (7): 1604–18. https://doi.org/10.1080/01402382.2020.1792731

De Benedictis-Kessner, Justin, and Christopher Warshaw. 2020. 'Accountability for the Local Economy at All Levels of Government in United States Elections'. *American Political Science Review* 114 (3): 660–76. https://doi.org/10.1017/S0003055420000027

De Boef, Suzanna, and Luke Keele. 2008. 'Taking Time Seriously'. *American Journal of Political Science* 52 (1): 184–200. https://doi.org/10.1111/j.1540-5907.2007.00307.x

De Bruycker, Iskander. 2016. 'Pressure and Expertise: Explaining the Information Supply of Interest Groups in EU Legislative Lobbying: Pressure and Expertise'. *JCMS: Journal of Common Market Studies* 54 (3): 599–616. https://doi.org/10.1111/jcms.12298

Demarais, Agathe. 2023. 'What Does "De-Risking" Actually Mean?' Foreign Policy. https://foreignpolicy.com/2023/08/23/derisking-us-china-biden-decoupling-technology-supply-chains-semiconductors-chips-ira-trade/

Dickson, Zachary P., and Sara B. Hobolt. 2024. 'Going Against the Grain: Climate Change as a Wedge Issue for the Radical Right'. *Comparative Political Studies*, August, 00104140241271297. https://doi.org/10.1177/00104140241271297
Doucette, Jonathan Stavnskær. 2024. 'What Can We Learn about the Effects of Democracy Using Cross-National Data?' *American Political Science Review*, December, 1–10. https://doi.org/10.1017/S0003055424001278
Douenne, Thomas, and Adrien Fabre. 2020. 'French Attitudes on Climate Change, Carbon Taxation and Other Climate Policies'. *Ecological Economics* 169 (March):106496. https://doi.org/10.1016/j.ecolecon.2019.106496
Downie, Christian. 2019. *Business Battles in the US Energy Sector: Lessons for a Clean Energy Transition*. 1st ed. Abingdon, Oxon and New York, NY: Routledge. https://doi.org/10.4324/9780429402074
DR. 2017. 'Kommission vil udfase støtten til vedvarende energi'. https://www.dr.dk/nyheder/politik/kommission-vil-udfase-stoetten-til-vedvarende-energi
Drews, Stefan, and Jeroen C.J.M. van den Bergh. 2016. 'What Explains Public Support for Climate Policies? A Review of Empirical and Experimental Studies'. *Climate Policy* 16 (7): 855–76. https://doi.org/10.1080/14693062.2015.1058240
Dunning, Thad. 2010. 'Design-Based Inference: Beyond the Pitfalls of Regression Analysis?' In *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, edited by Henry E. Brady and David Collier, 206–43. Lanham, Boulder, New York, Toronto, Plymouth: Rowman & Littlefield Publishers.
Dür, Andreas, and Gemma Mateo. 2013. 'Gaining Access or Going Public? Interest Group Strategies in Five European Countries: Gaining Access or Going Public?' *European Journal of Political Research* 52 (5): 660–86. https://doi.org/10.1111/1475-6765.12012
Eckersley, Robyn. 2013. 'Poles Apart?: The Social Construction of Responsibility for Climate Change in Australia and Norway'. *Australian Journal of Politics & History* 59 (3): 382–96. https://doi.org/10.1111/ajph.12022
———. 2016. 'National Identities, International Roles, and the Legitimation of Climate Leadership: Germany and Norway Compared'. *Environmental Politics* 25 (1): 180–201. https://doi.org/10.1080/09644016.2015.1076278
Edenhofer, O., R. Pichs-Madruga, Y. Sokona, S. Kadner, J.C. Minx, S. Brunner, S. Agrawala, et al. 2014. 'Technical Summary'. In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, et al. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
Egan, Patrick J., and Megan Mullin. 2017. 'Climate Change: US Public Opinion'. *Annual Review of Political Science* 20 (1): 209–27. https://doi.org/10.1146/annurev-polisci-051215-022857

Egli, Florian, Nicolas Schmid, and Tobias S Schmidt. 2022. 'Backlash to Fossil Fuel Phase-Outs: The Case of Coal Mining in US Presidential Elections'. *Environmental Research Letters* 17 (9): 094002. https://doi.org/10.1088/1748-9326/ac82fe

EHPA. 2023. 'German Heating Law: Watered down but End Goal Unchanged'. European Heat Pump Association. https://www.ehpa.org/news-and-resources/news/german-heating-law-watered-down-but-end-goal-unchanged/.

Ember. 2024. 'Global Electricity Review 2024'. https://ember-energy.org/app/uploads/2024/05/Report-Global-Electricity-Review-2024.pdf

Energy Institute. 2024. 'Statistical Review of World Energy'. Energy Institute. https://www.energyinst.org/statistical-review

Farstad, Fay Madeleine. 2019. 'Does Size Matter? Comparing the Party Politics of Climate Change in Australia and Norway'. *Environmental Politics* 28 (6): 997–1016. https://doi.org/10.1080/09644016.2019.1625146

Farstad, Fay Madeleine, and Marianne Aasen. 2023. 'Climate Change Doesn't Win You a Climate Election: Party Competition in the 2021 Norwegian General Election'. *Environmental Politics* 32 (4): 732–42. https://doi.org/10.1080/09644016.2022.2144019

Finnegan, Jared J. 2022. 'Institutions, Climate Change, and the Foundations of Long-Term Policymaking'. *Comparative Political Studies* 55 (7): 1198–1235. https://doi.org/10.1177/00104140211047416

———. 2023. 'Changing Prices in a Changing Climate: Electoral Competition and Fossil Fuel Taxation'. *Comparative Political Studies* 56 (8): 1257–90. https://doi.org/10.1177/00104140221141853

Flöthe, Linda. 2019. 'The Costs of Interest Representation – a Resource Perspective on Informational Lobbying'. *European Political Science Review* 11 (2): 161–78. https://doi.org/10.1017/S1755773919000055

Fraussen, Bert, Darren R. Halpin, and Anthony J. Nownes. 2021. 'Why Do Interest Groups Prioritise Some Policy Issues over Others? Explaining Variation in the Drivers of Policy Agendas'. *Journal of Public Policy* 41 (3): 553–72. https://doi.org/10.1017/S0143814X2000015X

Gaikwad, Nikhar, Federica Genovese, and Dustin Tingley. 2022. 'Creating Climate Coalitions: Mass Preferences for Compensating Vulnerability in the World's Two Largest Democracies'. *American Political Science Review* 116 (4): 1165–83. https://doi.org/10.1017/S0003055422000223

Gazmararian, Alexander F. 2024a. 'Fossil Fuel Communities Support Climate Policy Coupled with Just Transition Assistance'. *Energy Policy* 184 (January):113880. https://doi.org/10.1016/j.enpol.2023.113880

———. 2024b. 'Sources of Partisan Change: Evidence from the Shale Gas Shock in American Coal Country'. *The Journal of Politics*, September, 732949. https://doi.org/10.1086/732949

Geels, Frank W. 2014. 'Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective'. *Theory, Culture & Society* 31 (5): 21–40. https://doi.org/10.1177/0263276414531627

Genovese, Federica. 2019. 'Sectors, Pollution, and Trade: How Industrial Interests Shape Domestic Positions on Global Climate Agreements'. *International Studies Quarterly* 63 (4): 819–36. https://doi.org/10.1093/isq/sqz062

Genovese, Federica, Florian G. Kern, and Christian Martin. 2017. 'Policy Alteration: Rethinking Diffusion Processes When Policies Have Alternatives'. *International Studies Quarterly* 61 (2): 236–52. https://doi.org/10.1093/isq/sqx012.

Gerring, John. 2012. 'Mere Description'. *British Journal of Political Science* 42 (4): 721–46. https://doi.org/10.1017/S0007123412000130

Green, Fergus, and Richard Denniss. 2018. 'Cutting with Both Arms of the Scissors: The Economic and Political Case for Restrictive Supply-Side Climate Policies'. *Climatic Change*, no. 150, 3–87. https://doi.org/10.1007/s10584-018-2162-x

Green, Jessica, Jennifer Hadden, Thomas Hale, and Paasha Mahdavi. 2021. 'Transition, Hedge, or Resist? Understanding Political and Economic Behavior toward Decarbonization in the Oil and Gas Industry'. *Review of International Political Economy*, July, 1–28. https://doi.org/10.1080/09692290.2021.1946708

Green-Pedersen, Christoffer, and Peter B. Mortensen. 2010. 'Who Sets the Agenda and Who Responds to It in the Danish Parliament? A New Model of Issue Competition and Agenda-setting'. *European Journal of Political Research* 49 (2): 257–81. https://doi.org/10.1111/j.1475-6765.2009.01897.x

Gullberg, Anne Therese. 2013. 'Pressure or Information? Lobbying for Binding Renewable Energy Targets in the European Union: Lobbying for Binding Renewable Energy Targets'. *Review of Policy Research* 30 (6): 611–28. https://doi.org/10.1111/ropr.12049

Hale, Thomas. 2020. 'Catalytic Cooperation'. *Global Environmental Politics* 20 (4): 73–98. https://doi.org/10.1162/glep_a_00561

Hale, Thomas, and Johannes Urpelainen. 2015. 'When and How Can Unilateral Policies Promote the International Diffusion of Environmental Policies and Clean Technology?' *Journal of Theoretical Politics* 27 (2): 177–205. https://doi.org/10.1177/0951629813518128

Hall, Richard L., and Alan V. Deardorff. 2006. 'Lobbying as Legislative Subsidy'. *American Political Science Review* 100 (1): 69–84. https://doi.org/10.1017/S0003055406062010

Hamel, Brian T. 2024. 'Traceability and Mass Policy Feedback Effects'. *American Political Science Review*, August, 1–16. https://doi.org/10.1017/S0003055424000704

Hancock, Kathleen J, and Benjamin K Sovacool. 2018. 'International Political Economy and Renewable Energy: Hydroelectric Power and the Resource Curse'. *International Studies Review*, January. https://doi.org/10.1093/isr/vix058

Hansen, Kasper Møller, and Rune Stubager, eds. 2021. *Klimavalget*. København: Djøf Forlag.
———. 2023. 'Den Danske Valgundersøgelse 2022'. 5. CVAP Working Paper Series. København: Institut for Statskundskab, Københavns Universitet.
Harrison, Kathryn, and Guri Bang. 2022. 'Supply-Side Climate Policies in Major Oil-Producing Countries: Norway's and Canada's Struggles to Align Climate Leadership with Fossil Fuel Extraction'. *Global Environmental Politics* 22 (4): 129–50. https://doi.org/10.1162/glep_a_00682
Haščič, Ivan, and Mauro Migotto. 2015. 'Measuring Environmental Innovation Using Patent Data'. 89. Vol. 89. OECD Environment Working Papers. Paris: OECD Publishing. https://doi.org/10.1787/5js009kf48xw-en
Hausfather, Zeke, and Pierre Friedlingstein. 2024. 'Analysis: Global CO2 Emissions Will Reach New High in 2024 despite Slower Growth'. Carbon Brief. https://www.carbonbrief.org/analysis-global-co2-emissions-will-reach-new-high-in-2024-despite-slower-growth/
Ho, Daniel E., Kosuke Imai, Gary King, and Elizabeth A. Stuart. 2007. 'Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference'. *Political Analysis* 15 (3): 199–236. https://doi.org/10.1093/pan/mpl013
Hochstetler, Kathryn. 2020. *Political Economies of Energy Transition: Wind and Solar Power in Brazil and South Africa*. 1st ed. Cambridge University Press. https://doi.org/10.1017/9781108920353
Hughes, Llewelyn, and Johannes Urpelainen. 2015. 'Interests, Institutions, and Climate Policy: Explaining the Choice of Policy Instruments for the Energy Sector'. *Environmental Science & Policy* 54 (December):52–63. https://doi.org/10.1016/j.envsci.2015.06.014
Iberdrola. 2024. 'Iberdrola Today: Annual Integrated Report & ESG Information 2023'. https://www.iberdrola.com/documents/20125/3643974/integrated-report-esg-2023-iberdrola-today.pdf
IEA. 2022a. 'Energy Consumption in Transport by Fuel in the Net Zero Scenario, 2000-2030'. International Energy Agency. https://www.iea.org/data-and-statistics/charts/energy-consumption-in-transport-by-fuel-in-the-net-zero-scenario-2000-2030
———. 2022b. 'Major European Utilities' Installed Generation Capacity Mix'. International Energy Agency. https://www.iea.org/data-and-statistics/charts/major-european-utilities-installed-generation-capacity-mix
———. 2023a. 'Energy Consumption in Buildings by Fuel in the Net Zero Scenario, 2010-2030'. International Energy Agency. https://www.iea.org/data-and-statistics/charts/energy-consumption-in-buildings-by-fuel-in-the-net-zero-scenario-2010-2030-2
———. 2023b. 'Energy Technology Perspectives 2023'. Paris: International Energy Agency. https://www.iea.org/reports/energy-technology-perspectives-2023
———. 2023c. 'Industrial Energy Consumption by Fuel in the Net Zero Scenario, 2000-2030'. International Energy Agency. https://www.iea.org/data-and-

statistics/charts/industrial-energy-consumption-by-fuel-in-the-net-zero-scenario-2000-2030
———. 2024. *Global EV Outlook 2024*. Paris: International Energy Agency. https://www.iea.org/reports/global-ev-outlook-2024
IRENA. 2024. 'Renewable Power Generation Costs in 2023'. Abu Dhabi: International Renewable Energy Agency.
IRENA, and ILO. 2024. 'Renewable Energy and Jobs: Annual Review 2024'. Abu Dhabi and Geneva: International Renewable Energy Agency and International Labour Organization.
Jahn, Detlef. 2016. 'Changing of the Guard: Trends in Corporatist Arrangements in 42 Highly Industrialized Societies from 1960 to 2010'. *Socio-Economic Review* 14 (1): 47–71. https://doi.org/10.1093/ser/mwu028
Jenner, Steffen, Gabriel Chan, Rolf Frankenberger, and Mathias Gabel. 2012. 'What Drives States to Support Renewable Energy?' *The Energy Journal* 33 (2). https://doi.org/10.5547/01956574.33.2.1
Jensen, Carsten, and Mathias Bukh Vestergaard. 2022. 'Government Responsiveness to Voters' Economic Vulnerabilities: Evidence from 17 European Democracies'. *West European Politics* 45 (2): 223–41. https://doi.org/10.1080/01402382.2020.1861822
Johnstone, Nick, Ivan Haščič, and David Popp. 2010. 'Renewable Energy Policies and Technological Innovation: Evidence Based on Patent Counts'. *Environmental and Resource Economics* 45 (1): 133–55. https://doi.org/10.1007/s10640-009-9309-1
Junk, Wiebke Marie. 2019. 'When Diversity Works: The Effects of Coalition Composition on the Success of Lobbying Coalitions'. *American Journal of Political Science* 63 (3): 660–74. https://doi.org/10.1111/ajps.12437
Kayser, Mark A., and Jochen Rehmert. 2021. 'Coalition Prospects and Policy Change: An Application to the Environment'. *Legislative Studies Quarterly* 46 (1): 219–46. https://doi.org/10.1111/lsq.12273
Kelsey, Nina. 2018. 'Industry Type and Environmental Policy: Industry Characteristics Shape the Potential for Policymaking Success in Energy and the Environment'. *Business and Politics* 20 (4): 615–42. https://doi.org/10.1017/bap.2018.19
———. 2021. 'International Ozone Negotiations and the Green Spiral'. *Global Environmental Politics* 21 (4): 64–87. https://doi.org/10.1162/glep_a_00631
Kelsey, Nina, and Jonas Meckling. 2018. 'Who Wins in Renewable Energy? Evidence from Europe and the United States'. *Energy Research & Social Science* 37 (March):65–73. https://doi.org/10.1016/j.erss.2017.08.003
Kennard, Amanda. 2020. 'The Enemy of My Enemy: When Firms Support Climate Change Regulation'. *International Organization* 74 (2): 187–221. https://doi.org/10.1017/S0020818320000107
Kim, In Song. 2018. 'LobbyView: Firm-Level Lobbying & Congressional Bills Database'. https://web.mit.edu/insong/www/pdf/lobbyview.pdf

Kim, Sung Eun, Johannes Urpelainen, and Joonseok Yang. 2016. 'Electric Utilities and American Climate Policy: Lobbying by Expected Winners and Losers'. *Journal of Public Policy* 36 (2): 251–75. https://doi.org/10.1017/S0143814X15000033

Kivimaa, Paula, and Florian Kern. 2016. 'Creative Destruction or Mere Niche Support? Innovation Policy Mixes for Sustainability Transitions'. *Research Policy* 45 (1): 205–17. https://doi.org/10.1016/j.respol.2015.09.008

Klüver, Heike. 2012. 'Informational Lobbying in the European Union: The Effect of Organisational Characteristics'. *West European Politics* 35 (3): 491–510. https://doi.org/10.1080/01402382.2012.665737

Klüver, Heike, Caelesta Braun, and Jan Beyers. 2015. 'Legislative Lobbying in Context: Towards a Conceptual Framework of Interest Group Lobbying in the European Union'. *Journal of European Public Policy* 22 (4): 447–61. https://doi.org/10.1080/13501763.2015.1008792

Korpi, Walter, and Joakim Palme. 2003. 'New Politics and Class Politics in the Context of Austerity and Globalization: Welfare State Regress in 18 Countries, 1975–95'. *American Political Science Review* 97 (03). https://doi.org/10.1017/S0003055403000789

Kotch, Alex. 2020. 'Members of Congress Own Up to $93 Million in Fossil Fuel Stocks'. The American Prospect. https://prospect.org/power/members-of-congress-own-up-to-93-million-in-fossil-fuel-stocks/

Krause, Werner, Denis Cohen, and Tarik Abou-Chadi. 2023. 'Does Accommodation Work? Mainstream Party Strategies and the Success of Radical Right Parties'. *Political Science Research and Methods* 11 (1): 172–79. https://doi.org/10.1017/psrm.2022.8

Kupzok, Nils, and Jonas Nahm. 2024. 'The Decarbonization Bargain: How the Decarbonizable Sector Shapes Climate Politics'. *Perspectives on Politics*, August, 1–21. https://doi.org/10.1017/S1537592724000951

Lachapelle, Erick, Robert MacNeil, and Matthew Paterson. 2017. 'The Political Economy of Decarbonisation: From Green Energy "Race" to Green "Division of Labour"'. *New Political Economy* 22 (3): 311–27. https://doi.org/10.1080/13563467.2017.1240669

Larsen, Martin Vinæs, Frederik Hjorth, Peter Thisted Dinesen, and Kim Mannemar Sønderskov. 2019. 'When Do Citizens Respond Politically to the Local Economy? Evidence from Registry Data on Local Housing Markets'. *American Political Science Review* 113 (2): 499–516. https://doi.org/10.1017/S0003055419000029

Leipprand, Anna, Christian Flachsland, and Michael Pahle. 2020. 'Starting Low, Reaching High? Sequencing in EU Climate and Energy Policies'. *Environmental Innovation and Societal Transitions* 37 (December):140–55. https://doi.org/10.1016/j.eist.2020.08.006

Lerner, Michael, and Iain Osgood. 2023. 'Across the Boards: Explaining Firm Support for Climate Policy'. *British Journal of Political Science* 53 (3): 934–57. https://doi.org/10.1017/S0007123422000497

Levi, Sebastian, Christian Flachsland, and Michael Jakob. 2020. 'Political Economy Determinants of Carbon Pricing'. *Global Environmental Politics* 20 (2): 128–56. https://doi.org/10.1162/glep_a_00549

Lewis, Joanna I. 2021. 'Green Industrial Policy After Paris: Renewable Energy Policy Measures and Climate Goals'. *Global Environmental Politics* 21 (4): 42–63. https://doi.org/10.1162/glep_a_00636

Linsenmeier, Manuel, Adil Mohommad, and Gregor Schwerhoff. 2022. 'Policy Sequencing towards Carbon Pricing among the World's Largest Emitters'. *Nature Climate Change* 12 (12): 1107–10. https://doi.org/10.1038/s41558-022-01538-8

Lockwood, Ben, and Matthew Lockwood. 2022. 'How Do Right-Wing Populist Parties Influence Climate and Renewable Energy Policies? Evidence from OECD Countries'. *Global Environmental Politics* 22 (3): 12–37. https://doi.org/10.1162/glep_a_00659

Lockwood, Matthew. 2022. 'Policy Feedback and Institutional Context in Energy Transitions'. *Policy Sciences* 55 (3): 487–507. https://doi.org/10.1007/s11077-022-09467-1

Lueders, Hans. 2022. 'Electoral Responsiveness in Closed Autocracies: Evidence from Petitions in the Former German Democratic Republic'. *American Political Science Review* 116 (3): 827–42. https://doi.org/10.1017/S0003055421001386

Lyon, Thomas P, and Haitao Yin. 2010. 'Why Do States Adopt Renewable Portfolio Standards? An Empirical Investigation'. *Energy Journal* 31 (3): 133–57.

Mahdavi, Paasha, Cesar Martinez Alvarez, and Michael L. Ross. 2022. 'Why Do Governments Tax or Subsidize Fossil Fuels?' *The Journal of Politics* 84 (4): 2123–39. https://doi.org/10.1086/719272

Markussen, Peter, and Gert Tinggaard Svendsen. 2005. 'Industry Lobbying and the Political Economy of GHG Trade in the European Union'. *Energy Policy* 33 (2): 245–55. https://doi.org/10.1016/S0301-4215(03)00238-6

Marlon, Jennifer R, Xinran Wang, Parrish Bergquist, Peter D Howe, Anthony Leiserowitz, Edward Maibach, Matto Mildenberger, and Seth Rosenthal. 2022. 'Change in US State-Level Public Opinion about Climate Change: 2008–2020'. *Environmental Research Letters* 17 (12): 124046. https://doi.org/10.1088/1748-9326/aca702

Martin, Peter, James Whiteside, Fraser McKay, and Srinivasan Santhakumar. 2024. 'Conflicts of Interest: The Cost of Investing in the Energy Transition in a High Interest-Rate Era'. Wood Mackenzie.

Mauritzen, Johannes. 2020. 'Will the Locals Benefit?' *Energy Policy* 142 (July):111489. https://doi.org/10.1016/j.enpol.2020.111489

McNamara, Kathleen R. 2024. 'Transforming Europe? The EU's Industrial Policy and Geopolitical Turn'. *Journal of European Public Policy* 31 (9): 2371–96. https://doi.org/10.1080/13501763.2023.2230247

Mealy, Penny, and Alexander Teytelboym. 2022. 'Economic Complexity and the Green Economy'. *Research Policy* 51 (8): 103948. https://doi.org/10.1016/j.respol.2020.103948
Meckling, Jonas. 2015. 'Oppose, Support, or Hedge? Distributional Effects, Regulatory Pressure, and Business Strategy in Environmental Politics'. *Global Environmental Politics* 15 (2): 19–37. https://doi.org/10.1162/GLEP_a_00296
———. 2021. 'Making Industrial Policy Work for Decarbonization'. *Global Environmental Politics* 21 (4): 134–47. https://doi.org/10.1162/glep_a_00624
Meckling, Jonas, and Bentley Allan. 2020. 'The Evolution of Ideas in Global Climate Policy'. *Nature Climate Change* 10 (5): 434–38. https://doi.org/10.1038/s41558-020-0739-7
Meckling, Jonas, Nina Kelsey, Eric Biber, and John Zysman. 2015. 'Winning Coalitions for Climate Policy'. *Science* 349 (6253): 1170–71. https://doi.org/10.1126/science.aab1336
Meckling, Jonas, and Jonas Nahm. 2018. 'When Do States Disrupt Industries? Electric Cars and the Politics of Innovation'. *Review of International Political Economy* 25 (4): 505–29. https://doi.org/10.1080/09692290.2018.1434810
———. 2022. 'Strategic State Capacity: How States Counter Opposition to Climate Policy'. *Comparative Political Studies* 55 (3): 493–523. https://doi.org/10.1177/00104140211024308
Meckling, Jonas, Thomas Sterner, and Gernot Wagner. 2017. 'Policy Sequencing toward Decarbonization'. *Nature Energy* 2 (12): 918–22. https://doi.org/10.1038/s41560-017-0025-8
Meckling, Jonas, and Jesse Strecker. 2023. 'Green Bargains: Leveraging Public Investment to Advance Climate Regulation'. *Climate Policy* 23 (4): 418–29. https://doi.org/10.1080/14693062.2022.2149452
Meyer, Robinson, dir. 2024a. 'Energy Secretary Jennifer Granholm on What Comes After Biden's Climate Agenda'. *Shift Key with Robinson Meyer and Jesse Jenkins*. Acast. https://shows.acast.com/shift-key/episodes/tk-hed
———. 2024b. 'Politics, Not Money, Will Decide the IRA's Fate'. Heatmap News. https://heatmap.news/politics/ira-politics
Meyer, Robinson, and Jesse Jenkins, dirs. 2024. 'This Isn't the Same Kind of Climate Election'. *Shift Key with Robinson Meyer and Jesse Jenkins*. Acast. https://shows.acast.com/shift-key/episodes/this-isnt-the-same-kind-of-climate-election
Michaelowa, Axel. 1998. 'Climate Policy and Interest Groups—A Public Choice Analysis'. *Intereconomics* 33 (6): 251–59. https://doi.org/10.1007/BF02929886
Mildenberger, Matto. 2020. *Carbon Captured: How Business and Labor Control Climate Politics*. Cambridge, MA and London: MIT Press.
Miller, Michael K. 2015. 'Elections, Information, and Policy Responsiveness in Autocratic Regimes'. *Comparative Political Studies* 48 (6): 691–727. https://doi.org/10.1177/0010414014555443

Moe, Espen. 2015. *Renewable Energy Transformation or Fossil Fuel Backlash*. London: Palgrave Macmillan UK. https://doi.org/10.1057/9781137298799
Møller, Karl Magnus. 2024. 'Domestic Renewable Energy Industries and National Decarbonization Policy'. *Energy Policy* 192 (September):114249. https://doi.org/10.1016/j.enpol.2024.114249
Montfort, Simon, Lukas Fesenfeld, Isabelle Stadelmann-Steffen, and Karin Ingold. 2023. 'Policy Sequencing Can Increase Public Support for Ambitious Climate Policy'. *Policy and Society* 42 (4): 454–77. https://doi.org/10.1093/polsoc/puad030
Myllyvirta, Lauri. 2024. 'Analysis: Clean Energy Was Top Driver of China's Economic Growth in 2023'. https://www.carbonbrief.org/analysis-clean-energy-was-top-driver-of-chinas-economic-growth-in-2023/
Nachtigall, Daniel, Luisa Lutz, Miguel Cárdenas Rodríguez, Ivan Haščič, and Rodrigo Pizarro. 2022. 'The Climate Actions and Policies Measurement Framework: A Structured and Harmonised Climate Policy Database to Monitor Countries' Mitigation Action'. OECD Environment Working Papers 203. Vol. 203. OECD Environment Working Papers. https://doi.org/10.1787/2caa60ce-en
Nagy, Nikoletta. 2024. 'Orbán's Opportunistic Record Belies Hungary's New pro-Climate Rethoric'. Clean Energy Wire. https://www.cleanenergywire.org/news/orbans-opportunistic-record-belies-hungarys-new-pro-climate-rethoric
Nahm, Jonas. 2021. *Collaborative Advantage: Forging Green Industries in the New Global Economy*. New York: Oxford University Press.
Nahm, Jonas, and Johannes Urpelainen. 2021. 'The Enemy Within? Green Industrial Policy and Stranded Assets in China's Power Sector'. *Global Environmental Politics* 21 (4): 88–109. https://doi.org/10.1162/glep_a_00632
Newman, Benjamin J., Yamil Velez, Todd K. Hartman, and Alexa Bankert. 2015. 'Are Citizens "Receiving the Treatment"? Assessing a Key Link in Contextual Theories of Public Opinion and Political Behavior'. *Political Psychology* 36 (1): 123–31. https://doi.org/10.1111/pops.12069
Norgaard, Kari Marie. 2011. *Living in Denial: Climate Change, Emotions, and Everyday Life*. Cambridge, MA: MIT Press.
Nygård, Jakob Riiskjaer. 2014. 'Denmark: A Classic Case of a Green Spiral'. In *Can Green Sustain Growth?*, edited by John Zysman and Mark Huberty, 1st ed., 89–106. From the Religion to the Reality of Sustainable Prosperity. Stanford University Press. https://doi.org/10.2307/j.ctvqr1czp.10
Nyholt, Niels. 2024. 'Left behind: Voters' Reactions to Local School and Hospital Closures'. *European Journal of Political Research* 63 (3): 884–905. https://doi.org/10.1111/1475-6765.12622
O'Carroll, Lisa. 2024. 'EU Announces €4bn State Aid to Back Battery and Green Tech Factories'. The Guardian. https://www.theguardian.com/business/2024/jan/08/eu-state-aid-battery-green-tech-factories-northvolt

Otteni, Cyrill, and Manès Weisskircher. 2021. 'Global Warming and Polarization. Wind Turbines and the Electoral Success of the Greens and the Populist Radical Right'. *European Journal of Political Research* n/a (n/a). https://doi.org/10.1111/1475-6765.12487

Øyen, Morten. 2023. 'Markant Flertal Af Vælgerne Vil Have En Klimaafgift På Landbruget'. Altinget. https://www.altinget.dk/artikel/274117-

Pahle, Michael, Dallas Burtraw, Christian Flachsland, Nina Kelsey, Eric Biber, Jonas Meckling, Ottmar Edenhofer, and John Zysman. 2018. 'Sequencing to Ratchet up Climate Policy Stringency'. *Nature Climate Change* 8 (10): 861–67. https://doi.org/10.1038/s41558-018-0287-6

Parsons, Craig. 2007. *How to Map Arguments in Political Science*. Oxford: Oxford University Press.

Pei, Minxin. 2012. 'China and East Asian Democracy: Is CCP Rule Fragile or Resilient?' *Journal of Democracy* 23 (1): 27–41. https://doi.org/10.1353/jod.2012.0008

Pierson, Paul. 1993. 'When Effect Becomes Cause: Policy Feedback and Political Change'. *World Politics* 45 (4): 595–628. https://doi.org/10.2307/2950710

Plechinger, Maz. 2019. 'Vindindustrien Kræver Bund under CO2-Prisen'. ENERGIWATCH. https://energiwatch.dk/secure/Energinyt/Renewables/article11836133.ece

Povitkina, Marina. 2018. 'The Limits of Democracy in Tackling Climate Change'. *Environmental Politics* 27 (3): 411–32. https://doi.org/10.1080/09644016.2018.1444723

Purdon, Mark. 2015. 'Advancing Comparative Climate Change Politics: Theory and Method'. *Global Environmental Politics* 15 (3): 1–26. https://doi.org/10.1162/GLEP_e_00309

Radowitz, Bernd. 2024. 'Germany's $9bn Green Energy Subsidy Black Hole Heaps Pressure on Scholz'. Recharge News. https://www.rechargenews.com/energy-transition/germanys-9bn-green-energy-subsidy-black-hole-heaps-pressure-on-scholz/2-1-1666846

Reeves, Andrew, and James G. Gimpel. 2012. 'Ecologies of Unease: Geographic Context and National Economic Evaluations'. *Political Behavior* 34 (3): 507–34. https://doi.org/10.1007/s11109-011-9167-8

Regeringen. 2022. 'Regeringen Sætter Turbo På Grøn Omstilling Med Ambitiøs Grøn Skattereform'. https://www.regeringen.dk/nyheder/2022/regeringen-saetter-turbo-paa-groen-omstilling-med-ambitioes-groen-skattereform/

Reuters. 2022. 'RWE Says Could Keep Brown Coal Power Plants Open, EnBW, Steag Rethink Coal'. Reuters. https://www.reuters.com/article/business/energy/rwe-says-could-keep-brown-coal-power-plants-open-enbw-steag-rethink-coal-idUSL8N2Y72AA/

Rickard, Stephanie J. 2022. 'Incumbents Beware: The Impact of Offshoring on Elections'. *British Journal of Political Science* 52 (2): 758–80. https://doi.org/10.1017/S0007123420000757

Ritchie, Hannah. 2023. 'The End of Range Anxiety: How Has the Range of Electric Cars Changed over Time?' Sustainability by the numbers. https://www.sustainabilitybynumbers.com/p/electric-car-range
Ritzau. 2024. 'Dansk Metal: Landbruget Bør Betale Samme CO2-Afgift Som Industrien'. Kristeligt Dagblad. https://www.kristeligt-dagblad.dk/danmark/dansk-metal-landbruget-boer-betale-samme-co2-afgift-som-industrien
Rodrik, D. 2014. 'Green Industrial Policy'. *Oxford Review of Economic Policy* 30 (3): 469–91. https://doi.org/10.1093/oxrep/gru025
Ross, Michael L., Chad Hazlett, and Paasha Mahdavi. 2017. 'Global Progress and Backsliding on Gasoline Taxes and Subsidies'. *Nature Energy* 2 (1): 16201. https://doi.org/10.1038/nenergy.2016.201
Rowan, Sam. 2023. 'Extreme Weather and Climate Policy'. *Environmental Politics* 32 (4): 684–707. https://doi.org/10.1080/09644016.2022.2127478
Sabatier, Paul A. 1988. 'An Advocacy Coalition Framework of Policy Change and the Role of Policy-Oriented Learning Therein'. *Policy Sciences* 21 (2–3): 129–68. https://doi.org/10.1007/BF00136406
Schaffer, Lena Maria, and Thomas Bernauer. 2014. 'Explaining Government Choices for Promoting Renewable Energy'. *Energy Policy* 68 (May):15–27. https://doi.org/10.1016/j.enpol.2013.12.064
Schäpe, Belinda. 2024. 'How to De-Risk Green Technology Supply Chains from China Without Risking Climate Catastrophe'. Malcolm H. Kerr Carnegie Middle East Center. https://carnegieendowment.org/research/2024/08/how-to-de-risk-green-technology-supply-chains-from-china-without-risking-climate-catastrophe?lang=en&center=middle-east
Schultz, Stefan. 2012. 'Bankruptcies Have German Solar on the Ropes'. Spiegel International. https://www.spiegel.de/international/business/q-cells-bankruptcy-heralds-end-of-german-solar-cell-industry-a-825490.html
Schulze, Kai. 2021. 'Policy Characteristics, Electoral Cycles, and the Partisan Politics of Climate Change'. *Global Environmental Politics* 21 (2): 44–72. https://doi.org/10.1162/glep_a_00593
Schwander, Hanna, and Jonas Fischer. 2024. 'From a Cultural to a Distributive Issue: Public Climate Action as a New Field for Comparative Political Economy'. *Regulation & Governance*, August, rego.12620. https://doi.org/10.1111/rego.12620
Schwörer, Jakob. 2024. 'Mainstream Parties and Global Warming: What Determines Parties' Engagement in Climate Protection?' *European Journal of Political Research* 63 (1): 303–25. https://doi.org/10.1111/1475-6765.12602
Seawright, Jason, and John Gerring. 2008. 'Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options'. *Political Research Quarterly* 61 (2): 294–308. https://doi.org/10.1177/1065912907313077
Seto, Karen C., Steven J. Davis, Ronald B. Mitchell, Eleanor C. Stokes, Gregory Unruh, and Diana Ürge-Vorsatz. 2016. 'Carbon Lock-In: Types, Causes, and

Policy Implications'. *Annual Review of Environment and Resources* 41 (1): 425–52. https://doi.org/10.1146/annurev-environ-110615-085934
Shoeib, Eman Ahmed Hamed, Elisabeth Hamin Infield, and Henry C. Renski. 2021. 'Measuring the Impacts of Wind Energy Projects on U.S. Rural Counties' Community Services and Cost of Living'. *Energy Policy* 153 (June):112279. https://doi.org/10.1016/j.enpol.2021.112279
Simonsohn, Uri, Joseph P. Simmons, and Leif D. Nelson. 2020. 'Specification Curve Analysis'. *Nature Human Behaviour* 4 (11): 1208–14. https://doi.org/10.1038/s41562-020-0912-z
Skjærseth, Jon Birger, Teis Hansen, Jakob Donner-Amnell, Jens Hanson, Tor Håkon Jackson Inderberg, Helle Ørsted Nielsen, Birgitte Nygaard, and Markus Steen. 2023. 'Denmark'. In *Wind Power Policies and Diffusion in the Nordic Countries*, by Jon Birger Skjærseth, Teis Hansen, Jakob Donner-Amnell, Jens Hanson, Tor Håkon Jackson Inderberg, Helle Ørsted Nielsen, Birgitte Nygaard, and Markus Steen, 27–51. Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-34186-1_3
Slothuus, Rune, and Martin Bisgaard. 2021. 'How Political Parties Shape Public Opinion in the Real World'. *American Journal of Political Science* 65 (4): 896–911. https://doi.org/10.1111/ajps.12550
Soss, Joe, and Sanford F. Schram. 2007. 'A Public Transformed? Welfare Reform as Policy Feedback'. *American Political Science Review* 101 (1): 111–27. https://doi.org/10.1017/S0003055407070049
Sovacool, Benjamin K. 2021. 'Clean, Low-Carbon but Corrupt? Examining Corruption Risks and Solutions for the Renewable Energy Sector in Mexico, Malaysia, Kenya and South Africa'. *Energy Strategy Reviews* 38 (November):100723. https://doi.org/10.1016/j.esr.2021.100723
State of Green. 2020. 'Danish Exports of Green Technology Increased by Billions in 2019'. https://stateofgreen.com/en/news/danish-exports-of-green-technology-increased-by-billions-in-2019/
Steegen, Sara, Francis Tuerlinckx, Andrew Gelman, and Wolf Vanpaemel. 2016. 'Increasing Transparency Through a Multiverse Analysis'. *Perspectives on Psychological Science* 11 (5): 702–12. https://doi.org/10.1177/1745691616658637
Steinberg, Paul F. 2015. 'Can We Generalize from Case Studies?' *Global Environmental Politics* 15 (3): 152–75. https://doi.org/10.1162/GLEP_a_00316
Stigler, George J. 1971. 'The Theory of Economic Regulation'. *The Bell Journal of Economics and Management Science* 2 (1): 3–21. https://doi.org/10.2307/3003160
Stoddard, Isak, Kevin Anderson, Stuart Capstick, Wim Carton, Joanna Depledge, Keri Facer, Clair Gough, et al. 2021. 'Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?' *Annual Review of Environment and Resources* 46 (1): 653–89. https://doi.org/10.1146/annurev-environ-012220-011104

Stokes, Leah C. 2016. 'Electoral Backlash against Climate Policy: A Natural Experiment on Retrospective Voting and Local Resistance to Public Policy'. *American Journal of Political Science* 60 (4): 958–74. https://doi.org/10.1111/ajps.12220

———. 2020. *Short Circuiting Policy: Interest Groups and the Battle Over Clean Energy and Climate Policy in the American States*. New York: Oxford University Press.

Stokes, Leah C., and Matto Mildenberger. 2020. 'The Trouble with Carbon Pricing'. Boston Review. https://bostonreview.net/articles/leah-c-stokes-matto-mildenberger-tk/

Tagliapietra, Simone, and Cecilia Trasi. 2024. 'Northvolt's Struggles: A Cautionary Tale for the EU Clean Industrial Deal'. Bruegel. https://www.bruegel.org/analysis/northvolts-struggles-cautionary-tale-eu-clean-industrial-deal

The Economist. 2024. 'Donald Trump's Promise of a Golden Age for Oil Is Fanciful'. The Economist. https://www.economist.com/business/2024/07/24/donald-trumps-promise-of-a-golden-age-for-oil-is-fanciful

The White House. 2023. 'Remarks by President Biden on the Anniversary of the Inflation Reduction Act'. https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/08/16/remarks-by-president-biden-on-the-anniversary-of-the-inflation-reduction-act/

Tilsted, Joachim Peter, Anders Bjørn, Guillaume Majeau-Bettez, and Jens Friis Lund. 2021. 'Accounting Matters: Revisiting Claims of Decoupling and Genuine Green Growth in Nordic Countries'. *Ecological Economics* 187 (September):107101. https://doi.org/10.1016/j.ecolecon.2021.107101

Tobin, Paul. 2017. 'Leaders and Laggards: Climate Policy Ambition in Developed States'. *Global Environmental Politics* 17 (4): 28–47. https://doi.org/10.1162/GLEP_a_00433

Tooze, Adam. 2024a. 'Chartbook Carbon Notes 10: In China, Clean Energy Is Now THE Driver of Overall Economic Growth.' *Chartbook* (blog). 10 January 2024. https://adamtooze.substack.com/p/chartbook-carbon-notes-10-in-china

———. 2024b. 'Great Power Politics'. *London Review of Books* 46 (21).

Tørstad, Vegard, Jonas Nahm, Jon Hovi, Tora Skodvin, and Gard Olav Dietrichson. 2023. 'Economic Recessions and Decarbonisation: Analysing Green Stimulus Spending in Canada and the US'. *New Political Economy*, December, 1–19. https://doi.org/10.1080/13563467.2023.2294744

Trachtman, Samuel. 2023. 'Policy Feedback and Interdependence in American Federalism: Evidence from Rooftop Solar Politics'. *Perspectives on Politics* 21 (2): 462–77. https://doi.org/10.1017/S153759272100092X

Trachtman, Samuel, and Jonas Meckling. 2022. 'The Climate Advocacy Gap'. *Climatic Change* 172 (3–4): 24. https://doi.org/10.1007/s10584-022-03381-4

Treisman, Daniel. 2020. 'Economic Development and Democracy: Predispositions and Triggers'. *Annual Review of Political Science* 23 (1): 241–57. https://doi.org/10.1146/annurev-polisci-050718-043546
Truex, Rory. 2017. 'Consultative Authoritarianism and Its Limits'. *Comparative Political Studies* 50 (3): 329–61. https://doi.org/10.1177/0010414014534196
Tvinnereim, Endre, and Elisabeth Ivarsflaten. 2016. 'Fossil Fuels, Employment, and Support for Climate Policies'. *Energy Policy* 96 (September):364–71. https://doi.org/10.1016/j.enpol.2016.05.052
UNEP. 2024. *Emissions Gap Report 2024: No More Hot Air … Please! With a Massive Gap between Rhetoric and Reality, Countries Draft New Climate Commitments*. Nairobi: United Nations Environment Programme. https://doi.org/10.59117/20.500. 11822/46404
Unruh, Gregory C. 2000. 'Understanding Carbon Lock-In'. *Energy Policy* 28 (12): 817–30. https://doi.org/10.1016/S0301-4215(00)00070-7
Urpelainen, Johannes, and Alice Tianbo Zhang. 2022. 'Electoral Backlash or Positive Reinforcement? Wind Power and Congressional Elections in the United States'. *The Journal of Politics* 84 (3): 1306–21. https://doi.org/10.1086/718977
Valentim, António. 2023. 'Repeated Exposure and Protest Outcomes: How Fridays for Future Protests Influenced Voters'. https://doi.org/10.31235/osf.io/m6dpg
Valentim, António, Heike Klüver, and Cornelius Erfort. 2023. 'Buying Voter Support for Unpopular Policies: Evidence from German Nuclear Power Plants'. https://doi.org/10.31219/osf.io/jnarh
Van Den Bergh, Jeroen, and Ivan Savin. 2021. 'Impact of Carbon Pricing on Low-Carbon Innovation and Deep Decarbonisation: Controversies and Path Forward'. *Environmental and Resource Economics* 80 (4): 705–15. https://doi.org/10.1007/s10640-021-00594-6
Von Uexkull, Nina, Espen Geelmuyden Rød, and Isak Svensson. 2024. 'Fueling Protest? Climate Change Mitigation, Fuel Prices and Protest Onset'. *World Development* 177 (May):106536. https://doi.org/10.1016/j.worlddev.2024.106536
Vormedal, Irja. 2011. 'From Foe to Friend? Business, the Tipping Point and U.S. Climate Politics'. *Business and Politics* 13 (3): 1–29. https://doi.org/10.2202/1469-3569.1350
Vormedal, Irja, Lars H. Gulbrandsen, and Jon Birger Skjærseth. 2020. 'Big Oil and Climate Regulation: Business as Usual or a Changing Business?' *Global Environmental Politics* 20 (4): 143–66. https://doi.org/10.1162/glep_a_00565
Wenzelburger, Georg, Carsten Jensen, Seonghui Lee, and Christoph Arndt. 2020. 'How Governments Strategically Time Welfare State Reform Legislation: Empirical Evidence from Five European Countries'. *West European Politics* 43 (6): 1285–1314. https://doi.org/10.1080/01402382.2019.1668245
Wilson, James Q. 1980. *The Politics of Regulation*. New York: Basic Books.

WindEurope. 2024. 'No Offshore Bids in Denmark – Disappointing but Sadly Not Surprising'. https://windeurope.org/newsroom/press-releases/no-offshore-bids-in-denmark-disappointing-but-sadly-not-surprising/
Woll, Cornelia. 2008. *Firm Interests: How Governments Shape Business Lobbying on Global Trade*. Ithaca, NY: Cornell University Press.
World Bank. 2022a. '"Coal Rents (% of GDP)" (NY.GDP.COAL.RT.ZS). World Development Indicators. https://data.worldbank.org/indicator/NY.GDP.COAL.RT.ZS
———. 2022b. '"GDP per Capita (Current US$)" (NY.GDP.PCAP.CD). World Development Indicators. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD
———. 2022c. '"Natural Gas Rents (% of GDP)" (NY.GDP.NGAS.RT.ZS). World Development Indicators. https://data.worldbank.org/indicator/NY.GDP.NGAS.RT.ZS
———. 2022d. '"Oil Rents (% of GDP)" (NY.GDP.PETR.RT.ZS). World Development Indicators. https://data.worldbank.org/indicator/NY.GDP.PETR.RT.ZS
Xu, Lan, and Jun Yang. 2024. 'Carbon Pricing Policies and Renewable Energy Development: Analysis Based on Cross-Country Panel Data'. *Journal of Environmental Management* 366 (August):121784. https://doi.org/10.1016/j.jenvman.2024.121784
Yang, Joonseok. 2024. 'Why Compete for Firms? Electoral Effects of Corporate Headquarters Relocation'. *American Journal of Political Science* 68 (2): 339–53. https://doi.org/10.1111/ajps.12807
Yuan, Zhihang, and Chen Shen. 2024. 'How Citizens' Information Framing Enhances Government Responsiveness for Urban Sustainable Development? Evidence from China's Air Pollution Governance'. *Sustainable Cities and Society* 112 (October):105586. https://doi.org/10.1016/j.scs.2024.105586
Ziady, Hanna. 2024. 'Historic Moment for Volkswagen: Automaker Plans to Close "at Least" 3 German Plants and Cut Thousands of Jobs'. CNN. https://www.cnn.com/2024/10/28/business/volkswagen-factory-closures-layoffs
Zysman, John, and Mark Huberty, eds. 2014. *Can Green Sustain Growth? From the Religion to the Reality of Sustainable Prosperity*. Stanford, CA: Stanford University Press.

English Summary

Climate change is the most formidable political challenge of our time. To address this challenge, national governments need to enact stringent climate policies to speed up the energy transition and phase out fossil fuels. However, they face the dual problem of limited enthusiasm among citizens and fierce resistance from corporate interests with stakes in the incumbent fossil fuel-based economy. The emergence of low-carbon industries promises to change this. As renewable energy and other low-carbon industries expand, they give rise to firms and citizens with concentrated economic interests in a rapid energy transition. Scholars increasingly promote the idea that climate policy should focus on building up domestic low-carbon coalitions by subsidising the development and deployment of low-carbon technologies such as wind turbines, solar panels, and electric vehicles. Policy-makers around the world are heeding this advice by placing green industrial policies at the centre of their climate policy strategies. Nevertheless, the central assumptions that underpin this scholarship and political strategy remain largely untested.

This dissertation therefore asks how the emergence of domestic low-carbon industries affects national climate politics and policy. Through a set of theoretical propositions and empirical investigations, I challenge the widespread belief that the rise of domestic renewable energy and other low-carbon industries leads to more stringent national policies aimed at phasing out fossil fuels. I draw on established political science theories to argue that structural, institutional, and informational barriers can weaken this effect. Low-carbon corporate interests might lack the informational resources and institutional access to lobby effectively for fossil fuel phaseout policies. Citizens might not associate the emergence and continued success of low-carbon industries with ambitious climate policy. In addition, low-carbon coalitions likely face greater counter-mobilisation when they fight for stringent fossil fuel phaseout policies – which threaten high-carbon interests more directly – than when they lobby for further green industrial policy subsidies.

This dissertation comprises four self-contained empirical studies. In the first study, I provide evidence that, once confounding factors are taken into account, the size of domestic renewable energy industries has not been systematically associated with the introduction or stringency of national fossil fuel phaseout policies like carbon pricing and fossil fuel subsidy removal during the past three decades.

In the three subsequent studies, I investigate the micro level causal channels that might explain the absence of a country-level relationship. First, I leverage the European Commission's diverse climate policy agenda and its

systematic stakeholder engagement to quantitatively study the sectoral patterns of corporate climate lobbying. I show that firms and business associations from renewable energy and other low-carbon sectors are much more likely to lobby on green industrial policies compared to fossil fuel phaseout policies, and that they remain vastly outnumbered by high-carbon corporate interests when lobbying on these broader climate policy instruments.

Finally, I study the role of citizens and ask whether those who experience the tangible economic benefits of domestic low-carbon industries become more supportive of ambitious climate policy. I investigate this at the local level in separate case studies of Denmark and the United States. I first show that Danish citizens living close to large wind industry sites do not vote more for pro-climate or less for anti-climate parties in national elections and do not become more supportive of stringent climate regulation. In addition, I find that Danish news media does not highlight the connection to national politics in their coverage of this industry.

I then turn to the Inflation Reduction Act, a major green industrial policy package enacted in the United States in 2022. I exploit this unique policy to estimate the effect of newly-announced low-carbon manufacturing investments on local electoral support for the incumbent, pro-climate Democratic party in the 2024 presidential election. I find no evidence that the local economic benefits of emerging low-carbon industries boosted support for the pro-climate political party, even when it was directly responsible for the policy producing these benefits.

Together, these theoretical propositions and empirical results hold lessons for climate policy-making and contribute in important ways to the academic literature on strategic climate policy sequencing and green industrial policy. This dissertation not only challenges widely held beliefs about the political effects of rising low-carbon industries, but also provides new insights into the specific causal processes that undermine these effects. Rather than implying that this political strategy should be abandoned, my insights can therefore help identify new ways of activating the untapped potential of emerging low-carbon industries to transform national climate politics and catalyse the phaseout of fossil fuels.

Dansk resumé

Klimaforandringerne er vor tids største politiske udfordring. For at bremse dem er nationale regeringer nødt til at indføre ambitiøse klimapolitiske tiltag, som fremskynder den grønne omstilling og udfasningen af fossile brændsler. Men de står over for den dobbelte udfordring, at borgerne ikke er udpræget begejstrede, og at mange virksomheder med økonomiske interesser i fortsat produktion og forbrug af fossile brændsler yder intens modstand. Fremvæksten af grønne lavemissionsindustrier (*low-carbon industries*) har et unikt potentiale til at ændre det billede. I takt med at vedvarende energi og andre lavemissionsindustrier udbygges, udvides gruppen af borgere og virksomheder som har stærke økonomiske interesser i en hurtig grøn omstilling. Forskere argumenterer i stigende grad for, at landes klimapolitik bør fokusere på at styrke disse grønne koalitioner ved at subsidiere den nationale produktion og udrulning af grønne teknologier såsom vindmøller, solceller og elbiler. Flere og flere politikere verden over følger i disse år den tilgang og gør grøn industripolitik til et centralt element i deres klimapolitiske strategi. Alligevel er de centrale antagelser, som ligger til grund for denne politiske strategi og den tilhørende forskningslitteratur, stort set ikke er blevet undersøgt.

Denne afhandling spørger derfor, hvordan fremvæksten af nationale grønne industrier påvirker national klimapolitik – både de politiske dynamikker og den vedtagne lovgivning. Gennem en række teoretiske argumenter og empiriske undersøgelser, udfordrer jeg den udbredte tro på, at fremvæksten af nationale grønne industrier fører til mere ambitiøs national politik rettet mod udfasningen af fossile brændsler. Med udgangspunkt i etablerede politologiske teorier argumenterer jeg for, at strukturelle, institutionelle og informationsmæssige barrierer kan udvande den effekt. Grønne virksomheder mangler den tekniske viden og den institutionelle adgang, som skal til for effektivt at lobbye fossile udfasningspolitikker. Borgere forbinder muligvis slet ikke de grønne industriers fremvækst og fortsatte succes med ambitiøs national klimapolitik. Og disse grønne koalitioner vil møde større modstand, når de kæmper for fossile udfasningspolitikker – som mere direkte truer fossile interesser – sammenlignet med, når de søger indflydelse på den grønne industripolitik.

Afhandlingen indeholder fire selvstændige empiriske studier. I det første studie viser jeg, at der over de sidste tre årtier ikke er nogen systematisk sammenhæng mellem størrelsen på landes vedvarende energi-industrier og deres fossile udfasningspolitikker, herunder CO_2-priser og reduktion af subsidier til fossile brændsler, når der tages højde for bagvedliggende faktorer.

I de tre efterfølgende studier undersøger jeg på mikro-niveau de mekanismer, som kan forklare fraværet af en sammenhæng på landeniveau. I afhandlingens andet studie fokuserer jeg på virksomheder. Jeg udnytter Europakommissionens omfattende klimapolitiske dagsorden og systematiske interessentinddragelse til kvantitativt at undersøge virksomhedslobbyisme på klima- og energiområdet. Jeg viser, at virksomheder og erhvervssammenslutninger fra grønne industrier er langt mere tilbøjelige til at lobbye omkring grøn industripolitik end fossil udfasningspolitik, og at de fortsat er i markant undertal ift. aktører fra højemissionsbrancher, når de forsøger at yde indflydelse på disse bredere klimapolitiske instrumenter.

Afhandlingens tredje empiriske fokusområde er borgerne. Jeg spørger her hvorvidt de borgere, som oplever de konkrete økonomiske gevinster ved udviklingen af nationale grønne industrier, udviser større støtte til ambitiøs klimapolitik. Det undersøger jeg med fokus på det lokale niveau gennem to kvantitative casestudier af henholdsvis Denmark og USA. Først viser jeg, at borgere i de områder af Danmark, som ligger tæt på vindenergibranchens store arbejdssteder, ikke er målbart mere tilbøjelige til at stemme på politiske partier med en ambitiøs klimapolitisk profil. De stemmer heller ikke i mindre grad på de højre-populistiske partier, som er mest imod udfasning af fossile brændsler. Jeg finder desuden, at danske medier i deres dækning af vindenergibranchen kun sjældent fremhæver forbindelsen til national politik.

Slutteligt udnytter jeg Inflation Reduction Act – en betydelig grøn industripolitik indført i USA i 2022 – til at estimere effekten af en pludselig bølge af lokale investeringer i nye grønne fabrikker på støtten til den siddende Demokratiske regering ved præsidentvalget i 2024. Jeg finder igen ingen evidens for, at de lokale gevinster fra fremvoksende grønne industrier øger støtten til de politiske partier, som står for mere ambitiøs klimapolitisk handling, selv ikke når de er direkte ansvarlige for den politik, som har ført til disse gevinster.

Afhandlingens teoretiske pointer og empiriske resultater indeholder vigtig læring for beslutningstagere og udgør samlet set et betydeligt bidrag til forskningslitteraturen om grøn industripolitik og *climate policy sequencing*. Afhandlingen udfordrer ikke bare udbredte antagelser om de politiske effekter af fremvoksende grønne industrier, men giver også ny indsigt i de specifikke kausale processer, som underminerer disse effekter. Snarere end at indikere, at den klimapolitiske strategi bør opgives, kan mine resultater derfor hjælpe med at identificere nye måder at aktivere grønne industriers uudnyttede potentiale til at forandre national klimapolitik og fremskynde udfasningen af fossile brændsler.