



Ariadne-Report

Mapping variation in institutions for climate policymaking

Climate institutions in Germany, the
United Kingdom, Sweden, and Australia



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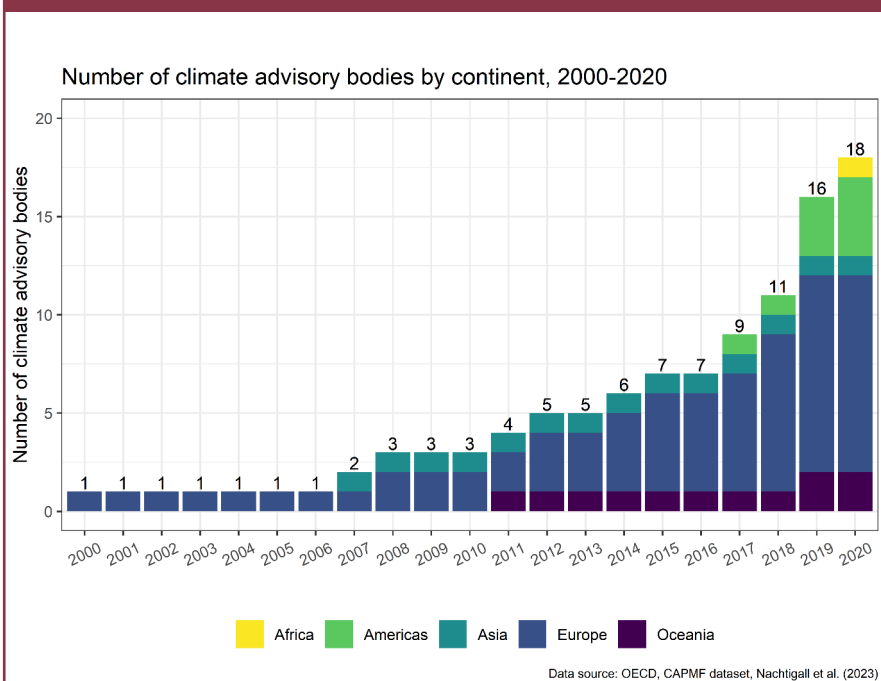
1. INTRODUCTION

Countries around the world have set increasingly ambitious targets to reduce greenhouse gas emissions and mitigate climate change. To deliver on these targets, policymakers have (i) implemented new policy instruments, (ii) increased the stringency of existing policy instruments, and (iii) created 'climate institutions'. A substantial body of literature is devoted to the first two phenomena. Yet we know little about climate institutions, including the different types of institutions countries create and how they affect the development and stringency of climate policy (Dubash 2021; Dubash et al. 2021).

This report therefore seeks to answer three research questions. First, what are climate institutions and how can we characterise them across countries? Second, what effects do climate institutions have on climate policymaking? Third, based on these findings, what lessons can we draw about the landscape of German climate institutions and what options exist for institutional reform? To address these questions, we propose a definition of climate institutions and develop a conceptual framework for analysing and comparing their effects on climate policymaking in four countries: Germany, the United Kingdom, Sweden, and Australia. We then draw on this framework and our comparative analysis to identify potentially promising reforms for German climate governance, especially in light of the proposed changes to the German climate law (the *Bundes-Klimaschutzgesetz*, or KSG).

Political institutions are, generally speaking, "the formal laws, rules, and organisations that make decisions stable", which "bind us into choices we make" and "allow us to fix our expectations of what others are likely to do" (Ansell 2023, 18). 'Climate institutions' are a specific type of political institution, explicitly devoted to climate change policy, which formalise the process of climate policymaking and steer its development, delivery, and potential improvement. They include, inter alia, climate framework legislation, climate advisory bodies, climate ministries, and parliamentary committees dedicated to climate policy.

Figure 1: Proliferation of climate advisory bodies, 2000-2020.



Over the past decade or so, these climate-specific institutions have proliferated in several countries. Figure 1, for instance, illustrates the emergence of climate advisory bodies around the world since 2000.

Though we observe the emergence of climate institutions, we lack clear definitional criteria for identifying these institutions and distinguishing them from other political institutions relevant for climate policy. This conceptual clarity is critical if we are to compare climate institutions across countries, within countries over time, and assess their effects on climate policymaking.

Existing definitions of climate institutions in the academic literature do not allow for systematic comparison of the climate institutional landscape for two reasons. First, some papers focus specifically on a single type of institution, such as climate laws (Duwe and Evans 2020), climate advisory bodies (Crowley and Head 2017; Weaver, Lötjönen, and Ollikainen 2019; Evans and Duwe 2021) or institutions focused on climate-related inter-ministerial coordination (von Lüpke, Leopold, and Tosun 2023), and therefore preclude analysis of the range of climate institutions involved in policymaking. Second,

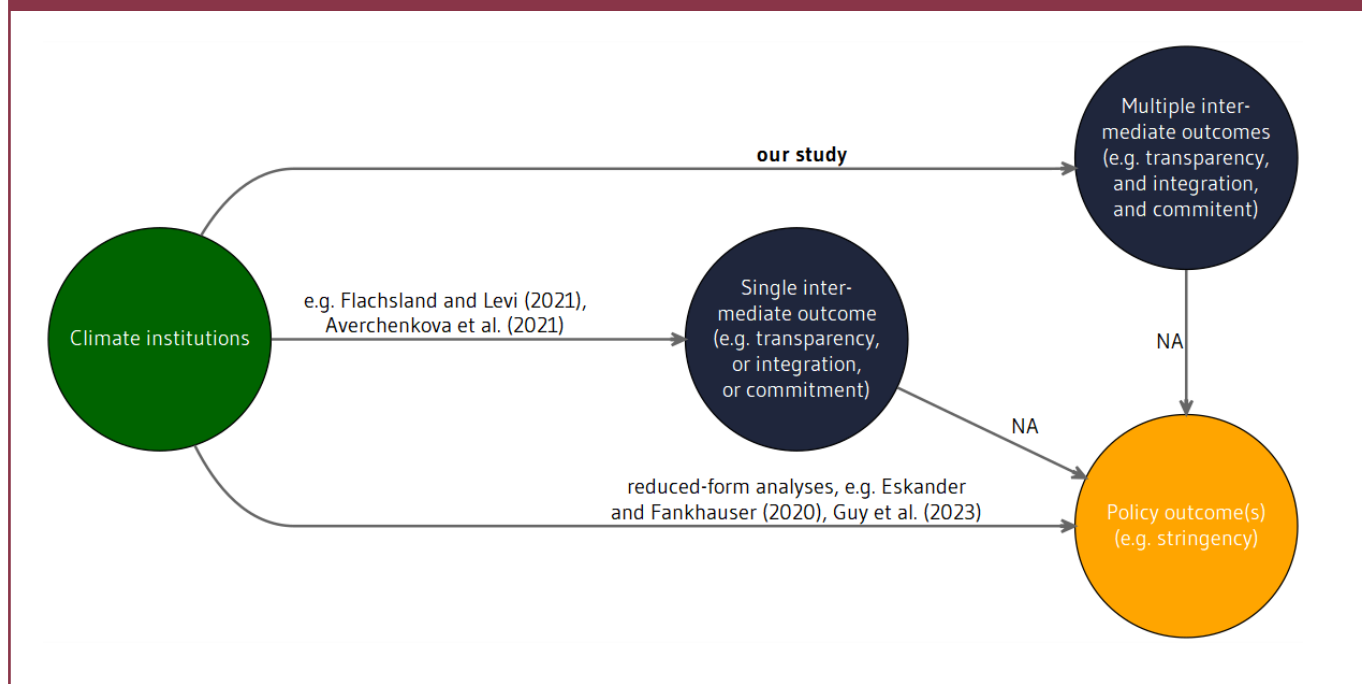
others adopt encompassing definitions that cover multiple types of institutions (MacNeil 2021; Guy, Shears, and Meckling 2023). But these obscure important differentiation among institutions, especially formal and informal institutions, and the lack of easily replicable criteria limits comparative analysis. Our definition seeks to cover multiple institutions, while its formalistic focus ensures a high degree of replicability, allowing us to distinguish between ‘climate institutions’ and the larger set of institutions relevant to climate-policymaking.

The climate institutions literature also offers no ‘off-the-shelf’ framework for comparing the effects of multiple¹ climate institutions on policymaking. Indeed, most of the literature focuses on the emergence of climate institutions, rather than their effects (Lorenzoni and Benson 2014; Torney 2017, 2019; Karlsson 2021). A very small number of studies examine the effect of the presence of certain types of institutions on climate policy performance (Eskander and Fankhauser 2020; Guy, Shears, and Meckling 2023). These are ‘reduced-form’ analyses, indicated in the bottom-most arrow in Figure 2: studies that examine the effect of one or multiple climate institutions on policy outcomes

(e.g. emissions reductions or stringency) without examining how climate institutions engender these outcomes, e.g. by enhancing transparency, integration, or commitment. Others focus on the effect of climate institutions on a single intermediate outcome, an aspect of climate policymaking hypothesised to have a knock-on effect on policy outcomes (the central dark circle Figure 2). For instance, studies examine the effect of climate institutions on increasing transparency (Averchenkova, Fankhauser, and Finnegan 2021b), policy integration (Flachsland and Levi 2021), and commitment (Lockwood 2013; Averchenkova, Fankhauser, and Finnegan 2021a). To our knowledge, no studies exist analysing how these intermediate outcomes, or aspects of climate policymaking, then affect climate policy outcomes, as shown by the edges labelled ‘NA’.

While the links between climate institutions and intermediate outcomes have received some attention in the literature, they remain under-theorised. We lack a nuanced understanding of the range of effects of climate institutions and the mechanisms by which these effects occur. Our study addresses this gap by proposing an analytical framework that (i) theorises climate institutions can have a

Figure 2: Existing analyses of effects of climate institutions on climate policymaking and climate policy outcomes.
Source: Own illustration.



¹ There exist, however, frameworks for analysing the effects of a single type of institution across countries, such as the one developed by Evans and Duwe (2021).

range of potential effects, (ii) identifies mechanisms by which effects occur and intervening variables which influence them, and (iii) recognises (but does not analyse) the knock-on effects of intermediate outcomes on policy, including the stringency of targets and policy instruments.

We categorise effects of climate institutions in terms of 'strategic challenges' in climate policymaking. Following, inter alia, Averchenkova and Nachmany (2017) and MacNeil (2021), we conceive of climate institutions as means by which policymakers respond to strategic challenges inherent in climate policymaking. These include the need for long-term commitment to emissions reduction targets, the need for common knowledge about the issue of climate change and potential solutions, the need to consult with and compensate stakeholders who stand to lose from the transition, and the need to coordinate implementation. In the absence of a theory of climate policymaking (or policymaking more broadly) that explicitly provides micro-foundations for these strategic challenges, we derive a list of these challenges from (i) a review of the role of institutions in the broader political science, comparative politics, and policy studies literatures; and (ii) a focused literature review of studies on the effects of climate institutions specifically. We apply this framework through analysis of climate institutions and their effects in four countries, drawing on desktop analysis and interviews with climate policy experts in each country (22 interviews, ~5 per country). Our cases were selected with the aim of maximising variation in macro-political context among a sample of wealthy democracies. This allowed us to better distinguish between variation arising from the functions, or design of institutions and 'intervening variables' that influence their effects, while holding socio-economic variables (e.g. per capita income) roughly constant.

Three key findings emerge from our comparison of institutions and their effects across the four cases. First, there is a rich landscape of climate institutions in all countries in our sample. This is con-

trary to significant parts of the academic literature, which focuses almost exclusively on climate laws and climate advisory bodies. Second, we find that formal climate institutions tend to primarily address both the epistemic (knowledge-related) and attention-related strategic challenges present in climate policymaking. Climate advisory bodies, for instance, enhance transparency through ex-post and (in some cases) ex-ante analysis. Their credibility as knowledge brokers allows them to establish 'common knowledge': a shared understanding among policy elites about the problem of climate change, potential solutions, and relevant trade-offs involved in implementation.

Several types of climate institutions – including climate laws, climate advisory bodies, parliamentary committees, and climate ministries – address attention-related challenges by ensuring that climate policy is placed upon or returned to the political agenda. The regular process that climate institutions establish for climate policy development – involving scheduled analysis by advisory bodies, publication of reports, debates in parliament, replies by the government to advisory bodies' reports, and regular policy updates – not only ensures that governments are frequently forced to consider climate policy, but also that there are regular focal points for public scrutiny of the government's performance. Different arrangements for climate ministries – including combined 'super-ministries' and dedicated climate ministries – contribute to agenda setting within the government in different ways. They are supported by 'climate units' within other ministries, especially when those ministries possess significant political clout (e.g. finance ministries).

Third, few of the institutions covered by our definition are focused specifically on implementation of climate policy and compensating the potential 'losers' from climate policy. This is due, in part, to the importance of sector-specific institutions for implementation, which we do not examine in this report. The lack of compensation-related institutions may reflect the fact that many wealthy democracies have until now been able to compensate

the losers from climate policy and climate change via existing institutions or via ad hoc, informal ones (e.g. Germany's "Kohlekommission"). Where large-scale decarbonisation is particularly contentious, however, we may witness the emergence of formal, compensation-focused institutions in the future, as illustrated by Australia having recently established the Net Zero Transition Authority to deliver compensation to communities affected by the energy transition (PM&C 2023a).

Our comparative analysis also sheds light on the potential effects of the proposed amendment (*Klimaschutznovelle*) to the KSG on German climate policymaking, the institutional gaps the amendment could fill, and those that will likely remain. We identify viable and potentially impactful avenues for institutional reform aimed at both increasing the *Klimaschutznovelle's* effectiveness and addressing some of its key remaining deficits. These include: (i) improving integration and horizontal coordination by establishing processes for devising and evaluating cross-sectoral *Sofort- and Förderprogramme* as well as reinstating the currently dormant *Klimakabinett* (climate cabinet); (ii) enhancing transparency and accountability by increasing the scope and transparency of the modelling of the likely evolution of future emissions (*Projektionsdaten*) as well as the ERK's analytical capacity; (iii) boosting the ERK's agenda-seeding and agenda-setting powers via more active policy entrepreneurship.

This report proceeds as follows. In the following section, we detail our analytical approach, including how we approached the literature reviews and justification for our case selection. Section 3 summarises our analytical framework. Section 4 sets out our results, examining variation both within and across cases. Section 5 discusses options for improving the landscape of German climate institutions.

2. ANALYTICAL APPROACH

This section describes our approach to developing both a definition of climate institutions and an analytical framework for ascertaining their effects on climate policymaking.

2.1 Definitions and scope

To develop a clear and easily reproducible² definition of climate institutions, we proceeded in two steps. First, we identified the conditions we deem individually necessary and collectively sufficient for an institution to be classified as a climate institution. Second, we justified why the institutions excluded by our conditions lie outside the scope of our study.

Practically, this involved first developing a list of climate institutions based on the German case (our best understood case) and then identifying the corresponding and potentially additional institutions in other countries based on detailed desktop analysis, triangulated with interviews (see 2.4.1). To harmonise this collection of institutions across the countries in our sample, we defined a climate institution as a formal, state institution established to steer the development and / or implementation of national climate mitigation policy from a multi-sectoral perspective. The specific criteria and justifications for choosing these criteria are detailed in Table 1, below (see Table 5 in section 4.2 for the full table of institutions which meet these criteria).

Clearly, this definition – with its focus on formal, state climate mitigation institutions – is narrow, in comparison to other definitions in the literature. It certainly does not include all institutions that are influential in the climate policymaking process, such as think tanks and NGOs (e.g. Oreskes and Conway 2010; Wilkinson 2020; Böhler, Hanegraaff, and Schulze 2022), energy regulators (e.g. Ofgem in the UK, Australian Renewable Energy Agency) and other sector-specific institutions (e.g. rail and road transport infrastructure regulators), peak business associations or labour unions (e.g. Mildemberger 2020).

The rationale behind this narrow scope is twofold. First, most studies adopt broad definitions of climate institutions, including both formal and informal ones, without providing clear and straightforwardly replicable criteria for operationalising these definitions for comparative purposes. In contrast, our definition's emphasis on formal institutions ensures a high degree of reproducibility, thus facilitating comparative analysis. Second, by carving out one segment of the set of climate-relevant institutions, we can reduce complexity and better disentangle the effects of formal, national, mitigation-focused institutions, and the effects of other institutions (e.g. sector-based, sub-national, informal). Both rationales are important for building the broader research agenda in this area, to expand

2 Following Cheibub et al. (2010) and Clark et al. (2017, 166), we define reproducibility as the property that, given identical coding rules and the same set of facts, all potential coders classify the same institutions as climate institutions. We use 'reproducible' and 'replicable' synonymously throughout the report.

Table 1: Individually necessary and collectively sufficient conditions for inclusion as a climate institution

Criterion	Explanation	Excludes	Example(s) excluded	Justification
State	Executive (created by government) and or legislative (mandated by law) institutions	Non-state institutions, such as research institutes, think tanks, NGOs, unions, and interest groups	Agora Energiewende (Germany) Stockholm Environment Institute (Sweden) Bürgerrat Klima ³	Seek to understand how governments, rather than non-governmental actors, respond institutionally to climate policy-making
Formal	An established, discernible institutional body / structure	Culture, customs, narratives	Climate narratives (Guy, Shears, and Meckling 2023, fig. 1) Informal or semi-formal institutions, such as All-Party Parliamentary Groups (UK)	Enables replicability across contexts
National	Operates at federal-government level or equivalent. Domestic climate policy is the institution's main focus	Sub-national climate institutions (e.g. at state or regional level) and supra-national climate institutions, as well as institutions focused on steering international or supra-national climate policy, or on facilitating coordination between national and supra-national institutions	Climate Change Act 2017 in Victoria, Australia (state-level climate law) Wissenschaftlicher Beirat für Globale Umweltfragen (WBGU, Germany; internationally oriented) National energy and climate plans (NECP) ⁴	Reduces complexity implied by interactions across multiple levels of governance
Climate mitigation⁵	Focused on measures to reduce greenhouse gas (GHG) emissions with the goal to achieve climate neutrality	Other climate-relevant and environmental issues, such as adaptation, biodiversity, sustainable development, negative emissions and resource management	National Adaptation Policy Office (Australia) Sachverständigenrat für Umweltfragen (SRU) Nationaler Wasserstoffrat (Germany)	Reduces complexity
Ecompassing	Addressing climate change mitigation with a holistic, multi-sectoral and / or cross-sectoral intent	Sector or issue-specific climate institutions which steer a specific aspect of climate mitigation, such as renewable energy, energy market design, transport, or industry.	Clean Energy Regulator (Australia) Deutsche Energie-Agentur (DENA, Germany) Office of Gas and Electricity Markets (Ofgem, United Kingdom)	Reduces complexity and allows to abstract from sector-specific dynamics, which are often country-specific, potentially impeding comparative work
Permanent	Established with the intent of a permanent role in climate policy-making	Institutions established with the intent of operating for a prescribed period, such as temporary task forces, commissions.	Net Zero Economy Taskforce (Australia) 'Kohlekommission' (Germany) Climate Assembly UK ⁶	Allows for a 'here-and-now' comparative approach, thus reducing complexity by ignoring temporal variation
Steering	Designed to steer the development and / or implementation of policy instruments	Any kind of legislation, executive action, or strategic plan which implements new policy instruments and / or modifies existing ones, without simultaneously specifying principles that will guide the design of future climate policy instruments or packages. For example, a law proscribing the operation of renewables subsidies or carbon pricing schemes	Erneuerbare-Energien-Gesetz (Germany) Renewable Energy Target Legislation (Australia) Feed-in tariffs for renewable electricity (UK, 2010, 2014, 2020) An Integrated Climate and Energy Policy (Sweden, 2009)	Allows to abstract from instrument-specific dynamics, which tend to be country-specific, thus hampering comparative analysis

³ The official sponsor was BürgerBegehren Klimaschutz e.V. (Bürgerrat Klima n.d.), i.e. a non-profit organisation.

⁴ By 31 December 2018, all EU member states had to submit draft NECPs for the period from 2021 to 2030 – documents, which “outline how EU countries intend to address the 5 dimensions of the energy union: decarbonisation, energy efficiency, energy security, internal energy market, research, innovation and competitiveness.” (European Commission 2023)

⁵ We recognise that some institutions combine climate mitigation and climate adaption (e.g. the UK CCC includes an Adaptation (Sub-)Committee). We nevertheless include these institutions because they retain a focus on climate mitigation.

⁶ Unlike the German Bürgerrat Klima, this citizens' assembly would qualify as a state institution since it was run by the House of Commons (Climate Assembly UK n.d.).

our analysis to a greater number of country cases in future work, and to investigate the effects of other categories of climate-relevant institutions.

Finally, we operationalise our definition in a here-and-now manner by deliberately restricting our attention to a specific point in time (early 2023). As a result, we do not chart the emergence or development of institutions over time – nor do we examine temporal heterogeneity in the effects of climate institutions. We hope this will be the focus of future work, and we believe our static approach lays the groundwork for such a dynamic extension of our analysis. Yet, such longitudinal analysis is beyond the scope of this report.

2.2 Case selection

The sample of cases for our study are Germany, Sweden, the United Kingdom, and Australia. Given that we seek to establish a clear definition of climate institutions and facilitate theory building about their effects, our first criterion was to select countries that display relatively advanced development of these institutions. We then took the German case as our point of departure and selected three further cases that are socio-economically similar to Germany but differ in their macro-political institutions and features; specifically electoral rules, interest-group mediation, type of economy, structure of the state, and (non-)membership in the European Union (see Table 2).

This strategy – minimising variation in socio-economic characteristics while maximising variation in political institutions among countries with well-developed climate institutions – has three advantages relative to a most-similar approach. First, a diverse set of cases allows us to distinguish between features and functions of climate institutions that are unique to a given country and those that are common across different political contexts. Without the backdrop provided by politically different countries, we may mistakenly believe some idiosyncratic features to be general and vice versa. By reducing the risk of such misclassifications, a diverse case selec-

tion strategy is conducive to identifying necessary conditions and therefore to developing a clear definition.

Second, we know that climate institu-

tions can affect policymaking differently in different contexts. This can be as a result of their varying functions (i.e. what they are mandated to do) or because there are ‘intervening variables’ – such

Table 2: Macro-political features considered in case-selection and justification

Macro-political institutional feature	Justification
Electoral rules (Bormann and Golder 2022)	Several studies (e.g. Harrison and Sundstrom 2010; Harrison 2010; Lockwood et al. 2017; Finnegan 2022) identify electoral rules – the rules for translating votes into seats – as an important direct determinant of climate policy. Most studies argue that proportional representation (PR), compared to majoritarian, electoral rules tend to result in more stringent climate policies (Meckling and Karplus 2023).
Interest group mediation (Siaroff 1999; Lijphart 2012)	Patterns of interest group mediation appear to affect climate policy (e.g. Scruggs 1999, 2003; Jahn 2018; Mildemberger 2020; Finnegan 2022). Corporatist arrangements, some argue, facilitate long-term climate policymaking by, for instance, enabling governments to commit credibly to compensation (Finnegan 2022). Others, however, believe corporatism to be detrimental to climate policy on account of institutionalising the ‘double representation’ of incumbent carbon-intensive workers and businesses (Mildemberger 2020).
Type of welfare state (Esping-Andersen 1990)	Extensive welfare states, compared to minimal ones, allow governments to compensate climate policy’s losers more effectively and are, thus, seen as crucial element of climate governance landscapes conducive to transitioning to a low-carbon economy (Gough and Meadowcroft 2011; Gough 2016; Meckling et al. 2022). Other studies focus on the relationship between different types of welfare states and more specific features of climate policy, such as citizens’ preferences for climate policy instruments (Sivonen and Kukkonen 2021).
Type of economy (Hall and Soskice 2001)	Hall and Soskice (2001) employ the concept of ‘institutional complementarities’ to argue that modern capitalist arrangements can be described by two ideal types: liberal market and coordinated market economies (LMEs and CMEs). A small literature examines how these clusters of capitalist institutions translate into distinct varieties of decarbonisation (Četković and Buzogány 2016). This includes analyses of (i) the varieties of phasing out coal (Rentier, Lelieveldt, and Kramer 2019), (ii) the varieties of green innovation and how they result in differences in mitigation technologies (Mikler and Harrison 2012), and (iii) the limitations LMEs place on governments in implementing environmental taxes (MacNeil 2016).
Structure of state (federal vs unitary)	The structure of the state is hypothesised to affect climate policy, through the mechanisms of (i) efficient vertical coordination in unitary states and (ii) space created for policy experimentation (Callander and Harstad 2015; Reich 2021), and entrepreneurship in federal systems. Works that regard the absence of coordination as an obstacle to effective climate policy emphasise the value of vertical coordination (Jordaan et al. 2019). In contrast, studies that investigate climate policy in nationally polarised contexts – such as the US and Australia – tend to place greater emphasis on the role of sub-national experimentation, learning and policy entrepreneurship in fostering stringent climate policy (Christoff and Eckersley 2021; Karapin 2020; Mildemberger 2020; Müller and Slominski 2017; Trachtman 2019).
EU member	EU membership has been shown to influence climate policy outcomes (Calel and Dechezleprêtre 2016; Bayer and Aklın 2020; Eskander and Fankhauser 2020; Dechezleprêtre, Nachtigall, and Venmans 2023), particularly through policy diffusion and convergence (e.g. Strunz et al. 2018; Gawel and Strunz 2019; Grafström et al. 2023).

as electoral rules, or political culture – that change the effect of institutions. Examining macro-politically different cases helps us to illuminate these distinct sources of variation, which is important for accurately identifying variation in the effects of otherwise similar climate institutions.

Thirdly, diverse cases enable us to investigate whether and how different macro-political contexts give rise to distinct clusters of climate institutions (Guy, Shears, and Meckling 2023); this allows researchers to clearly specify the scope conditions of their hypotheses as to what effects different climate institutions have on the policymaking process. Though clearly, more cases are needed to define these clusters, our case selection approach aids hypothesis generation in this way and provides a foundation for future research.

We varied our cases based on macro-political institutional variables identified in the climate policy literature as poten-

tial drivers of both intermediate (aspects of climate policymaking, see section 1) and ultimate policy outcomes (e.g. stringency of targets and instruments). Table 2 provides a justification for each of these variables and Table 3 summarises how they vary across our chosen cases. It is worth noting that these macro-political variables are correlated with one another, giving rise to multi-collinearity between them. The resulting clustering of macro-political institutions is one reason why it is empirically difficult to disentangle the effect(s) of one type of institution, e.g. electoral rules, on climate policy outcomes.⁷

Economically, both Sweden and Germany belong to the group of coordinated market economies (CMEs), and, as such, tend to rely on corporatist structures for interest group mediation. While, politically, both countries use proportional representation (PR) electoral systems, there are important institutional differences, notably Sweden being a unitary state and Germany being a federal one. In con-

trast, the two Anglo-Saxon countries in our sample have liberal market economies (LMEs) and pluralist interest group systems. Politically, they both elect their representatives via majoritarian electoral systems, though they differ in the structure of their states, with the UK being unitary and Australia being federal.

2.3 Literature review

To develop our analytical framework, we conducted a two-part literature review: (1) a scoping review of the literature to identify the range of approaches used to analyse political institutions and their effects on climate policymaking, and (2) a focused review of papers that specifically examine the effects of climate institutions. Each is discussed in turn, below.

2.3.1 Review of existing approaches to analysing the effects of institutions on climate policymaking

We conducted a scoping review of the literature to understand the effects institutions have been shown to have on climate policymaking, and to find out whether there were existing analytical approaches or frameworks that we could apply to climate institutions. To that end, we reviewed frameworks about the role of institutions from the broader political science, comparative politics, and policy studies literatures. In addition, we also reviewed literature on the effects of institutions on climate policymaking, broadly defined. Given the large and broad range of relevant material, it was not possible to conduct this review exhaustively – instead, we identified papers drawing on relevant syllabi and identifying related papers using Google Scholar and Research Rabbit.

The outcome of this literature review was two-fold. First, we ascertained that no appropriate frameworks exist for analysing the impact of climate institutions, emphasising the need for a novel framework. Second, we identified relevant

Table 3: Case selection matrix

Macro-political and economic characteristics						
Country	Electoral rules (Bormann and Golder 2022 ⁸)	Interest group mediation (Siaroff 1999; Lijphart 2012) ⁹	Type of welfare state (Esping-Andersen 1990)	Type of economy (Hall and Soskice 2001)	Structure of state	EU member
Germany	Mixed-member proportional	Corporatist	Conservative	CME	Federal	Yes
Australia	Majoritarian (alternative vote)	Pluralist	Liberal	LME	Federal	No
United Kingdom	Majoritarian (Single-Member-District-Plurality)	Pluralist	Liberal	LME	Unitary (with devolution)	No
Sweden	Proportional (open-list PR)	Corporatist	Social-democratic	CME	Unitary	Yes

⁷ We thank Marion Dumas for pointing this out.

⁸ We classified electoral systems according to the 'elecrule' variable in Bormann and Golder (2020, 7). While we recognise the importance of all three components of electoral systems – ballot structure, district magnitude, and electoral rules (Cox 1997; Shugart and Taagepera 2017) – we focus only on the third component because it features most prominently in the relevant literature.

⁹ Countries' interest group systems were classified based on Lijphart's extension of Siaroff's 'index of interest group pluralism', which ranges from 0.35 (Sweden) to 3.25 (Canada). The mean is roughly 2.02 and the standard deviation is 0.95. Given that Australia (2.12) and the UK (3.02) have above-average pluralism scores, we classify their interest group systems as pluralist, and because Germany (0.88) and Sweden (0.35) have below-average scores we classify them as corporatist.

macro-political institutions for variation in case selection (see Section 2.2).

2.3.2 Review of effects of climate institutions on climate policymaking

Our second step in the literature review was to narrow our focus to studies that examine the functions and effects of climate institutions. We wanted to capture the range of effects identified in the literature, to help us answer our second research question: what impact do institutions have on climate policymaking? This presented us with two challenges: one conceptual, the other technical. Conceptually, the main challenge was that the existing literature relies on vague and hard-to-operationalise definitions of 'climate institutions'. This implied that we could not simply identify relevant papers by searching for a clearly specified list of climate institutions. Drawing up such a list a priori carried the risk of overlooking important climate institutions and the literatures relating to them. To avoid these pitfalls, we scoured the academic literature via Scopus and ResearchRabbit for a broad range of keywords, from 'climate advisory body' to 'consultation venue'.¹⁰

The technical challenge was to prune the just over 31,000 papers our search returned to those focused on climate institutions. To that effect, we downloaded the Scopus query as a csv file, and followed the conventional approach to topic modelling by fitting a Latent Dirichlet Allocation (LDA) model to the paper titles (Grimmer, Roberts, and Stewart 2022). The number of topics (twelve) was chosen by trial and error to allow for a maximally efficient manual search of our query's results. Ultimately, we identified roughly 130 papers on climate institutions for advanced industrial democracies (see section 2.2).

To identify the papers focused specifically on the effects of climate institutions (rather than, for instance, on their emer-

gence), we developed four scoping rules. These scoping rules were particularly important for dealing transparently with borderline papers – papers not clearly focused on climate institutions' effects, but whose results are potentially relevant for understanding these effects. Our four scoping rules were:

1. The independent variable is a climate institution in one of our sample's four countries, or in a country similar¹¹ to the countries in our sample.
2. The dependent variable is related to climate policymaking, which we define as the process of formulating, coordinating, deciding, and implementing national climate policy.
3. The climate institution examined in the paper meets all of the seven definitional conditions that we rely on for operationalising 'climate institutions.' These are: state, formal, national, climate mitigation-focused, encompassing, permanent, steering (see Table 1).
4. The effect of the climate institution is identified empirically OR the effect is theorised ex-ante (i.e. the effects are hypothesised, as opposed to actually identified). We include the additional ex-ante criterion to widen our sample slightly, given the very limited number of papers examining actual effects.

Applying these scoping rules left us with a sample of just over 30 papers. To analyse these papers, we devised a coding scheme, which required coders to specify (i) the climate institution having the effect, (ii) the hypothesised effects or theory, (iii) the mechanisms bringing about the effects, (iv) the actual effects, and (v) the dependent variable.¹² We randomly assigned two coders to each paper, who first blind-coded the paper before comparing their results with the other to ensure inter-coder reliability. Based on the coding scheme, coders' classifications of the relevant papers were mostly aligned.

When disagreements arose, a third coder was consulted to resolve these.

We used the results of this coding exercise to identify effects of climate institutions in our comparative analysis and to estimate 'confidence levels' for those effects (see section 4.3.2).

2.4 Empirical analysis

The goal of our empirical analysis was to identify and compare the climate institutions in each of our selected countries, their key features, and effects. This analysis consisted of two parts: a desktop review of climate institutions drawing on public documents, and interviews with experts in climate policy.

2.4.1 Desktop analysis

For our desktop review, we created a matrix of climate institutions, their features, and functions, with 'features' referring to important descriptive characteristics of climate institutions (e.g. size and composition of climate advisory bodies) and 'functions' referring to what the respective institutions are intended to do¹³ in the climate policymaking process. Our initial categories of institutions were based on the climate institutions present in the German case. This reflected our orientation towards and stronger understanding of the German climate governance landscape. We then identified the corresponding institutions in Sweden, the United Kingdom, and Australia, noting where there were gaps compared with Germany and adding categories of institutions identified in other cases. We drew on primary documents, including legislation and policy documents, as well as secondary sources, like academic articles and media reporting. This exercise produced a broad mix of institutions across the four cases.

Based on this analysis of 'climate institutions' across our four cases, we developed seven definitional 'criteria' that

¹⁰ The exact Scopus query was: TITLE-ABS-KEY (("Climate" OR "climate") AND ("council" OR "advisory body" OR "framework law" OR "legislation" OR "act" OR "ministry" OR "department" OR "committee" OR "governance" OR "consultation venue" OR "inter-departmental coordination" OR "strategy")) AND (LIMIT-TO (SUBJAREA, "SOCI")).

¹¹ We define 'similar' as a democracy, with similar GDP per capita that is also part of the same region (Western Europe, Nordic region, Central Eastern Europe, Southern Europe, South-East Europe, Asia-Pacific region).

¹² If possible, coders were required to specify the dependent variable at a conceptual level, how the paper operationalises the dependent variable, and the data used for operationalisation.

¹³ While we recognise that institutions cannot be doers without agents, we use this expression as a shorthand, reflecting our assumption that institutions are a means through which agents pursue their strategic objectives.

any institution must collectively meet to qualify as a ‘climate institution’ (see section 2.1). We then excluded institutions that do not meet our definition to produce a final, harmonised list.

2.4.2 Interviews

The purpose of interviews with climate policy experts across the different countries was (1) to test our list of climate institutions and identify any further institutions we might have missed, (2) to better understand the functions of these institutions in the climate policymaking process, and (3) to identify hypothesised effects of these institutions from the perspective of interviewees. We conducted 22, roughly one-hour interviews¹⁴ in total, including five in Germany, seven in Sweden, five in the United Kingdom, and five in Australia. Our full list of interviewees is contained in the appendix. We asked interviewees the same types of questions across all countries (refer appendix for generic questionnaire), and included a tailored list of climate institutions, based on our definitional criteria (see section 2.1). We discussed each institution in turn with our interviewees to elicit their views on the functions of the institutions and their effects on climate policymaking.

We coded interview transcripts in the qualitative analysis software MAXQDA.

Our codebook consisted of two main elements: (i) the set of climate institutions included in our definition and (ii) the list of ‘strategic challenges in climate policy-making’ identified in our analytical framework (see section 3.1). Our full codebook is included in the appendix. This code system allowed us to identify matrices comprised of specific types of institutions (rows) and their effects (columns), which we used to draw comparative insights on the effects of institutions. A sample of five transcripts was double-coded to ensure inter-coder reliability, which averaged approximately 70%.

After completing our first full draft of the report in early June 2023, we conducted a two-step review process. First, we shared the draft with all our interviewees to ensure they were happy with how we used their data in the report and to invite them to give substantive feedback if they wished. Second, as part of the internal Ariadne peer review process, we shared the draft version of the report with two, primary reviewers. We also circulated the report among roughly 15 climate policy experts to elicit additional feedback. Given the urgency of the debate about German climate institutions and the *Klimaschutznovelle*, we told experts that we could only incorporate feedback received by late June. In addition to the comments by our two primary

reviewers, we received comments by five other experts. We responded to these comments by creating an excel sheet, indicating the section to which a given comment pertains, the comment itself, our decision as to whether we accepted or rejected the comment, and our reason(s) for doing so.

2.5 Identifying reform options

The final step in our process was to draw on the results of our comparative analysis to identify gaps in the landscape of German climate institutions and potential avenues for reform.

The rationale for doing this was twofold. First, the goal of the Ariadne research project, of which this report is a part, is to guide the German government through the energy transition (Ariadne n.d.). As a result, we seek to illustrate the policy relevance of our findings by shedding light on institutional reforms that may enable or constrain Germany’s path to climate neutrality. Second, we want to demonstrate how our framework can be used as a diagnostic tool to identify institutional gaps and propose reform options based on analysis of climate institutions in other countries.

The ‘strategic challenges’ aspect of our analytical framework (see section 3.1, below) reveals gaps – strategic challenges that the ensemble of German climate institutions currently does not address, or addresses only insufficiently – and therefore helps identify institutional deficits. The ‘stylised causal chains’ aspect of our analytical framework, with its focus on mechanisms, allows us to leverage our comparative analysis to identify where institutional innovations may be replicated across contexts. Rather than adopting a simple copy-and-paste logic, we identify where mechanisms driving the effect(s) engendered by an institution might carry over to the German context. For a more detailed description of this methodological approach, refer to Appendix.

During the writing of this report, the German government published a draft proposal to considerably amend the KSG via the *Klimaschutznovelle*. The proposed

Table 4: Types of interviewees by country

	United Kingdom	Australia	Sweden	Germany
Climate advisory body	1	1	3	2
Government	0	1	0	2
Academia	3	3	3	0
Think tank	1	0	1	1
Total	5	5	7	5

changes have potentially profound implications for German climate governance and the functioning of German climate institutions. Given our analysis was conducted prior to the amendment, we do not analyse these changes in our main results. In section 5, however, we draw on these results to analyse which institutional gaps the *Klimaschutznovelle* may fill and what deficits remain. The reform options we outline take the proposed amendment into account – we identify further potential reforms to ensure the updated German climate governance framework can function effectively.

3. ANALYTICAL FRAMEWORK

Drawing on our literature reviews (see section 2.3), we devised an analytical framework that allows us to identify what effects climate institutions have on the climate policymaking process and how these effects are engendered. Our framework's two central planks are:

1. strategic challenges present in climate policymaking (discussed in section 3.1), and
2. stylised causal chains connecting climate institutions to their effects on policymaking, via addressing related strategic challenges (discussed in section 3.2).

Climate change is a deeply challenging policy problem for several reasons. It is characterized by severe or 'deep' uncertainty (Kriegler et al. 2009; Held et al. 2009; Weitzman 2009; Schmidt et al. 2011, 2013; Nordhaus 2013; Weitzman 2015; Wagner and Weitzman 2015; Barnett, Brock, and Hansen 2020; Manski, Sanstad, and DeCanio 2021; DeCanio, Manski, and Sanstad 2022; Fillion, Guivarch, and Taconet 2023) – both about the physical impacts of climate change (including their temporal and spatial distribution), and about the efficacy of potential policy instruments to mitigate dangerous climate change. It demands long-term investments, which impose costs on individuals, communities and businesses in the present for payoffs (far) in the future. Climate policy faces significant barriers to implementation, including the physical challenge of

replacing or 'greening' fossil fuel infrastructure, and political barriers from interest groups who stand to lose in the transition. These 'wicked' features of climate policy imply a series of 'strategic' challenges. They include the need to build a shared understanding of the problem of climate change and potential solutions, the need to ensure long-term commitment to emissions reductions targets, the need to compensate losers, and the need to coordinate activity across all sectors of the economy and segments of society more broadly. These challenges appear throughout the policy process and addressing them supports ambitious domestic climate action.

Our analytical framework, as summarised in Figure 3, begins with the assumption – following, *inter alia*, Averchenkova and Nachmany (2017) and MacNeil (2021) – that institutions represent a means to respond to these strategic challenges. A classic response to the challenge of commitment, for example, is to delegate policy decisions to independent institutions (Gilardi 2002), like a central bank or a climate advisory body, to insulate them from short-term political, especially electoral, pressures (Brunner, Flachsland, and Marschinski 2012). We represent this assumption in the figure below with the arrow connecting 'strategic challenges' to the institutional ecosystem box. Institutions, however, are not the only means by which policymakers respond to these challenges. Policy instruments, the regulat-

ory toolkit upon which governments draw, and targets, can all also address strategic challenges. For example, both policy instruments and targets can be designed in ways to encourage commitment. This can be achieved by, inter alia, including a price collar in the design of an emissions trading scheme (Edenhofer et al. 2019; Stavins 2022), adopting earmarking rules for revenues from environmental taxes (Marsiliani and Renstrom 2000), creating enforceable property rights to investment subsidies (Abrego and Perroni 2002) or carving long-term targets into five-year carbon budgets. Responding to strategic challenges via instruments¹⁵ or targets, however, is not the focus of our study.

The second part of our analytical framework, in the centre of Figure 3, is the ‘stylised causal chain’ through which climate institutions engender effects via addressing strategic challenges. This causal chain consists of an institution’s function (what it is intended to do), the mechanism by which (how) an effect is engendered, an intervening variable which influences the effect, and the effect on a strategic challenge (e.g. achieving commitment). The arrow connecting ‘effect on strategic challenge’ to ‘effect on climate policy’ illustrates that tackling these strategic challenges institutionally can influence policy, including

targets, the choice of policy instruments, and their stringency.

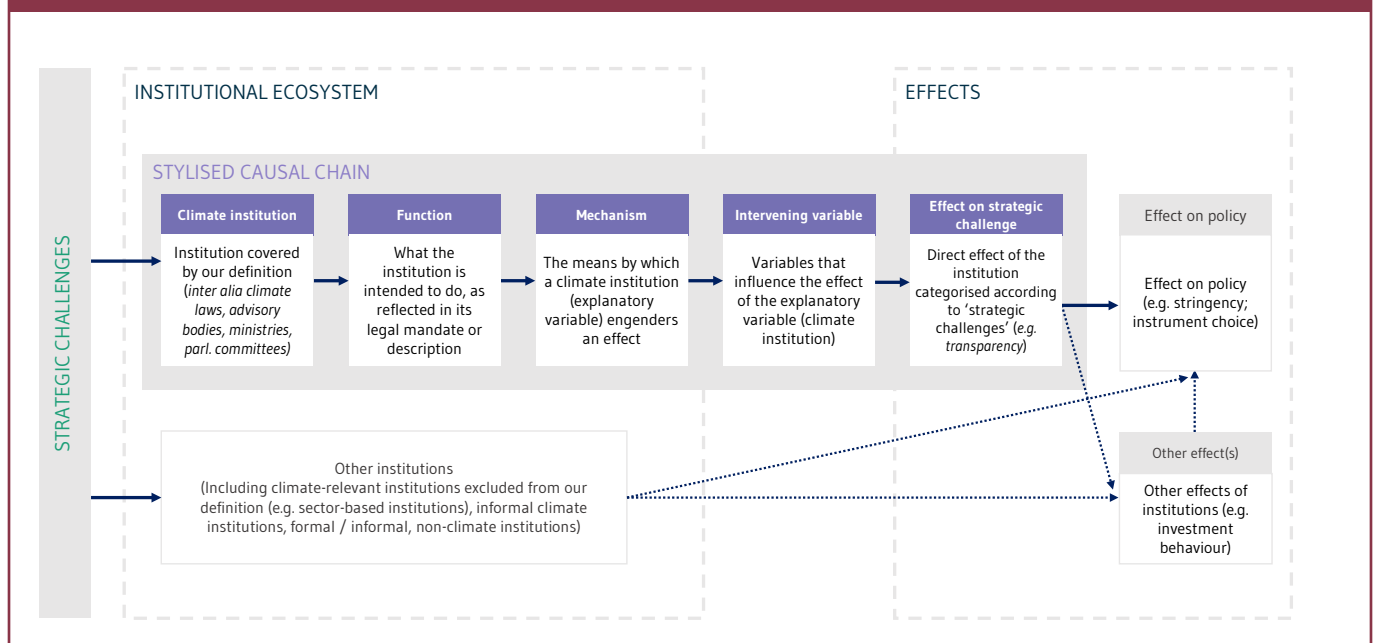
We also indicate that institutions can have other, independent effects (the ‘other effects’ box), such as improving the government’s credibility in international negotiations (e.g. Bennett 2018), changing decentralised agents’ investment behaviour via changing investors’ expectations (e.g. Dorsey 2019), or giving rise to policy diffusion (Torney 2017, 2019). ‘Other effects’ can in turn affect overall stringency, as shown by the arrow between ‘other effects’ and the ‘effect on policy’ box. Our framework focuses on the effects of climate institutions but recognises that these are part of a broader set of institutions, identified in the ‘other institutions’ box. Naturally, other institutions, such as informal climate institutions and non-climate institutions, can also affect policy, as indicated by the arrow connecting ‘other institutions’ to ‘effects on policy’. The solid arrows indicate relationships we are interested in for the purposes of this study; the broken lines indicate other relationships which we do not explore.

Before setting out this analytical framework in more detail, three caveats are required. First, our challenge-focused approach carries the risk of being ‘hyper-

intentional’ – assuming that institutions are intentionally created by rational, forward-looking actors to help them solve complex strategic challenges. While institutions can be intentionally created to address strategic challenges, clearly this is not always the case. Assuming this would be at odds with important strands in the broader political science literature – including historical-institutionalist analyses of the emergence of institutions (Mahoney and Thelen 2009), the ‘policy drift’ and path-dependence literatures (Page 2005; Hacker and Pierson 2010; Callander and Krehbiel 2014; Galvin and Hacker 2020) – which highlight the importance of, for instance, misperceptions and unintended consequences in institutions’ effects (Pierson 2000; Cortell and Peterson 2001). To reduce the risk of hyper-intentionality, we carefully distinguish between the functions of institutions – what they are intended to do – and their actual effects.

Second, our analytical framework does not assume that climate institutions are always the most effective means of addressing strategic challenges and therefore that countries will only be able to address the strategic challenges outlined below (see section 3.1) by adopting the full range of climate institutions we analyse in section 4. Our framework rather acknowledges that other (types

Figure 3: Analytical framework.
Source: Own illustration.



of) institutions, e.g. informal institutions, or non-institutional means, such as policy instruments, may better address some challenges and that this will likely vary across (macro-political) contexts. Understanding which strategic challenges are best addressed by formal, mitigation-focused climate institutions, as opposed to policy instruments or other types of institutions, is a potential avenue for further research.

Finally, our framework is designed to capture effects at a specific point in time, not to explain the emergence of institutions over time. Other frameworks – such as historical institutionalist ones – may be more appropriate for this analysis. There is potential to extend our framework, however, for future longitudinal analysis by comparing effects and mechanisms both across time and countries.

3.1 Strategic challenges

Operationalising our ‘functionalist’ analytical approach – i.e. conceiving of climate institutions as a means through which policymakers respond to strategic challenges – requires a list of such challenges. Ideally, we would derive this list from an encompassing theory of (climate) policymaking, which provides micro-foundations for the relevant challenges. This means generating a list of strategic challenges based on systematic analysis of how political actors achieve climate policy goals. Yet, to our knowledge, there exists no theoretical framework – neither in the broader political science literature nor in the ‘effects of climate institutions’ literature – that allows us to derive a list of strategic challenges in this way. The policy cycle framework (Guy, Shears, and Meckling 2023) helps to distinguish between different activities in the policymaking process, but, because of its static nature, fails to capture challenges that appear dynamically across cycles. This is particularly problematic for analysing climate policy since much of it is about achieving long-term policy goals across multiple policy cycles (e.g. Brunner, Flachsland,

Figure 4: Word cloud of strategic challenges mentioned in ‘effects of climate institutions’ literature.

Source: Own illustration.



and Marschinski 2012).

We therefore derive our list of strategic challenges inductively from the scoping review of the broader political science literature on the role of institutions (see section 2.3.1) and validate it based on our analysis of the ‘effects of climate institutions’ literature (see section 2.3.2). The resulting list serves as a heuristic – rather than an exhaustive and definitive list of strategic challenges present in climate policymaking. Indeed, deriving such a list from first principles is an important avenue for future research. Despite that, we believe our list of strategic challenges to be good enough for our descriptive and comparative purposes: the list is both sufficiently broad for us to be able to investigate the effects of climate institutions on multiple important aspects of climate policymaking and sufficiently generalisable across contexts to allow for comparative analysis of these effects.

The strategic challenges most salient in the ‘effects of climate institutions’ literature are visualised in the word cloud above (see Figure 4), which is based on our coding of the ‘effects of climate institutions’ literature (see section 2.3.2). Since our primary objective is to conduct comparative analysis, we focus our attention on challenges that are likely to be common across contexts, though we understand their specific features will vary between countries. Overall, we identified eight strategic challenges present in climate policymaking that climate institutions may help to address. Each is defined briefly below.

Agenda seeding & setting: Agenda seeding (Wasow 2020) is an attention-related challenge that here refers to the ways in which climate institutions seed ideas about climate policy in public and / or elite discourse, for instance by suggesting new policy instruments or new frameworks for thinking about climate policy.¹⁶ Agenda setting,¹⁷ in contrast, occurs when climate institutions (i) put climate policy on the political agenda, and / or (ii) increase the probability that it will remain on the agenda in the future. Both concepts are widely considered important, but there is little work on how they are affected by climate institutions. Guy, Meckling and Shears (2023) are a notable exception, arguing that climate framework laws, research bodies, and coordination bodies have an agenda-setting effect.

Knowledge and transparency: the epistemic or knowledge-related challenge of establishing common knowledge and providing transparency.

► **Common knowledge:** the problem of establishing a shared understanding of issues relevant to climate policy among policy elites (e.g. politicians, bureaucrats, journalists, private-sector actors) and creating an awareness among elites that this knowledge is shared by other elites, who, in turn, know or believe that others know and so on. Common knowledge includes key facts about the policy problem (e.g. the greenhouse effect), and the mechanisms as well as trade-offs underlying policy instrument choice (e.g. mar-

¹⁶ The Stern Review, for example, popularised the use of cost-benefit analysis for justifying climate targets, as is borne out by its headline conclusion that the costs of inaction on climate change exceed the costs of action (Stern 2007). The recently published Skidmore Review follows a similar logic in making the case for the UK’s net zero target (Skidmore 2023, pt. 1).

¹⁷ Our definition is narrower than other definitions in the literature, which frequently do not differentiate between agenda setting and seeding. Guy, Meckling and Shears (2023, 190), for example, define agenda setting as the way in which ‘the state comes to understand climate change as a policy problem and how it augments and rearranges its organs in response.’

ket-based vs. non-market-based). Our definition implies that common knowledge requires actors to coordinate their beliefs about these factual components of climate policy, i.e. they all agree on the credibility of information about these factual components (Basu 2018; Vanderschraaf and Sillari 2022). Common knowledge is crucial for enabling bargaining among elite actors and helping them reach consensus about policy decisions. To our knowledge, we are the first to introduce this strategic challenge in relation to climate institutions, though there is an extensive game-theoretic literature on common knowledge (Brandenburger and Dekel 1989; Geanakoplos 1992). Common knowledge provision via climate institutions is related to Pielke's (2007) idea of knowledge brokerage: When climate advisory bodies act as knowledge brokers¹⁸ they can create common knowledge, as Averchenkova, Fankhauser, and Finnegan (2021b) show in the UK context.

We focus on common knowledge among elites, as opposed to the general public, because we conceive of this strategic challenge specifically in relation to climate institutions. Given the literatures (i) on low levels of political knowledge among the public (Bartels 2016; Achen and Bartels 2017; Illing 2017) and (ii) the long and complex processes required for mass-level common knowledge to emerge (e.g. Suk-Young Chwe 2013), it seems unlikely that climate institutions coordinate beliefs among citizens about the often highly specific aspects of climate policy these institutions deal with, like emissions reductions targets (e.g. five-year carbon budgets in the UK), potential policy instruments, and trade-offs between these instruments.

By adopting this elite-centred conception of common knowledge we

do not wish to deny the importance of mass-level awareness of climate change and climate policy. Indeed, our elite-centred conception is compatible with climate institutions playing an important role in raising awareness of climate change and making information available to the public; we deal with this under the 'external' aspect of the strategic challenge of transparency. Such efforts aimed at increasing climate policy's salience and / or disseminating information do not, however, amount to facilitating the emergence of mass-level common knowledge, which would require that these institutions are capable of coordinating beliefs among the public.

- ▶ **Transparency:** (i) increasing access to information about climate policy-making, including with respect to the scale of the problem (e.g. ex-ante emissions gap), existing and potential policies to address the problem, and the projected (ex-ante) as well as actual (ex-post) effectiveness of these policies, and (ii) synthesising information in an easily comprehensible manner, for instance by gathering data and creating new indicators.¹⁹ Transparency can be internal – increasing access to this information within and among government entities – and external: increasing access to the public and key stakeholders. A given institution may increase both. Transparency is less restrictive than common knowledge, which requires not only access to easily comprehensible information, but also agreement between elite actors on the credibility of that information. The transparency-enhancing effects of climate institutions figure prominently in the climate policy literature, in particular in studies on climate laws (Duwe and Evans 2020) and advisory bodies (Weaver, Lötjönen, and Ollikainen 2019; Evans and Duwe 2021).

Integration: the integration of climate objectives into all aspects of policy, especially in non-climate policy areas (Candel 2021; Candel and Biesbroek 2016), such as industrial or transport policy, plus strategic integration of cross-sectoral policy packages to ensure coherence in their pursuit of GHG reduction targets. In our analysis of climate institutions, we focus on structures and processes that incentivise decision-makers to take into account multiple objectives, the trade-offs between them, and the externalities generated by different policy instruments – all relevant considerations for integrated climate policy. Integration can occur within (within-ministerial integration) or between ministries (cross-ministerial integration). In either case, integration often involves devising complex medium- to long-term policy plans, which requires substantial analytical capacity and bureaucratic expertise. Flachsland and Levi's (2021) analysis of the German *Bundes-Klimaschutzgesetz's* effect on policy integration is an example of the nascent, integration-focused strand of the climate policy literature.

Coordination: creating and strengthening the institutions and mechanisms used to coordinate the development, monitoring, and delivery of climate policy such that state or governmental actors act in concert. Coordination can be horizontal among groups of actors (e.g. ministerial units) at one level of government, or vertical across different levels of government (Hassel and Wegrich 2022, chap. 8). Clarifying the assignment of responsibilities among state actors is a particularly important mechanism through which both vertical and horizontal coordination can be improved (Ting 2011; Gailmard and Patty 2012; Sasso, Turner, and Li 2020; Patty 2021; Hassel and Wegrich 2022, 141; Li, Sasso, and Turner 2023). Given our definitional criteria (see section 2.1), in this report we examine only horizontal coordination and distinguish between two sub-types. Horizontal coordination can occur within a single ministry (within-ministerial coordination), i.e. between the different entities (e.g. divisions or working groups) in

¹⁸ "The defining characteristic of the honest broker of policy alternatives is an effort to expand (or at least clarify) the scope of choice for decision-making in a way that allows for the decision-maker to reduce choice based on his or her own preferences and values." (Pielke 2007, 2)

¹⁹ A case in point are energy unit costs ('Energiestückkosten'), the energy costs per unit of value added, which were first systematically measured in 2013 / 2014 by the "Monitoring-Kommission" to assess the industrial competitiveness of German sectors in comparative perspective (Germehausen and Lösche 2015; Kaltenecker et al. 2017).

a ministry, or between ministries (cross-ministerial coordination). Coordination is distinct from integration: the former relates to the process of policymaking, including its development and delivery, while the latter refers to the substance of policy – how well integrated climate objectives are across policy packages. Coordination has long been recognised as a crucial strategic challenge in the public policy literature (Peters 2018; Coyle and Muhtar 2023), and recently also in the climate policy literature (Neby and Zanakis 2020; von Lüpke, Leopold, and Tosun 2023).

Accountability: holding the government responsible for delivering on its stated climate targets. Accountability implies both the existence of transparency and sanctioning devices of some kind, whether informal or formal. Informal sanctioning includes, for instance, the dismissal or demotion of ministers who fail to withstand parliamentary or media scrutiny on climate policy, or a loss of reputation. In contrast, formal sanctioning refers to legal challenges and other formal procedures used to punish non-compliance. Accountability is *ex-ante* when the government is (in)formally sanctioned before it has become clear whether it has achieved its targets. Otherwise, accountability is *ex-post*. The climate policy literature criticises the absence of sufficiently strong accountability mechanisms for enforcing targets, though climate framework laws may function as informal and sometimes even formal accountability devices (Bennett 2018; Duwe and Evans 2020).

Commitment: requires policymakers to credibly indicate the long-term direction of climate policy. This implies giving businesses and the public confidence that changes in the distribution of political power will not lead the current government or future ones to renege on long-term climate commitments (policy reversal) and it is therefore safe to make the investments and behavioural changes necessary to achieve the government's climate policy objectives. As a sizable body of work shows, governments can resort to a range of commit-

ment devices, including delegation to independent bodies (Helm, Hepburn, and Mash 2003), legislation (Brunner, Flachsland, and Marschinski 2012), or (semi-) formal agreements between all major political parties (Lockwood 2021b). These commitment devices are formal when they incorporate explicit legal mechanisms for sanctioning governmental non-compliance, as is the case with some pieces of climate legislation, such as the German KSG's *Sofortprogramme* following overshoot of *Sektorziele* (although note this mechanism will be removed under the amendment to the KSG, see section 5 for a discussion of this proposed change). Informal commitment devices, by contrast, rely merely on informal mechanisms for sanctioning non-compliance, such as reputational or audience costs.

Consultation: facilitating and structuring (Meckling and Nahm 2022; Srivastav and Rafaty 2023) discussions between government representatives and non-governmental stakeholders, including labour unions and businesses, about proposed targets or policies. Consultation is formal when the interactions between governmental and non-governmental actors occur in official settings, whereas informal consultation refers to unofficial exchanges. By gathering input from key stakeholders on policy proposals, consultation is an important means of interest group management – they help to manage the risk of interest groups lobbying against the adoption of legislation or undermining its implementation (Dubash and Joseph 2016; Pillai and Dubash 2021; Dubash, Valiathan, and Bhatia 2021). In addition, consultation allows stakeholders, with, for instance, sector-specific expertise, to communicate hard-to-find information to bureaucrats and politicians, which can improve the design and implementation of policies. Examples of consultation include Germany's "Kohlekommission" and the Fossil Free Sweden initiative (Nasiritousi and Grimm 2022).

Compensation: compensating the losers from both climate policy, e.g. workers in carbon-intensive industries (e.g. UK CCC

2023a). The potential for compensation to ensure the 'buy-in' of politically powerful actors and manage the influence of interest groups is a prominent theme in various strands of the broader political science (Trebilcock 2014; Lindvall 2017; Garritzmann et al. 2022a) and climate policy literatures (Green and Gambhir 2020; Finnegan 2022; Gaikwad, Genovese, and Tingley 2022; Meckling and Nahm 2022; Bolet, Green, and Gonzalez-Eguino 2023; Gazmararian 2023; Gazmararian and Tingley 2023; Srivastav and Rafaty 2023). Yet, few works examine how climate-related institutions affect the state's ability to compensate losers so as to prevent them from undermining climate policy (Patashnik 2008) or even achieving cooperation from private actors threatened with losses, with important exceptions (Wiseman, Campbell, and Green 2017).

3.2 Stylised causal chains

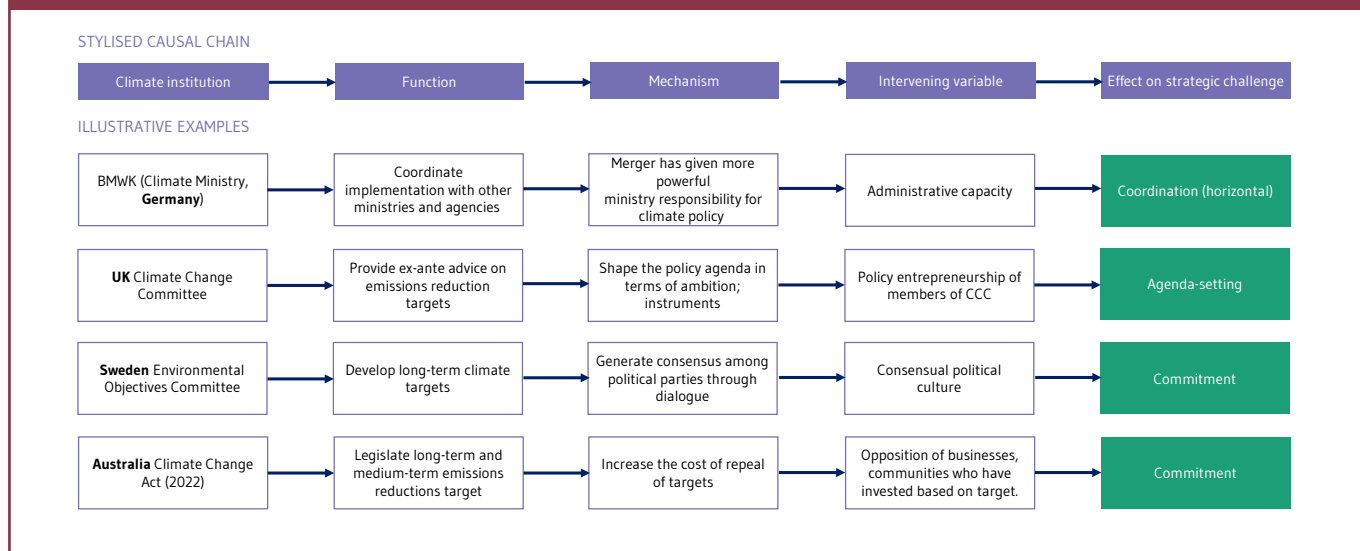
Our framework aims to elucidate, in a stylised manner, the causal relationships connecting climate institutions to their effects on policymaking – the strategic challenges they address and how they do so. We do this by arranging five components – (i) institutions, (ii) functions, (iii) mechanisms, (iv) intervening variables, and (v) effects – into stylised causal chains, as shown in Figure 5. Functions relate to the strategic challenges that climate institutions are intended to address, as reflected in their respective mandates. Mechanisms describe the means by which ('how') climate institutions give rise to certain effects. Intervening variables capture the set of additional variables that influence the effect(s) of a given climate institution. The effect describes how the climate institution actually addresses one of the eight strategic challenges identified above.

The UK CCC example (top causal chain in Figure 5) illustrates how this framework allows us to identify effects of climate institutions, derived inductively from our analysis of interviews.²⁰ As discussed in section 4.2.2, the UK's climate advisory body addresses the strategic challenge

²⁰ Given our relatively small number of interviewees and the semi-structured nature of the interviews, more work is clearly required to demonstrate the internal validity of our causal chains. We refer deliberately to these chains as 'stylised' because our method does not allow for causal identification.

Figure 5: Stylised causal chains and illustrative examples.

Source: Own illustration.



of agenda setting – putting pressure on the government to devote attention to climate targets and the policy mixes most conducive to achieving these targets. This effect can be traced back to three factors. First, its function: the UK CCC’s mandate includes the responsibility to provide ex-ante advice on emissions reduction targets via advice on five-year carbon budgets (McGregor, Kim Swales, and Winning 2012). Second, the effect’s mechanism: the UK CCC proposes carbon budgets that, in combination with past budgets, constitute a viable pathway to achieving the government’s stated long-term goal of carbon neutrality by 2045. Third, the central intervening variable is the policy entrepreneurship of the committee’s members – their willingness to be vocal in framing the committee’s recommendations as the benchmark for credible climate policy, i.e. policy that is consistent with the government’s long-term objectives.

These stylised causal chains address three shortcomings of existing frameworks. First, the limited literature on the effects of climate institutions tends to conflate two distinct sources of variation: (i) variation in the functions or design of institutions (see section 4.3.1), and (ii)

variation that arises from intervening variables (e.g. policy entrepreneurship). Institutions may impact policymaking in different ways across different contexts for two reasons: either because they have different functions, or because their effects are moderated²¹ by different sets of intervening variables, despite being designed similarly (see Figure 6). Conflating these two sources of variation together is problematic for comparative analyses given a key objective is to investigate how and why the same types of climate institutions affect policymaking differently across countries. Our framework therefore distinguishes between the functions and effects of institutions, with differences in functions capturing design variation. By holding the design of institutions conceptually constant, this distinction allows us to determine whether differences in effects are attributable to variation intervening variables, the design of institutions, or both.

Second, the climate institutions literature tends to treat mechanisms as a ‘black box’, with few studies analysing how an effect is engendered (see section 2.3.2). In contrast, our framework makes mechanisms explicit. This helps explain variation in how the same types of climate institutions achieve similar effects

in different political contexts – which in turn is useful for generating hypotheses about this variation and suggesting improvements to countries’ climate governance landscapes. If an institution that is not present in, for example, Germany has a similar effect across the other three countries via (i) a consistent mechanism that is (ii) likely to operate in Germany, then we have some reason to believe the institution’s effect may be replicable in Germany. Conversely, a mechanism that is at odds with central planks of Germany’s political system or culture should give us pause as to the institution’s potential to generate this effect in Germany. If we found, for instance, that the integration-enhancing effect of the UK’s climate-focused inter-ministerial coordination mechanism²² relies on the Cabinet Office having substantial power over departments, we should be sceptical about a similarly designed institution promoting integration in Germany, where the *Ressortprinzip*²³ safeguards ministries’ independence vis-à-vis the *Bundeskanzleramt* (Meinel 2019, 68).

Third, institutional frameworks often ignore agential factors, thus entrenching an unhelpful dichotomy between institutional and agential theories of climate

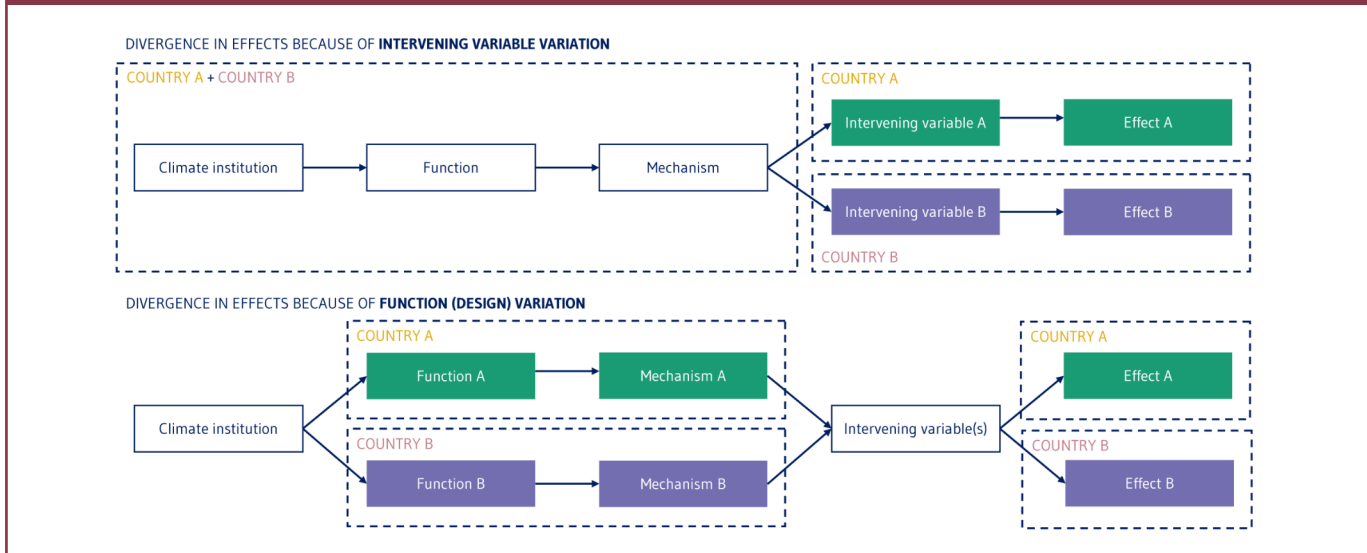
²¹ We follow the literature on causal inference in distinguishing between mediated and moderated. An effect is said to be mediated by some variable if this variable is the mechanism through which the effect engenders a certain outcome. An effect is said to be moderated when some intervening variable changes the marginal effect of an explanatory variable on the outcome of interest. Formally, this amounts to hypothesising the derivative of the marginal effect with respect to the intervening variable of interest (cross-partial derivative) to be statistically significant.

²² A body established to coordinate the process of developing and implementing climate policy among various relevant ministries or departments.

²³ Article 65 of the German Basic Law (“Grundgesetz”).

Figure 6: Types of variation.

Source: Own illustration.



polycymaking. Agential factors include, for instance, the actions of bureaucrats, the media, politicians, academics, and other relevant political actors. Structural or institutional factors, by contrast, include electoral rules, the strength of political parties, and the nature of a country’s interest group system. Both types of factors may influence climate policymaking, especially the effects of climate institutions. By introducing the analytical category of ‘intervening variables’, we ensure our institutional framework can acknowledge the role of both.

4. RESULTS

This section summarises the results of our study, drawing on analysis of literature and interviews. We begin by identifying the institutions present in our sample which satisfy our criteria for ‘climate institutions’ (Table 5, below). Section 4.1 provides relevant context for our cases, including key macro-political institutional features which may act as intervening variables on effects. Section 4.2 presents our within-case analysis: including the most important institutions, key institutional effects, as well as institutional deficits and reform options highlighted within each country in our sample. Section 4.3 summarises our analysis across the four cases, examining the variation in functions and effects.

4.1 Context

This section offers a brief overview of the country contexts in which the climate institutions in our sample operate. Examining the different contexts helps to identify potential intervening variables that may influence the effects of climate institutions. Because our framework distinguishes between structural and agential intervening variables, this section highlights three sets of variables: (1) electoral rules and particularly how these support Green party success, (2) the structure of multi-level governance, and (3) features of the political context (e.g. actions of politicians (Shepsle 2017)) in each country, where relevant. The justification for (1) is that parliamentary representation of Green parties is – following Hughes and Urpelainen

(2015) – taken to be a proxy for the institutionalisation of pro-climate opinion. This is a conservative proxy; almost all electoral systems lead to some degree of disproportionality between Green parties’ seat and vote shares, with vote shares usually being higher than seat shares. Examining the structure of (2) multi-level governance – notably the structure of the state (unitary vs. federal) and / or EU (non-)membership – is important because these distinct, albeit related, levels of governance affect not only the formulation of national climate policy, but also its delivery. Finally, (3) political features – such as polarisation surrounding climate policy – can shed light on factors that amplify or mute institutional effects. While we acknowledge that these are not the only relevant macro-institutional variables, we think they provide a good starting point for formulating hypotheses about the role different types of intervening variables play in the four countries in our sample.

Germany: Germany exhibits strong institutionalisation of pro-climate public opinion – its political system has facilitated the emergence and consolidation of a powerful green party for two reasons. First, the mixed-member PR (proportional representation) system enabled the Greens to develop into a potent parliamentary force at the national level (Harrison 2010). Secondly, the Greens’ growing national importance has been bolstered by their strong performance in some states (Länder). Their state-level

Table 5: Climate institutions in our cases, as of May 2023

Climate institution	Germany	Sweden	United Kingdom	Australia
Climate Law	Bundesklimaschutzgesetz (2019, 2021) ²⁴	The Swedish Climate Act (2018)	Climate Change Act (2008, 2019)	Climate Change Act (2022)
Climate advisory body	Expertenrat für Klimafragen (ERK) Kommission zum Monitoring der Energiewende Wissenschaftsplattform Klimaschutz (WPKS)	Climate Policy Council	UK Climate Change Committee	Climate Change Authority
Climate ministry	Bundesministerium für Wirtschaft und Klimaschutz (BMWK)	Ministry of Climate and Enterprise	Department for Energy Security and Net Zero (previously BEIS)	Department of Climate Change, Energy, the Environment and Water
Within- ministry / within-agency climate unit(s)²⁵	Umweltbundesamt (UBA), Fachbereich V Unterabteilung I B, BMF Unterabteilung II B, BMF Spiegelreferate, Bundeskanzleramt, Gruppe 42 / Referat 424	Climate Policy Department, Swedish Energy Agency Climate Action Department, Swedish Environmental Protection Agency	Climate Policy Team within Climate, Energy and Environment Group in Treasury	Energy and Climate Branch in the Department of Prime Minister and Cabinet Net Zero Unit in Department of Infrastructure, Transport, Regional Development, Communication and the Arts Climate and Industry Branch (Fiscal) and Climate and Industry Modelling Branch (Macro-economic) in Treasury
Inter-ministerial coordination body for climate policy	NA ²⁶	NA	Domestic and Economic Affairs (Energy, Climate and Net Zero) Cabinet sub-Committee, chaired by Chancellor of the Duchy of Lancaster	Powering Australia Interdepartmental Committee ²⁷
Parliamentary committee(s)	Ausschuss für Klimaschutz und Energie	Cross-Party Committee on Environmental Objectives (or All-Party Committee on Environmental Objectives)	Environment and Climate Change Committee (Lords Select Committee) Business, Energy and Industrial Strategy Committee (Commons Select Committee) Environmental Audit Committee (Commons Select Committee)	Senate Standing Committees on Environment and Communications House Standing Committee on Climate Change, Energy, Environment, and Water
Other	Fraktionsarbeitsgruppen für Energie & Klimaschutz (Party-level working groups on climate protection and energy in Bundestag)	Fossil Free Sweden ²⁸	NA	National Net Zero Authority ²⁹

²⁴ Dates indicate the year in which a given piece of framework legislation initially entered into force and was, in some cases, subsequently amended. At the time of finalising this report (early August 2023), the traffic-light coalition's amendment had not been adopted by parliament, which is why we have not added '2023' to the German cell.

²⁵ It is likely that more of these units exist and are not included here, either because we did not identify them, or they were in the process of being created during the period of our analysis.

²⁶ The Klimakabinett is currently inactive (see also sections 4.1, 4.2.1, and 5).

²⁷ This is a somewhat borderline case because the inter-ministerial committee is focused on a single, albeit central, climate policy.

²⁸ Fossil Free Sweden is an initiative by the Swedish government to develop roadmaps for the transition of various sectors of the economy. It does this through consultation between the government and business representatives.

²⁹ This authority was established after the substantive period of our analysis and so is not explored in detail below.

success – especially in the last two decades – has translated into participation in various state coalition governments, which has allowed the Greens to influence national climate policy through the Bundesrat, Germany’s Länder-centred upper chamber, even when they were in opposition nationally. Because of the relatively high number of veto points implied by federalism and bicameralism, policy change requires broad consensus (Saalfeld 2004), which is reinforced by Germany’s corporatist tradition.

The combination of Germany’s federal structure and EU membership means that climate policy requires vertical coordination between the central government, the state governments and the EU. As a result, the state governments are constrained by both national and EU climate policy. In the realm of climate policy, German federalism thus allows for less subnational experimentation or policy entrepreneurship than, for instance, Australia. Similarly, national climate policymaking is heavily influenced by EU climate policy, particularly with the adoption of the EU Green Deal. Horizontal coordination between ministries is strongly shaped by an idiosyncratic institutional feature, namely the constitutionally enshrined *Ressortprinzip* (article 65 of the Grundgesetz). By granting ministries a fair amount of autonomy vis-à-vis the Chancellery, the *Ressortprinzip* implies that successful policy delivery requires genuine coordination between the centre of government, the Chancellery, and other ministries (Grotz and Schroeder 2021, 272–73). Usually, horizontal coordination cannot be achieved by the Chancellery simply giving orders to other ministries. This is especially true for coalition governments and those ministries controlled by parties other than the Chancellor’s party.

United Kingdom: In the UK, two institutional factors are of particular significance for climate policy: its majoritarian electoral system and the system of de-

veloped administrations embedded in an otherwise unitary state. The first-past-the-post electoral system – by incentivising strategic voting in favour of large parties (e.g. Cox 1997) – has made the emergence of a powerful green party extremely difficult, with the Green Party of England and Wales (GPEW) currently holding only one out³⁰ of 650 seats in the House of Commons. The GPEW’s lack of parliamentary clout means a relatively small number of Members of Parliament (MPs) champion ambitious climate policy and those that do are not organised in a political party, raising the costs of coordination. This is reflected in the relatively low salience of climate policy in the party manifestos and parliamentary behaviour of the two major parties, which may, in part, be attributable to the low salience of climate policy – relative to, for instance, the general state of the economy – among the general public (Kenny 2022). In addition, the UK’s increase in devolution³¹ since the late 1990s has brought the importance of vertical coordination between the central government and devolved administrations into sharp relief, particularly as the Scottish government adopted more ambitious climate legislation in 2009 than the UK government had done a year earlier (Nash 2021).

With respect to political context: it is worth noting that, unlike in other majoritarian democracies, such as the USA and Australia, both major parties in the UK have recognised climate change as an urgent challenge – though the recent attacks, intensified in the wake of the Conservative’s surprise victory in the Uxbridge and South Ruislip by-election, on the government’s commitment to the Net Zero target by senior Tories demonstrate the fragility of this consensus (Rutter 2023; Cooper and Dawson 2023). Moreover, strong elite-level policy entrepreneurship has characterised UK climate policy. This is exemplified by the actions of (former) politicians, notably Lord Deben³² in his capacity as the former UK

CCC chairman, academics, including Lord Stern, author of the Stern Review, and civil society organisations, such as Friends of the Earth, whose ‘Big Ask Campaign’ played an important role in establishing the UK CCA (Lorenzoni and Benson 2014; Carter and Childs 2018).

Sweden: In contrast to the UK, Sweden employs an open-list PR electoral system, which results in a relatively large and ideologically diverse number of parties gaining parliamentary representation. This includes the Swedish green party, the Miljöpartiet, which currently holds 18 out of 349 seats in the Riksdag. While this suggests that pro-climate public opinion is fairly strongly institutionalised, PR also implies that typically only coalitions can form governments. Large-scale policy change is therefore premised on cross-party agreements. The need for broad compromise is, as in Germany, reinforced by Sweden’s corporatist tradition de facto requiring the government to consult industry groups, labour unions and other key stakeholders on major legislative proposals (Kronsell, Khan, and Hildingsson 2019; Gronow et al. 2019). Another important institutional characteristic is Sweden’s combination of small ministries and large bureaucratic agencies (Johansson 2020), meaning that much of detail of drafting policy proposals is left to career bureaucrats in agencies, rather than bureaucrats or politically appointed officials in ministries. This has implications for policy integration and coordination as well as technical capacity for strategic climate policy planning, as we discuss below. These domestic institutions notwithstanding, EU climate policy significantly shapes what domestic targets, policies, and institutions Swedish policymakers adopt. EU membership has been associated with policy convergence (Strunz et al. 2018), and may act as a commitment device, making Swedish climate policy reversals less likely.

Finally, a relevant piece of political con-

³⁰ In early June 2023, Caroline Lucas, the only Green MP, announced her intention to step down as MP for Brighton Pavilion at the next General Election (Lucas 2023).

³¹ Devolution refers to the central government in England granting greater autonomy to (i) the other three countries that are part of the United Kingdom (Wales, Northern Ireland, and Scotland), and, (ii), to increasingly, sub-national regions within England, such as mayoral combined authorities (Henderson 2023).

³² Lord Deben retired in late June 2023, and, at the time of finalising this report (early August 2023), it is not clear who will take over as chair of the UK CCC, with interviews for potential successors expected to be finished by mid-August (UK Government 2023b). Piers Forster was appointed interim chair in late June (UK CCC 2023c).

text is that, at the 2022 general election, a Moderate-led minority government gained power, whose parliamentary survival depends on the support of the right-wing, Eurosceptic Sweden Democrats³³ (Rothstein 2023; Aylott and Bolin 2023). The Sweden Democrats are opposed to ambitious climate policy: they seek to lower taxes on electricity, for instance, and to reduce Sweden’s fuel emissions reduction target (Hivert 2023). The influence of this party in the governing coalition has potential to stymie or even reverse stringent climate policy.

Australia: Like the UK, Australia has a majoritarian electoral system, which has also made it challenging for the Australian Greens to gain a strong foothold in parliament. This has impeded the institutionalisation of pro-climate public opinion for much of the last two decades. Following the 2022 election, however, pro-climate forces – notably the Green party and the so-called ‘Teal’ independents – have become important power brokers since Anthony Albanese’s government only commands a majority in the House, but not the Senate, therefore requiring the support of these pro-climate forces to pass legislation. This is borne out by the negotiations that preceded the recently adopted Safeguard Mechanism Amendment Bill. The second significant piece of institutional context is Australia’s federal system, which has allowed for considerable sub-national action on climate change (Christoff and Eckersley 2021), even when anti-climate forces dominated nationally. Politically, the most striking feature is how polarising an issue climate change has been in Australia, particularly during the ‘climate wars’ of the 2010s. The ‘climate wars’ led to high policy instability, perhaps best illustrated by the Gillard administration’s introduction of the Carbon Pricing Mechanism in 2011 and its subsequent repeal by Prime Minister Tony Abbott in 2014. This inability to credibly commit to ambitious climate policy, in large part, reflects the political influence of the fossil fuel industry, given Australia’s role as a major resource, espe-

cially coal, exporter, and has led to Australia being perceived as a climate laggard internationally (Zwar 2022).

4.2 Within-case analysis

This section analyses the effects of climate institutions within each country case (for comparative analysis across cases see section 4.3). For each case, we first identify which institution(s) interviewees saw as the most important for achieving that country’s emissions reduction goals (this question was specifically asked at the beginning of all interviews). We then highlight the most salient effects of climate institutions – those effects our interviewees placed most emphasis on. ‘Most salient’ is based on frequency analysis of the number of times an institution was mentioned in combination with one of our strategic challenge categories among interviewees from a given country. Figure 7 provides a rough overview of these frequencies based on our coding of interview transcripts. Given the small number of interviewees, this is a rough measure of most important effects – we therefore

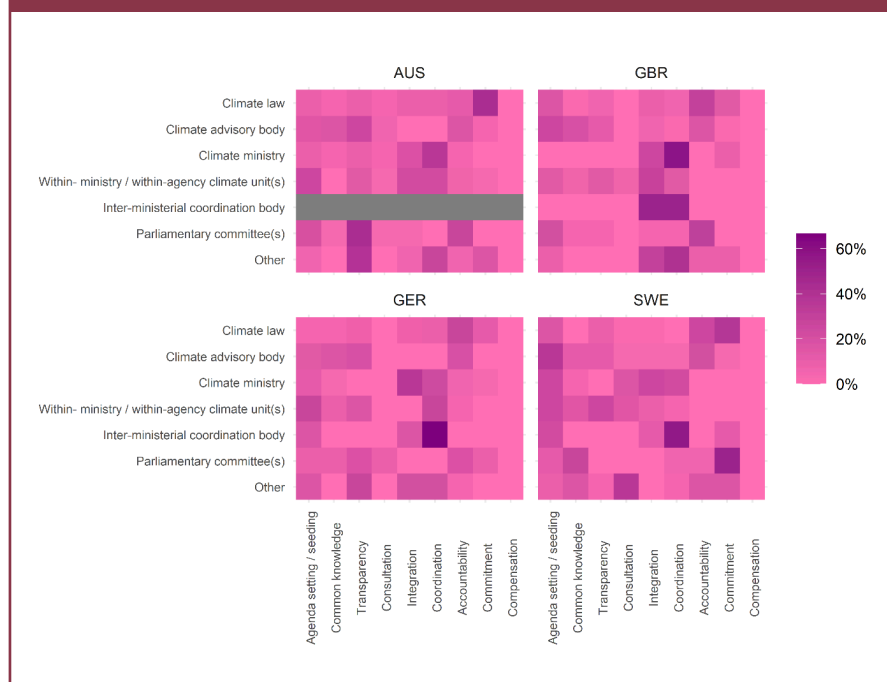
use it as a guide to structure our analysis, rather than as a measure of effect size.

4.2.1 Germany

In late March 2023, Germany’s traffic light coalition resolved to considerably amend the *Bundes-Klimaschutzgesetz* (KSG) via the *Klimaschutznovelle* (Koalitionsausschuss 2023). Key elements of the draft amendment include the abolition of legally binding sectoral targets (*Sektorziele*) and sector-specific *Sofortprogramme*, the introduction of targets based on projected emissions, and the granting of new powers to the ERK (BMWK 2023b). Assuming they are implemented as intended, these changes could have profound impacts on German climate governance.

Our analysis in the following section, however, deliberately focuses on the effects of climate institutions prior to the adoption of the amendment. The reason for this is that most of our interviews and analyses were carried out prior to the publication of the draft version of the

Figure 7: Frequency tables for interview analysis.³⁴
Source: Own illustration.



³⁴ The missing values for ‘inter-ministerial coordination mechanism’ in the Australian case are explained by the fact that we decided to include the Powering Australia Committee only at a relatively late stage of our analysis, given that it is somewhat of a borderline case. Note, too, the values for integration and coordination are somewhat artificially inflated because many interviewees discussed these strategic challenges twice in the interview, in the context of effects of climate institutions and current deficits in the climate governance landscape.

amendment – we therefore capture effects engendered by institutions under the framework of the original KSG. Even knowing the provisions of the draft amendment, we lack evidence – from interviews or otherwise – for how the range of intervening variables will interact with the modified functions of the KSG and therefore exclude them from our analysis here. Nevertheless, we can draw tentative inferences about the *Klimaschutznovelle*'s likely future effects on German climate policymaking based on our contextual knowledge (see section 4.1) and comparative analysis. These are examined in section 5, where we assess the amendment and outline options for institutional reform based on the deficits identified here.

All German climate policy experts we interviewed agreed that the KSG is the key element of Germany's climate governance landscape. Two interviewees further suggested that the recently established climate ministry, the BMWK, may replace the KSG as the most important climate institution in the future. This is by virtue of much of the climate policy-making capacity, previously dispersed across the environment and economy ministries, now being centralised within the BMWK: it is responsible for regulating the energy, industry, and buildings sectors (albeit not transport and agriculture) as well as the broader economic system.

4.2.1.1 Key effects

Our analysis³⁵ of the nexus between strategic challenges and German climate institutions yielded three main insights. First, the ERK, Germany's main climate advisory body, established by the KSG, exercises ex-post, formal accountability, with the 'bite' of that accountability power being mainly a function of the political costs under-performing ministries face when providing low-quality responses to the ERK's reports. This effect's mechanism can be traced back to the design of the sectoral targets (*Sekt-*

orziele), also established by the KSG. The ERK's determination that some sector has failed to meet its sectoral target automatically results in a legally binding obligation³⁶ for the relevant ministry to take corrective action in the form of an immediate action programme (*Sofortprogramm*) within three months. In this way, the ERK, as mandated by the KSG, is vital to holding under-performing ministries accountable. While the KSG endows the ERK with formal accountability powers, several interviewees cautioned that the de facto strength of this ex-post accountability depends on the political costs the relevant ministers incur if they undermine their obligation to implement immediate action programmes. Undermining their obligation could mean submitting poorly designed and ineffective *Sofortprogramme*, or even failing to deliver a programme. One interviewee observed that "on the one hand, it's clearly said in the law, the respective ministry has to provide such a program. On the other hand, what we have experienced last year, it's not taken ... too seriously." The significance of this intervening variable is borne out by the transport ministry's 2022 *Sofortprogramm*, which, the ERK concluded, "although it has an emission-reducing effect ... does not fulfil the requirement for an emergency programme under the Federal Climate Protection Act (Section 8 (1) KSG)." (ERK 2022a)³⁷ There are also no enforcement mechanisms in place if ministries fail to comply.

The second insight is that Germany's multiple climate advisory bodies – the ERK, WPKS, and the "Monitoring-Kommission" – establish common knowledge about climate policy through three mechanisms. First, their reports – particularly the ERK's biannual reports and its *Prüfberichte* – increase knowledge among elite actors, including journalists, about the emissions reductions achieved in each relevant sector. One of its members referred to the ERK as "the institution to make [the performance of sectors] more objective." This points to the ERK's re-

ports being considered the authoritative source of information about the effectiveness of government climate policy as the mechanism of the common-knowledge effect. A similar mechanism explains why the reports of the "Monitoring-Kommission" – by providing information about the government's progress in delivering the *Energiewende* – boosts common knowledge. The second mechanism is specific to the ERK: three interviewees suggested that the fact that its members are appointed by the entire government gives its recommendations more credibility than they would otherwise have. The ERK is not appointed by or affiliated with a specific ministry, unlike the WPKS (established by and affiliated with the BMBF as well as the BMWK) and the "Monitoring-Kommission" (established by and affiliated with the BMWK, and previously the BMWi). As a result, other ministries do not see the ERK as beholden to any ministry, but as genuinely independent and highly credible. Thirdly, the composition of all three climate advisory bodies – by being comprised of independent, non-partisan experts and academics (see Figure 8) – was seen as an important source of credibility and, thus, common knowledge.

The third key effect is ex-ante (hypothesised) and concerns the potential for the newly created climate ministry (BMWK) to facilitate policy integration. With the traffic-light coalition assuming power in late 2021, a relatively powerful climate ministry, the BMWK – headed by the Greens' Robert Habeck and housing both climate and economy units – was created to spearhead the detailed formulation and implementation of large parts of the government's domestic climate policy agenda. To that end, the climate-focused units previously located in the environment ministry (BMUV) were incorporated into what was formerly the economy ministry (BMWi). Several interviewees hypothesised that this merger would likely improve policy integration, with climate objectives assuming greater importance, relative to the economy

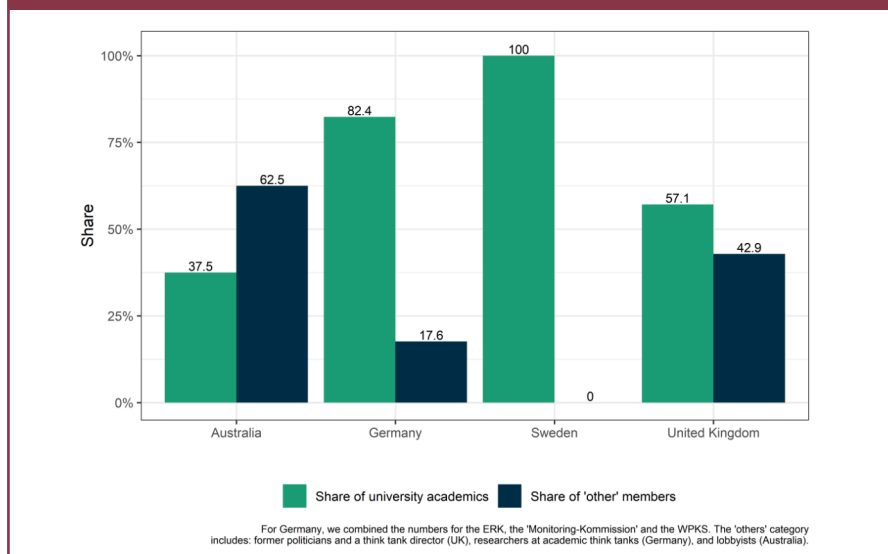
³⁵ For the reasons set out above, the effects identified here (largely) rest on the *Sektorziele* being in place.

³⁶ Strictly speaking, this obligation arises as soon as the UBA *Emissionsdaten* (sector-level emissions data), published on 15 March every year, show that some sector has failed to meet its sectoral target. Yet, the obligation is only triggered once the ERK has assessed the data in its *Prüfbericht*, meaning the relevant ministry must present a *Sofortprogramm* within three months of the publication of the ERK's report.

³⁷ The original German text reads: "In Bezug auf das vorgeschlagene *Sofortprogramm* für den Verkehrssektor stellt der Expertenrat für Klimafragen fest, dass dieses zwar eine emissionsmindernde Wirkung entfaltet, aber nicht die Anforderung an ein *Sofortprogramm* gemäß Bundes-Klimaschutzgesetz (§ 8 Abs. 1 KSG) erfüllt." (ERK 2022a)

Figure 8: Composition of climate advisory bodies as of June 2023.³⁸

Source: Own illustration.



tion will require a considerable degree of coordination between the BMWK, on the one hand, and the transport (BMDV), agriculture (BMEL) and buildings (BMWSB) ministries, on the other, to deliver coherent policy.

To improve both integration and coordination, a climate-focused, inter-ministerial coordination⁴¹ mechanism and higher-quality data are necessary, some of our interviewees argued. The first proposal is in line with work by, for instance, Flachsland et al. (2021), but interviewees stressed that the specifics of how such an inter-ministerial coordination mechanism would operate remain unclear. For instance, it is unclear whether cross-departmental coordination would be best achieved by re-activating the currently dormant *Klimakabinett*⁴² or creating an entirely new institution, and whether there should be separate bodies for coordinating policy formulation and delivery. The second proposal derives from a frustration, expressed by one interviewee in particular, with the scarce human and monetary resources the UBA, for instance, has at its disposal for gathering and analysing granular emissions data for each sector. With higher-quality and more extensive data, it would be easier to monitor the efficacy or lack thereof with which climate policy is delivered (ERK 2022b, sec. 5.2).

The existence of multiple climate advisory bodies was regarded as a deficit by several interviewees because their partly overlapping mandates hamper a clear division of labour between these bodies. It is debatable, in the words of one expert, "whether they have been too many of them [climate advisory bodies], or whether the attribution of responsibilities is unclear."⁴³ Another interviewee was particularly sceptical of those advisory bodies that were established by a specific ministry and are, thus, affiliated

ministry's traditional objectives, like competitiveness. According to one interviewee, "the ministry as such is trying to have a sustainable economics approach, which is much broader than climate." It was not clear from interviews, however, whether the same level of policy integration would extend to other ministries with responsibilities separate to those of the BMWK.

4.2.1.2 Institutional deficits³⁹

As of spring 2023, almost all interviewees pointed out that the BMWK has not yet become fully operational in the way envisaged in late 2021 on account of having been primarily concerned, for the past twelve months, with managing the (economic) fallout caused by Russia's war of aggression against Ukraine. Despite this, all experts agreed on the importance of making the BMWK work as originally intended. The chief obstacle to doing so, apart from dealing with the war's ramifications, is the difference in the policymaking frameworks employed by the climate and economy units re-

spectively. The climate-related and industry units' (notably divisions K – Climate Protection, III – Heat, Hydrogen und Efficiency, and IV – Industrial Policy)⁴⁰ principal objective is to ensure the rapid deployment of renewables and to green industrial policy via, for instance, (Carbon) Contracts for Difference (Hanke 2023; BMWK 2023a). The economy units (notably divisions I – Economic Policy and V – Foreign Trade Policy), however, are primarily focused on economic competitiveness. If the BMWK fails to address the tensions between these two objectives, policy formulation is likely to remain disjointed, rather than become better integrated.

Even if the BMWK eventually improves its integration and coordination capacities, this is unlikely to be sufficient to achieve coordination across the government and ensure climate objectives are integrated into all aspects of policy. One reason is that two especially crucial sectors, transport and agriculture (and in part buildings), lie outside the BMWK's purview, meaning that large-scale decarbonisa-

³⁸ Based on desktop analysis of features of climate institutions. Note, at the time of finalising this report (early August 2023), Lord Deben's successor had not yet been appointed. The bars for the UK reflect the committee's composition prior to Lord Deben's departure – and prior to the appointments of Nigel Topping (replaced Paul Johnson) and Steven Fries respectively (UK CCC 2023d, 2023e). These new members' terms started after our analysis concluded.

³⁹ See section 5 for a discussion of reform options.

⁴⁰ See organisational chart of BMKW https://www.bmwk.de/Redaktion/DE/Downloads/M-O/organisationsplan-bmwk.pdf?__blob=publication-file&v=34

⁴¹ No interviewee, save for one, made comments about deficits in vertical coordination, for instance with Länder and Kommunen – though this is likely a result of our definitional scope, which focused on national-level institutions.

⁴² The *Klimakabinett* was first convened in March 2019 for the purpose of implementing the initiatives outlined in the *Klimaschutzplan 2050* and then monitoring the efficacy of these initiatives.

⁴³ The original German quotation reads: "Ob jeder einzelne Klimabeirat dann sehr erfolgreich ist, oder ob es zu viele davon gab oder ob es zu unklare Zuständigkeitszuschreibungen gibt, ist wiederum eine andere Frage."

with it, as is the case for the WPKS and the “Monitoring-Kommi[s]sion”. These ministerial affiliations are problematic because “advice [may] not be taken up or it’s filtered first ... because ministries don’t want to be advised in way[s] they don’t like.” The same interviewee tentatively suggested merging the three climate advisory bodies into one centralised body with an extensive mandate, though other experts did not comment on this suggestion.

4.2.2. United Kingdom

The majority of interviewees identified the UK CCA as the most important climate institution, regarding it as the linchpin of the UK’s climate governance system; this is also reflected in the academic literature (e.g. Lockwood 2021a; Averchenkova, Fankhauser, and Finnegan 2021a). The act is important because it established the system of carbon budgets – five-year emission reduction targets that governments have to set twelve years in advance – and the UK CCC, as well as a statutory obligation for the government to respond to the UK CCC’s annual progress reports to parliament. Despite acknowledging that the UK CCA has been the most important institution since its adoption in 2008, two interviewees hypothesised that the newly created⁴⁴ Department for Energy Security and Net Zero (DESNZ), the UK’s climate ministry, would become the crucial climate institution since the delivery of climate policy will assume greater importance in the future, relative to the setting of targets.

4.2.2.1 Key effects

Drawing on interviews and peer-reviewed case studies, we found that it is the set of attention-related and epistemic strategic challenges – agenda setting and seeding, common knowledge as well as transparency – that UK climate institutions are particularly adept at addressing.

First, the UK CCC’s advice on carbon budgets and its ex-ante analyses of the projected impact of the government’s

proposed policies on (GHG) emissions have both an agenda-setting and agenda-seeding effect on climate policy-making, enhanced by the committee’s policy entrepreneurship in framing its analyses. The UK CCC is tasked with advising the government on medium-term climate targets, known as carbon budgets. Thus far, all governments have followed the committee’s advice, though they are not legally obliged to do so. This established precedent means any government would have to devote substantial attention to justifying the adoption of laxer targets. Through this mechanism the UK CCC can shape the government’s political agenda, with the strength of the effect depending on (at least) two intervening variables: the presence of strong media attention and politically powerful, pro-climate lobby groups. The importance of these intervening variables is illustrated by the heavy lobbying of pro-climate groups that ensued when it became clear that the Cameron-led coalition government toyed with the idea of ignoring the committee’s advice on the fourth carbon budget. This forced the PM to resolve the dispute between then Chancellor, George Osborne, and then Business secretary, Sir Vince Cable, on the one hand, and the then secretary for Energy and Climate Change, Chris Huhne, on the other, via personal intervention (Stratton 2011; Lockwood 2013).

The preceding shows how the UK CCC can influence the short-term political agenda when the government sets carbon budgets, but the committee also shapes the long-term agenda by engaging in agenda seeding – spreading ideas about what policy instruments constitute viable policy mixes with respect to the government’s objectives. In its recent report, *Delivering a reliable decarbonised power system*, the UK CCC, for instance, examines the range of policy mixes that would enable the government to achieve its goal of decarbonising the power system by 2035 (UK CCC 2023b).

The agenda-seeding effect is engendered by the committee stretching its mandate, as several interviewees noted. Narrowly construed, the CCC’s mandate is

to advise on targets, not on policy instruments (McGregor, Kim Swales, and Winning 2012). Despite that, one interviewee argued that “it’s pushed the envelope on that consistently. It’s strayed into suggesting scenarios and suggesting policies and all the rest of it, and constant letters from the chair, the chairs of the committee over time. It’s been a very activist institution and it’s slightly overreached its formal remit.” This suggests the agenda-seeding effect is moderated by the policy entrepreneurship of the committee’s members – their willingness to frame their ex-ante projections as quasi policy recommendations.

Secondly, the UK CCC helps establish common knowledge via two mechanisms. On the one hand, the committee acts as a ‘knowledge broker’ (Averchenkova, Fankhauser, and Finnegan 2021b) – it is considered an authoritative source of information by all major political actors. As one interviewee observed, “the information provided by the committee ... has been accepted and reported across the political spectrum both by Conservatives and Labour, not only by the Greens also NGOs and business widely use its information. Precisely because they are perceived as being a non-political player but a credible independent provider of information and independent assessments.”

On the other hand, several interviewees identified the committee’s considerable analytic capacity as the means by which it facilitates the emergence of common knowledge. One interviewee called the committee “very, very analytical, very evidence driven” and argued that “whatever argument you want to make about climate policy, whether you want to slow it down or accelerate it or change it in another way, most people use CCC analysis and facts to make their point.”

Both mechanisms may depend somewhat on the intervening variable of (until recently) relatively low political polarisation – especially at the mass level (Curtice 2022; Burn-Murdoch 2023) – around climate change policy in the UK. Lockwood (2021a) argues that the relatively

low salience of climate change and limited conflict around the issue were key factors supporting the emergence of an ambitious climate governance framework. Low salience is particularly important in light of the substantial intra-party divisions in the Conservative party, both among members and MPs, on climate change (Carter and Pearson 2022; Goodman 2023). These conditions may have allowed the UK CCC to gain credibility in the eyes of a range of political actors.

The third key effect relates to the UK's climate-focused parliamentary committees. The Business, Energy, and Industrial Strategy (BEIS) committee – the climate ministry's corresponding commons select committee⁴⁵ – was found to increase external transparency by scrutinising the ministry's legislative and / or other initiatives. The committee's role in providing external transparency is illustrated by its recently published report on the Decarbonisation of the Power Sector (BEIS Committee 2023). Interviewees pointed to the pooling of evidence and information that is part of the committee's inquiries as the chief mechanism through which it sheds light on the government's climate policy, with one expert noting that the BEIS committee "is providing the evidence space ... for parliament to scrutinise the work of [the] government." The strength of the committee's transparency-enhancing effect is, as another interviewee observed, moderated by a number of intervening variables, particularly the chair's political heft in parliament and personal interest in climate policy.

In contrast to the BEIS committee, the Environmental Audit Committee (EAC), the other climate-focused commons select committee, exercises an agenda-setting and agenda-seeding function. The

EAC's brief is "cross-departmental", as one interviewee noted, with its inquiries cutting across departments. That is, the EAC's focus is predominantly on gaps in the government's climate agenda, relevant areas which current government policy either ignores entirely or covers insufficiently, rather than on the internal flaws and inconsistencies of the government's legislative proposals. In that way, the EAC can push certain items onto the government's agenda; including, for instance, recent inquiries into accelerating the transition away from fossil fuels, and carbon border adjustment mechanisms.

Yet, the strength of the effect hinges on the EAC's chair being a climate policy entrepreneur, someone who is willing to press the government on gaps in its agenda. "I would say," one interviewee remarked, "that their chair has quite a lot of influence in terms of deciding exactly what type of committee they want to be because they don't dock into a single department in the way that the other committees do."

4.2.2.2 Institutional deficits and reform options

Interviewees tended to agree that the UK has developed a set of climate institutions, which effectively address many of the eight strategic challenges outlined in section 3.1. At the same time, interviewees singled out a lack of delivery capacity⁴⁶ as the key deficit of the UK's institutional landscape. The current climate governance system has failed to achieve the degree of vertical and horizontal coordination necessary for the UK to implement its ambitious climate targets.

Several interviewees, in line with the academic literature (e.g. Lockwood, Mitchell,

and Hoggett 2019), attributed the weakness of horizontal coordination mechanisms – mechanisms for ensuring that different departments act in unison when developing and implementing climate policy – to the climate department's inability to exert pressure on other relevant departments to follow through on their climate-related obligations. This is especially true for the Treasury, which is, apart from the Cabinet Office, widely considered the most important veto player (John 2021, sec. 8.3.4).

Given the Treasury's veto power, empowering the climate ministry was seen as unlikely to significantly boost horizontal coordination. Instead, a 2020 Institute for Government report proposed the creation of Net Zero Unit located in the Cabinet Office and headed by an official at the director general level, with "overall responsibility for climate change mitigation and adaptation, setting carbon budgets and responding to [the UK] CCC, as well as conducting international climate negotiations" (Sasse et al. 2020, 69). One of our interviewees similarly recommended the creation of a delivery-focused policy unit, with autonomy to implement policy. A similar recommendation was made in the Skidmore review (Skidmore 2023, sec. 1.3).

While these proposals have not been implemented, recently a Cabinet Office sub-committee on Energy, Climate and Net Zero – chaired by the Chancellor of the Duchy of Lancaster, a position currently held by Oliver Dowden – was established, whose remit is to coordinate the formulation and delivery of climate policy across the whole of government.⁴⁷ It is too early to tell whether this sub-committee will, in fact, increase horizontal coordination, but its composition,⁴⁸ by including key veto ministries, addresses

⁴⁵ The February 2023 reshuffle resulted in the BEIS department being, in part, replaced with the Department for Energy Security and Net Zero. Since commons select committees are usually aligned with specific departments the committee's name and remit will likely change in the future (Natzler 2023).

⁴⁶ This is consistent with the UK CCC's 2023 progress report to parliament, in which it noted: "The establishment of the new Department for Energy Security and Net Zero means there is now a central department with a specific remit to oversee the delivery of Net Zero. Responsibility for managing interdependencies and coordinating delivery must be embedded in its objectives, backed up by sufficient authority. Effective coordination and clear alignment of key decision-making frameworks with the required outcomes are essential, and this needs to extend to the Government's interactions with devolved administrations, local government and the wider system. Structures such as the Inter-Ministerial Group, the Net Zero Council and the Local Net Zero Forum have been established for this purpose, but must now become more effective in agreeing clear roles and responsibilities and managing shared outcomes." (UK CCC 2023f, 336–37)

⁴⁷ Its specific terms of reference are to "consider matters relating to energy, and to the delivery of the United Kingdom's domestic and international climate strategy."

⁴⁸ Apart from the chair, this sub-committee includes: the Chancellor of the Exchequer; the Secretaries of State for Foreign, Commonwealth and Development Affairs, Energy Security and Net Zero (deputy chair), Science, Innovation and Technology, Levelling Up, Housing and Communities, Business and Trade, Environment, Food and Rural Affairs, Transport; the Ministers for Intergovernmental Relations, Women and Equalities, Cabinet Office (and the Paymaster General), Energy Security and Net Zero as well as the President of the Board of Trade.

one of the principal obstacles that has hampered climate policy delivery until now.⁴⁹

The importance of better institutionalising vertical coordination – albeit mentioned in passing by several experts and recognised as a crucial challenge by the government itself in the Carbon Budget Delivery Plan (UK Government 2023a) – was discussed at length by only one interviewee. That interviewee pointed out that there are no institutions for coordinating the actions of the central government and the devolved administrations in Scotland, Northern Ireland, and Wales. Yet, vertical coordination is also a challenge within England, where multiple and incongruous administrative boundaries impede effective coordination between the national government and sub-national regions (Newman and Kenny 2023; McHarg 2023). Reform proposals for improving vertical coordination are scarce, with the work by Nice and Sasse (2023) being a notable exception. Indeed, Tom Sasse, Associate Director at the Institute for Government, suggested according ‘Metro Mayors’⁵⁰ a greater role in delivering sub-national climate policies.

4.2.3 Sweden

There was no single institution in Sweden that emerged as the most important, as identified by interviewees. Those we spoke to variously identified the recently created Ministry of Climate and Enterprise⁵¹ because it represents the locus of climate policy development in the government; the climate law because it signalled a shift towards more stringent climate policy; and the climate units within the Environmental Protection Agency and the Energy Agency. Those that highlighted the agencies did not focus purely on the climate units within them, but rather highlighted their

general analytical capacity (Environmental Protection Agency) and role in formulating policy options (Energy Agency and Environmental Protection Agency), if not the direction of policy.

4.2.3.1 Key effects

The Swedish Climate Act (2017) enhances commitment to long-term climate goals through three distinct mechanisms. The first is that it enshrines the consensus for climate action among almost all Swedish political parties that was achieved as part of the Act’s development. The adoption of the Act was preceded by a period (2014 – 2017) of extensive consultation and consensus building, coordinated by the Cross-Party Committee on Environmental Objectives (Karlsson 2021). The committee, composed of MPs representing seven of the eight parties present in the Riksdag at the time,⁵¹ plus 30 experts, worked together to agree on the tenets of Sweden’s climate policy framework, comprised of the Act, long-term targets, and the Climate Policy Council. They presented these recommendations as a report to the government in early 2016 and they were later adopted by parliament in the form of the climate law (Matti, Petersson, and Söderberg 2021). Interviewees argued this process was critical to achieving a stable, long-term political bargain, which is a key feature of policymaking in Sweden: “the process of developing the Swedish Climate Act was very important ... all political parties except for one [Sweden Democrats] were in agreement. From that perspective, it represents a very long-term commitment.” The importance of this political consensus, enshrined in the Act, is also highlighted by Karlsson (2021): he finds that the consensus achieved by the committee was more important than the detail of the Act itself, and that this political agreement was critical for the Act to

gain support of other actors, like the Finance Ministry.

The second commitment mechanism is a feature of the Act itself: it legislates the requirement that Swedish climate policy be consistent with climate targets agreed by parliament. Enshrining this requirement in law increases commitment by raising the political costs of repealing the law. This effect is present in Sweden, even though the Act does not, as in the other three countries in our sample, legislate climate targets directly. Commitment is nevertheless strong by virtue of the high number of veto players in Sweden’s political system ensuring a considerable degree of policy stability (Tsebelis 2002; Lindvall et al. 2020). This was reflected by interviewees’ belief that the law sends a strong signal of Sweden’s commitment to climate action, which is additional to its commitment under EU-wide climate policy. Interviewees pointed out that there have recently been some discussions in Sweden about whether its domestic climate law and policy framework is redundant in the context of the government’s commitment to EU-wide targets. It is significant that the Act has been retained because, as one interviewee argued, the Swedish climate law remains important; it provides a forum for national debate about the direction of climate policy, despite its target-setting function potentially having been rendered redundant by the EU’s Fit-for-55 package.

The final commitment mechanism of the law is the requirement that governments publish a Climate Action Plan every four years, in the year after ordinary elections have been held.⁵³ This requirement, and in particular the time limit it imposes, implies that governments must engage with climate policy development – even if they would otherwise fail to do so or delay doing so. One interviewee argued

49 In its 2023 progress report, the UK CCC observed: “At Cabinet level, coordination of Net Zero delivery is overseen by the new Domestic and Economic Affairs (Energy, Climate and Net Zero) Committee, which was established by the new Prime Minister. It is important that this Committee meets frequently and gives priority to the coordination challenges of delivery, as was implied by the previous arrangement of two separate Committees – focussing on strategy and implementation respectively. Unlike the previous Climate Action Strategy Committee, this Committee is no longer chaired or attended by the Prime Minister, which could reduce its political capital. The CBDP [Carbon Budget Delivery Plan] confirms that this Committee will receive regular updates on the UK’s progress against carbon budgets and its 2030 NDC and act based on them to ensure that policies remain on track to deliver the outcomes that are required.” (UK CCC 2023f, 367)

50 These mayors are directly elected by residents in a metropolitan region or a number of adjacent local authorities. Currently, the following regions directly elect such mayors: Greater London Authority, and the Combined Authorities of the West Midlands, Greater Manchester, West Yorkshire, Liverpool City Region, South Yorkshire, West of England, Cambridgeshire and Peterborough, North of Tyne and Tees Valley.

51 The Ministry of Climate and Enterprise became operational on 1 January 2023.

52 Excluding the Sweden Democrats, who refused to join the committee.

53 Paragraph 5 of Swedish Climate Act.

that the current government would under different circumstances have avoided further climate policy development: “the government would really try to avoid developing a coherent climate policy if they could, because it’s very hard to imagine that this coalition that there’s in power now would be able to develop a climate policy together with the Swedish Democrats.” While the current government is legally required to submit a Climate Action Plan, it remains to be seen how it will interpret the statutory requirement – the next Climate Action Plan is due to be published in the autumn of 2023. It is also unclear what sanctioning mechanisms exist if the government fails to deliver the plan (these are not contained in the Act) and what other consequences would arise from non-compliance.

The second group of effects we identified in Sweden is the increase in transparency and common knowledge as a result of the work of Sweden’s climate advisory body. A core function of the Climate Policy Council is to publish annual reports containing ex-post analysis of the government’s progress in achieving its emissions targets and ex-ante analysis of the degree to which current policy is aligned with Sweden’s climate goals. These reports have increased transparency and improved understanding of key climate policy issues within the government. A member of the Climate Policy Council said, “the bureaucrats will use it [the report] and then they will give their politicians arguments rooted in the report if it helps in one way or another”. The reports may also have enhanced understanding about Sweden’s climate policy among the public, in part due to the intervening variable of the Council’s efforts to make the reports accessible to a general audience. The chief executive of the Climate Policy Council commented, “we ... try to make our reports, not like scientific papers, but easy to read and understand and for all stakeholders to discuss and have a kind of a knowledge base for a good discussion.” Transparency is enhanced further by an additional intervening variable, the actions of NGOs and other civil society groups, which use the reports as the basis for

discussions and awareness campaigns. As one interviewee described, “there’s a lot of media attention. So it causes debate, and they [the media] open up for discussions on things that the government might not have discussed.”

The third key insight that emerged from interviews was the agenda-setting effect of the climate units within the Swedish Environmental Protection Agency (SEPA) and the Energy Agency. We highlighted above (see section 4.1) that a key feature of Sweden’s political system is the presence of large and semi-autonomous state agencies, which in the context of the prohibition on ministerial rule, allows agencies more leeway in regulatory decisions (Neby and Zannakis 2020). Interviewees argued that this special position enables climate-relevant agencies to considerably shape the agenda on climate policy, especially through their function of preparing analysis and policy options for political decision-makers. The SEPA has a specific mandate to provide the basis for the annual climate reporting section of the budgetary bill and the four-year Climate Action Plans each electoral term. This function, in combination with its significant analytical capacity, relative to the Ministry of Climate and Enterprise, means it can advocate for further climate policy action; as one interviewee stated, “They’re looking at it from the climate policy perspective side, the targets, and so they can have kind of that voice for climate and keeping track.”

The fourth insight relates to whether the incorporation of the Ministry of Climate into a combined Ministry of Climate and Enterprise enhances integration of climate policy with economic and other policy areas. Given the Ministry is still new, interviewees theorised this effect ex-ante, and differed in their predictions. One interviewee argued that locating the two portfolios under ‘one roof’ could have the effect of faster and more holistic policy integration: “it could potentially speed up the whole ... policy design and implementation process.” Given Sweden has a “history of inter-ministerial tension” in relation to the most ap-

propriate climate policy instruments. The Ministry of Finance and Ministry of Enterprise has typically adopted an economic perspective, while the Ministry for Environment has argued for values other than economic efficiency (Neby and Zannakis 2020, 603). The co-location of two ministries has the potential to allow trade-offs to be resolved within the ministry before they are taken for collective decision as part of the cabinet process. Others argued that the merger risked diminishing the influence of the climate portfolio within the combined ministry, in part because the climate minister is more junior, belongs to the smallest party (the Green Party), and is personally less experienced in comparison to the Minister for the Enterprise. Interviewees noted that, despite the potential for Sweden to integrate climate concerns into its industrial and economic policy, the risk remains that the merger instead signals a downgrading of the priority given to climate policy in comparison to that devoted to the Enterprise part of the Ministry. It is worth noting that this merger was made in the context of a new, more conservative government in Sweden and a reduction in ambition of some of Sweden’s key climate policies (Rolander 2022; Hivert 2023; Szumski 2023).

Finally, the corporatist Fossil Free Sweden (FFS) initiative, overseen by the Ministry of Climate and Enterprise, (Brodén Gyberg and Lövbrand 2022; Fossilfritt Sverige 2023a)⁵⁴ is a distinct institution in our sample of cases. The initiative engages in policy development by formulating and presenting strategic proposals to the government and collaborating with (Fossilfritt Sverige 2023b) 22 industries to produce roadmaps to outlining the path to decarbonize various industrial sectors of the economy (Brodén Gyberg and Lövbrand 2022). Nasiritousi and Grimm (2022) describe Fossil Free Sweden as an ‘orchestrator’ which engages in both formal and informal consultation with a variety of non-government actors to facilitate the delivery of Sweden’s climate policy goals. Several interviewees also argued the initiative bolsters informal commitment by

⁵⁴ Fossil Free Sweden is led by a National Coordinator, Svante Axelsson, who was previously Secretary-General of the Swedish Society for Nature Conservation and staffed by a small secretariat of around seven (mostly administrative) employees (Brodén Gyberg and Lövbrand 2022; Fossilfritt Sverige 2023a).

creating a visible community of economic actors publicly committed to climate targets. The presence of this community helps to prevent political actors from arguing climate ambition should be reduced on grounds of either (i) loss of economic competitiveness of key industries and / or (ii) likely opposition from key economic actors. FFS' roadmaps – created through public consultation processes and available on their website (Fossilfritt Sverige 2023b) – demonstrate the feasibility and industry's willingness to reach climate goals.

4.2.3.2 Institutional deficits and reform options

The most common deficits in Sweden's institutional landscape highlighted by interviewees were the need for better (i) vertical coordination on climate policy among national and sub-national levels of government, and (ii) horizontal coordination among the various ministries and agencies with responsibility for climate mitigation. County councils and municipalities have a considerable degree of autonomy and independent policy responsibility in Sweden (Neby and Zannakis 2020; Johansson 2020). This includes important aspects of climate policy, such as regulating regional public transport. Interviewees said sub-national governments sometimes faced competing priorities to climate mitigation, however, and vertical coordination mechanisms with the national-level government were lacking.

To achieve horizontal coordination, two interviewees argued Sweden needs a coordinating unit led by the Prime Minister's office. Given there are over eight agencies with some responsibility for climate policy (Matti, Petersson, and Söderberg 2021), one interviewee argued such a coordination mechanism was necessary – to coordinate their work and their interactions with the ministries. The Climate Policy Council, explicitly referencing the German Klimakabinet, and an equivalent institution in Denmark (CPC 2020, 43), recommended the establishment of a 'climate cabinet' in their 2020 report to coordinate decision-making and review impact-assessed policies forming part of the Climate Action Plan

(CPC 2020, 43). The Council also recommended the creation of another coordinating unit for Sweden's climate-related agencies in its 2022 report (CPC 2022, 83–84). The climate cabinet proposal was adopted by Stefan Löfven's government in June 2020, but according to interviewees, became dormant after Magdalena Andersson replaced Stefan Löfven as leader of the Swedish Social Democrats and Prime Minister in 2021. This indicates the critical intervening variable of political will – these types of coordinating mechanisms are at risk if Prime Ministers do not wish to lead them.

Interviewees made two other reform suggestions. One argued that the Climate Policy Council needs a larger secretariat: its current secretariat is comprised of less than ten people (supporting eight council members), in comparison to advisory bodies in the UK and Australia, which have secretariats of approximately 30 to 40 technical staff. Another suggestion was for greater technical capacity within ministries, especially in the Ministry of Climate and Enterprise. Because ministries are generally small in Sweden (e.g. the Ministry of Climate and Enterprise has only ~30 staff), with most technical expertise located in the agencies, the Ministry's ability to analyse complex issues internally is limited and can lead to excessive dependence on agencies (especially SEPA) for technical support.

4.2.4 Australia

The 'most important' institution cited by interviewees was split between Australia's climate law (Climate Change Act 2022) and the recently created climate ministry, the Department of Climate Change, Energy the Environment and Water (DECCEEW). Those that identified the climate law reasoned that it provided a legislative basis for climate action which has not existed in Australia before. Those that cited the climate ministry did so because it is the main institution responsible for the development of climate policy.

4.2.4.1 Key effects

Over the past year, Australia has experienced significant change in its landscape of climate institutions, including the passage of a climate law, the expansion of the mandate of the climate advisory body, the creation of a new climate ministry, and the creation of new climate units in other ministries across government. Because of the recency of these changes, the effects we highlight were predominantly theorised ex-ante by experts in interviews. With this in mind, three insights stand out.

First, the legislation of targets within the climate law will likely increase commitment to climate mitigation over the long term via two mechanisms. Enshrining emissions reduction targets in legislation can increase the political costs of repeal in a non-trivial way (Brunner, Flachsland, and Marschinski 2012, sec. 4.1). This is particularly relevant in Australia where climate policies have been repealed in the past, most notably Australia's emissions trading scheme (see section 4.1). One interviewee noted that "it's still possible for everything to be reversed again. I think it's unlikely, but it's still possible. And in that sort of situation, having legislation that's comprehensive and quite detailed, is really a big safeguard." The second mechanism interviewees suggested is that legislated targets send an important signal to businesses and communities that they should make investments and behavioural changes in line with long-term climate goals, or as one interviewee put it "creating that business ... should do the same [act in response to climate change]." These groups are likely to oppose any reversal that undermines the value of these investments, providing an additional potential mechanism through which commitment is achieved.

The second key effect in Australia was the likely increase in external transparency brought about by the climate advisory body, the Climate Change Authority's (CCA), expanded mandate to deliver ex-post and ex-ante analysis of the effectiveness of government climate policy. Interviewees believed this function would increase transparency through two

mechanisms. First, the publication of the advice would provide an assessment of the gap between current government policies and longer-term targets. A report of this kind from the CCA – as an independent, government-associated body – was seen as a more credible source for this analysis than, say, a think tank. The regular, annual publication of the CCA's advice will also likely enhance transparency through the mechanism of a focal point in the climate policy debate – a moment when increased scrutiny is directed at the government by politicians, the media, and civil society. One federal government bureaucrat commented, “it kind of forces the public's attention on this at least once a year to kind of stock take what the government has done that year. And summarises for the public media where we are at in reaching our NDCs [Nationally Determined Contributions] and in what policies we have implemented through the year.” The importance of this focal point is somewhat dependent on the extent to which these actors use the publication of the report to enhance transparency, for instance through debates in parliament and media attention on the findings of the report itself. Another potentially important intervening variable is the composition of the CCA, which comprises representatives from major fossil fuel lobbying groups (see Figure 8). This may undermine the quality of the scrutiny contained in its report and therefore its transparency-enhancing effect.

Second, interviewees theorised that primarily within-departmental policy integration – the inclusion of climate policy targets in the formulation of policy in other sectors – would be enhanced by the creation of ‘climate units’ in other ministries, especially in the Treasury and in the Department of Infrastructure. Treasury has recently created two climate units, the Climate and Industry Branch in the Fiscal Group and the Climate and Industry Modelling Branch in the Macroeconomic Group. Interviewees said the creation of these dedicated units, in particular the increased capacity to model climate policy implications and climate impacts in the Modelling Branch, will increase their climate policy expert-

ise and engagement in internal climate policy debates. This means they are better placed to advise on the intersection of climate issues with strategic economic challenges and integrate climate concerns with economic policy. The Treasury's climate modelling branch is also heavily involved in the development of Australia's latest Intergenerational Report: an outlook for the impact of policies and a projected budget over the next 40 years. Integrating the effects of climate change and climate policy into this report may enhance long-term climate policymaking. These changes are significant in the Australian context, first because of the significant power and influence of the Treasury as a central agency with responsibility for all policies involving funding and investment (Kefford et al. 2023), but also because interviewees said Treasury had been somewhat absent from these debates in the past.

The Department of Infrastructure, Transport, Regional Development, Communication and the Arts (the Department of Infrastructure) recently created a dedicated climate policy unit. The role of the Net Zero Unit is to identify opportunities within the infrastructure portfolio to help Australia to achieve its climate neutrality targets, as one interviewee described “to identify sort of strategic opportunities for how government policy can move in the right direction in responding to climate change ... within the remit of the infrastructure portfolio.” Interviewees thought that the presence of such a unit within the Department of Infrastructure would increase policy integration by ensuring climate has a ‘voice’ within internal departmental policy debates, particularly in relation to issues such as fuel efficiency standards. One interviewee noted the leadership of this unit, by Ian Porter, a climate policy expert and activist, was important because he would “bring together all those different bits and pieces, the transport and the industry, hopefully, so providing another level of integration within the portfolio.” According to another interviewee, it may also increase cross-ministerial policy integration through its engagement with the (currently temporary) Net

Zero Taskforce, which advises the federal government on how best to support regional communities through the energy transition.

4.2.4.2 Institutional deficits and reform options

In the context of questions about institutional reform, several interviewees highlighted the importance of the intervening variable of political will in the Australian context, where the prioritisation of climate change has been politically volatile (see section 4.1). They suggested that, though climate institutions are critical, they are no substitute for political support for climate policy action in achieving emissions reductions. Nevertheless, interviewees made three, distinct reform proposals.

The first proposal relates to the need for new institutions or institutional arrangements that address the strategic challenges of consultation and compensation for communities exposed to carbon-intensive industries. Coal-mining regions and communities based around coal-fired power stations, for instance, are particularly exposed to job losses resulting from the energy transition and require investment for economic and social adjustment. Some institutional approaches have emerged to respond to this issue, including the Net Zero Economy Task Force, a cross-agency task force run out of the Department of Prime Minister and Cabinet with the mandate to develop approaches to ‘regional transformation’ (PM&C n.d.). In September 2022, the Australian Greens proposed the creation of a National Energy Transition Authority – a national authority charged with investment for structural adjustment – but in March 2023, the Labor-led Senate Economics committee issued a report in which it recommended that such an authority not be created (Senate Economics Legislation Committee 2023). Despite that, the Australian government announced the creation of the National Net Zero Authority / Economy Agency in early May 2023: an agency dedicated to steering the energy transition in Australia, with responsibility for supporting workers and communities

and identifying investment opportunities.⁵⁵ This may become an important climate institution, but because it was only established very recently (after the conclusion of our interview and analysis period), is not examined in detail here. One interviewee, though he agreed with the need to address the compensation challenge, nevertheless wondered whether existing regional authorities (such as the La Trobe Valley Authority) would be better placed to manage the impacts of the energy transition than a national agency.

The second proposal relates to the need for better vertical coordination between the federal government and states and territories on climate policy. Sub-national governments have significant responsibility for implementing climate mitigation policy and each have developed climate neutrality and (some) sector targets (CCA 2022, sec. 2.3.4). The National Cabinet – Australia’s forum for all vertical coordination between the federal and sub-national government – includes a Ministerial Council for ‘Energy and Climate’, composed of ministers in state and territory governments with responsibility for climate change policy. This group recently launched a National Energy Transformation Partnership, which aims to support alignment among sub-national governments in transforming the energy system (DCCEE 2022).

There is potential for this group to take a more encompassing approach to coordinating climate policy, beyond transformation in the power sector. One interviewee also suggested there was scope for a climate policy-specific joint council in National Cabinet, equivalent to the Joint Council on Closing the Gap (focused on indigenous affairs).

The final reform proposal was for mechanisms to strengthen horizontal coordination among the various federal ministries and agencies involved in the development and delivery of national climate policy. As one interviewee put it, “the big challenge is getting the coordin-

ation, getting everything working in a way that’s coherent”; others also suggested now that targets have been legislated, there should be sharper focus on delivery. No interviewee made a concrete proposal for how to achieve this, however. There was no proposal, for instance, for a ‘climate cabinet’ mechanism, or to strengthen the Powering Australia Interdepartmental Committee, those these mechanisms would appear potential responses to the challenge of horizontal coordination.

4.3. Cross-case analysis

This section summarises our comparative analysis across cases in our sample. We first discuss variation in the functions or design of climate institutions. Then we discuss variation in their effects, including where institutions have similar effects across cases and idiosyncratic effects in a single case.

4.3.1 Variation in functions

Within our categories of climate institutions, we observe variation in the design of these institutions and the different roles they are mandated to play in climate policymaking. Table 6 summarises the variation in functions performed by climate institutions in countries across our sample.

The table above shows that variation in the design of institutions in our sample is greatest among climate laws and climate advisory bodies. Sweden’s climate law, for instance, differs from others in our sample in that it does not enshrine long- and medium-term (2030) emissions reduction targets within the law itself. Targets were adopted separately by parliament, and the Act simply requires that governments pursue climate policies in line with these agreed targets. Climate laws vary further in whether they contain provisions for specific policy instruments (only the UK’s does this, for the operation of the emissions trading scheme); whether they impose sector-

based targets (only Germany) and whether they legislate the creation of the climate advisory body (all save for Australia). Unlike other climate laws, which legislate the creation of a climate advisory body, Australia’s body was created under the 2011 Climate Change Authority Act; though its recent climate law modifies the body’s mandate.

Climate advisory bodies share the common function of providing ex-post analysis and reporting on the government’s climate policy performance, or in other words, the emissions reductions achieved to-date by current policies. The degree to which these bodies provide ex-ante analysis – of how well current policies are likely to achieve future targets – can be harder to discern. The UK CCC is empowered to report on ‘further progress’ needed to meet targets, while Sweden’s Climate Policy Council must “identify policy areas where additional measures are needed” (CPC 2023). Australia’s Climate Change Authority lacks a specific mandate for ex-ante analysis but must assist the Minister for Climate in the preparation of an annual climate change statement, which includes analysis of the effectiveness of current policies in achieving future targets. In contrast, the mandate for Germany’s main climate advisory body, the ERK, was, prior the *Klimaschutznovelle*, relatively restricted: it is only empowered to analyse where current emissions have exceeded budgets for that year, drawing on modelling provided by the UBA⁵⁶. The WPKS also has a mandate to conduct ex-ante analysis, though this is mainly related to the implementation of the *Klimaschutzplan 2050* and the *Klimaschutzprogramm 2030* (WPKS 2023) as well as the development (Fortschreibung) of further *Klimaschutzprogramme*⁵⁷ rather than analysis of existing policy instruments.

Further important sources of variation in the functions of climate advisory bodies are whether they (i) advise on specific emissions reduction targets and (ii)

⁵⁵ On 14 June 2023, the government announced that the agency was established as an “interim step whilst a statutory Net Zero Authority is established. The Agency will also undertake work to design and establish the statutory Authority.” (PM&C 2023b).

⁵⁶ If the proposed amendment to the KSG (*Klimaschutznovelle*) passes without major amendments the government will assign a more prominent role to ex-ante analysis (see section 5.2) than has been the case until now (BMWK 2023b).

⁵⁷ From the official English translation of the German Federal Climate Change Act: “The Federal Government shall involve the Länder, municipalities, business associations and civil society organisations as well as the Scientific Platform on Climate Change [WPKS] and scientific advisory bodies of the Federal Government in every climate action programme through a public consultation procedure.” (FCCA 2019, secs 3, §9, (3)) According to the latest draft of the *Klimaschutznovelle* (June 2023), the government may no longer be obliged to consult the WPKS.

Table 6: Variation in functions across cases, as set out in mandate or legislation (as of June 2023)⁵⁸

Climate institution	Function categories	Germany	Australia	Sweden	United Kingdom
Climate law	Legislate long-term targets E.g. legislate net zero emissions by 2050				
	Legislate mid-term targets E.g. 65% reduction by 2030				
	Legislate sectoral targets E.g. energy sector must reduce emissions by 40% by 2030				
	Establish policy instruments E.g. legislate a carbon pricing mechanism (excludes policy plans)				
	Create climate advisory body Provide statutory basis for climate advisory body, set mandate and structure				
	Require regular climate policy reporting Set requirements for government to report on climate policy progress (e.g. annual statement to parliament)				
	Establish climate policy planning process Require development of climate policy plans on regular basis				
Climate advisory body	Ex-post analysis and reporting Analysis and reporting on emissions already emitted and existing previous / current effects of policies				
	Ex-ante analysis and reporting Analysis of the future trajectory of emissions and future policy impacts				
	Climate minister must respond to analysis Statutory obligation for the climate minister to respond to reports from climate advisory body				
	Ex-ante policy advice Providing advice on future policy measures to achieve targets				
	Advise on targets Propose medium- and long-term emissions reduction targets (e.g. carbon budget)				
Climate ministry	Develop climate policies Draft new climate legislation; assess implementation options				
	Consult public / stakeholders on development of policy Consult relevant stakeholders on policy impacts; elicit expert input				
	Work with other ministries to integrate climate policy objectives into other policy sectors E.g. work with transport ministry to prioritise policies for electric vehicles				
	Coordinate implementation of climate policy with other ministries / agencies Coordinate enforcement, infrastructure development, other areas of policy delivery with relevant ministries / agencies				
Within-ministry / within-agency climate unit	Monitoring and analysis of government climate policy Knowledge centre for climate policy within the non-climate ministry				
	Integrate climate policy objectives into policy of non-climate ministry Promote consideration of climate objectives in internal policy decisions	Sometimes			
	Develop sector-based climate policies E.g. policy for renovations for energy efficiency				
	Coordinate delivery of climate policy Work with other relevant entities to deliver and enforce climate policy				
Climate-focused inter-ministerial coordination committee	Integrate climate policy across ministries Provide forum and support for integration of climate policy objectives into all sectors	NA – inactive		NA – inactive	
	Coordinate development and delivery of climate policy Provide forum and support for coordination of policy implementation	NA – inactive		NA – inactive	
Parliamentary committee	Assess new climate policy proposals (new legislation) Scrutinise new climate-relevant legislation from cross-party perspective				
	Consult with experts / stakeholders on climate policy Call expert witnesses to input on policy review				
	Provide recommendations to improve climate policy E.g. publish reports, conduct special reviews				
	Assess implementation of climate policy Review and report on policy delivery				

Key Yes No

⁵⁸ In the German case, the functions of its climate law reflect the state of affairs prior to the adoption of the Klimaschutznovelle, given that only the draft version of this amendment was available at the time of finalising this report (early August 2023).

provide ex-ante policy advice on how those targets can or should be achieved. The UK CCC has the most explicit mandate to advise on targets through the mechanism of five-year carbon budgets, while Australia's Climate Change Authority must advise on changes to the country's nationally determined contribution; advice which the Minister must request every five years. Germany and Sweden's advisory bodies are not empowered to advise on targets. However, Sweden's advisory body does have somewhat of a mandate to provide ex-ante policy advice, through analysis of how "goals can be achieved in a cost-effective manner" (CPC 2023). The Australian Climate Change Authority similarly has leeway to provide ex-ante policy advice by assisting the Minister in the preparation of the annual climate statement, which contains information on policies. Germany's ERK does not possess the explicit mandate to provide ex-ante policy advice and the UK's CCC is simply mandated to supply advice on request, on an ad hoc basis. Nevertheless, the UK CCC does provide policy recommendations, which have increased in number and specificity in recent years (Dudley, Jordan, and Lorenzoni 2022).

Climate ministries tend to perform similar functions, with central responsibility for the development of policy proposals and the management of those proposals through the cabinet process. Sweden's Climate and Enterprise Ministry differs, however, in that it has less responsibility than in other countries for detailed policy development. Because most analytical and technical capacity is concentrated in Sweden's public agencies, like SEPA and the Swedish Energy Agency, detailed policy proposals, including advice on the development of the Climate Action Plan, are developed at agency-level in consultation with the Ministry. In our sample, there are three different types of climate units within ministries and within agencies. One type is a 'mir-

ror' of the climate ministry housed within the cabinet office, like the Climate and Energy Branch in the Department of Prime Minister and Cabinet in Australia and the Spiegelreferate (mirror departments) in the *Bundeskanzleramt* (Chancellery) in Germany. These 'mirror' units exist to monitor the activity of the climate department; for the most part, they do not propose policies, but rather track whether climate policy aligns with the PM or Chancellor's climate policy objectives, in particular, and those of the whole government, in general.

The second type are climate units located in non-climate ministries – other than the cabinet office or their equivalents. For example, the UK Treasury has established a Climate Policy Team and the Australian Treasury has established both Climate and Industry and Climate and Industry Modelling Branches. Such units are mostly tasked with integrating climate policy into the ministry's other policies and objectives, including industrial policy or international competitiveness for economy or finance ministries. Indeed, representatives from these types of units from over 80 countries have established the 'Coalition of Finance Ministries for Climate Action'. A recent report from the Coalition highlighted the need for climate units within finance ministries to 'mainstream' climate across fiscal policy and expenditure, drawing on dedicated staff with specialised technical expertise (Coalition of Finance Ministers for Climate Action 2022, 2023).

The third type are climate units within ministries and agencies responsible for developing policy proposals. The climate units within SEPA and the Swedish Energy Agency, for instance, are deeply involved in analysing emissions data and proposing policy options, in concert with the Ministries; Fachbereich V in the German Environment Agency (UBA) similarly contributes to policy through analysis and presentation of emissions data. Fi-

nally, the recently created Net Zero Unit in Australia's Department of Infrastructure has responsibility for consulting on and developing policy proposals, for instance for new fuel efficiency standards (Department of Infrastructure 2022). Inter-ministerial committees for the coordination of climate policy are only present in two cases in our sample. Of these, the UK's Domestic and Economic Affairs (Energy, Climate and Net Zero) Cabinet Committee has the broader mandate, with responsibility for coordination of all policy matters related to climate mitigation. By contrast, Australia's coordination body (the Powering Australia Interdepartmental Committee) applies to just a single, albeit important, policy platform. Germany and Sweden both currently lack these bodies but have established them (and later disbanded them) in the past.

Finally, a function common to several types of climate institutions is to impose a regular process for climate policymaking. Climate laws, for instance, impose a timeline upon which climate policy is created and delivered, through mechanisms such as five-year carbon budgets (UK), annual reports to parliament (Australia), and climate policy plans that must be published every four years (Sweden). Germany's climate law requires the government to publish long-term climate action plans and supporting climate action programmes within the following year – though it is not clear from the law how often climate action plans should be updated.⁵⁹ Climate advisory bodies, similarly, publish reports according to a regular, mostly annual, timeline, contributing to a legally specified rhythm of scrutiny which the media and civil society are aware of and participate in. Other institutions also play their part in this climate policy process: climate units in environmental agencies or climate ministries publish emissions data on a regular timeline, which is then fed into the process of scrutiny and reporting by the ad-

⁵⁹ Under the draft *Klimaschutznovelle*, the German government will be required to publish a new climate policy plan at the beginning of each new legislative term (BMWK 2023b, secs 6, §9).

⁶⁰ To our knowledge, there exist no comparative analyses of climate-focused parliamentary committees, including their descriptive features and policing strength – though, since Strøm's (1998) seminal contribution, a relatively small literature has emerged that examines parliamentary committees in comparative perspective (e.g. Martin and Vanberg 2020; Shugart et al. 2021; Zubek 2021). This recent work shows that committees' functions are such that their overall policing strength is, as of 2011, higher in Germany and Sweden than in the UK (Zubek 2021, fig. 3, top panel), with UK parliamentary committees likely having witnessed a decline in their scrutiny powers following the 'parliamentary battles' over Brexit (Russell and James 2023). Australian parliamentary committees are argued to be relatively powerful, but not included in systematic comparative work (Marsh and Halpin 2015). Conducting a comparative analysis of climate-focused parliamentary committees would be an interesting avenue for further research.

visory body; climate ministries prepare strategic policy plans in time to be tabled in parliament; and parliamentary committees⁶⁰ provide regular scrutiny of legislation. With the proliferation of climate institutions, we observe the consolidation of a 'climate policy cycle', itself comprised of multiple cycles of (usually annual) monitoring and (usually five-year) planning. This is somewhat similar to the well-established economic budgetary cycle – indeed, Sweden explicitly integrates its climate policy reporting with its annual budgetary cycle.

4.3.2 Variation in effects across cases

This section summarises commonalities and differences in the way climate institutions address the strategic challenges identified in section 3.1: the variation in the effects of these institutions in our sample of countries. In line with our analytical framework, we explicitly identify the mechanisms through which various institutions help policymakers deal with the strategic challenges, while also identifying, where possible and relevant, whether differences in the effects of institutions are caused by differences in design or differences in intervening variables (see Figure 6).

It is a challenge to identify effects robustly, given our small sample of countries and academic papers on the effects of climate institutions as well as the limited number of interviews. We therefore attempt to assign confidence levels for individual effects to indicate findings with a greater level of certainty with the aid of a decision tree (see Figure 9). The highest level of confidence occurs when an effect is directly entailed by an institution's function – for instance, transparency being entailed by the provision, enshrined in climate framework legislation, of publishing progress reports. The next lower confidence level is assigned when an effect is not automatically implied by an institution's mandate but is present in both a peer-reviewed study from the small literature on the effects of climate institutions (see section 2.3.2) and was independently identified by country experts during interviews.

When an effect was identified solely on the basis of peer-reviewed case studies, we assign a lower level of confidence than in instances where the literature is additionally backed up by our interviewees' analysis. Given the rigorous nature of peer review, we are less confident in effects identified by multiple ex-

perts, but not discussed in the academic literature. Finally, we assign the lowest level of confidence to effects that are identified by interviewees ex-ante – effects that interviewees hypothesised recently created institutions would likely engender in the future.

In the following, we focus on those effects that we identified with higher levels of confidence, as can be gleaned from Table 7. Importantly, however, our analysis does not allow us to draw inferences about the size or magnitude of these effects. Finally, note that here we combine coordination and integration into a single subheading to ease exposition – for this reason there are seven subheadings, but eight strategic challenges used in our analysis.

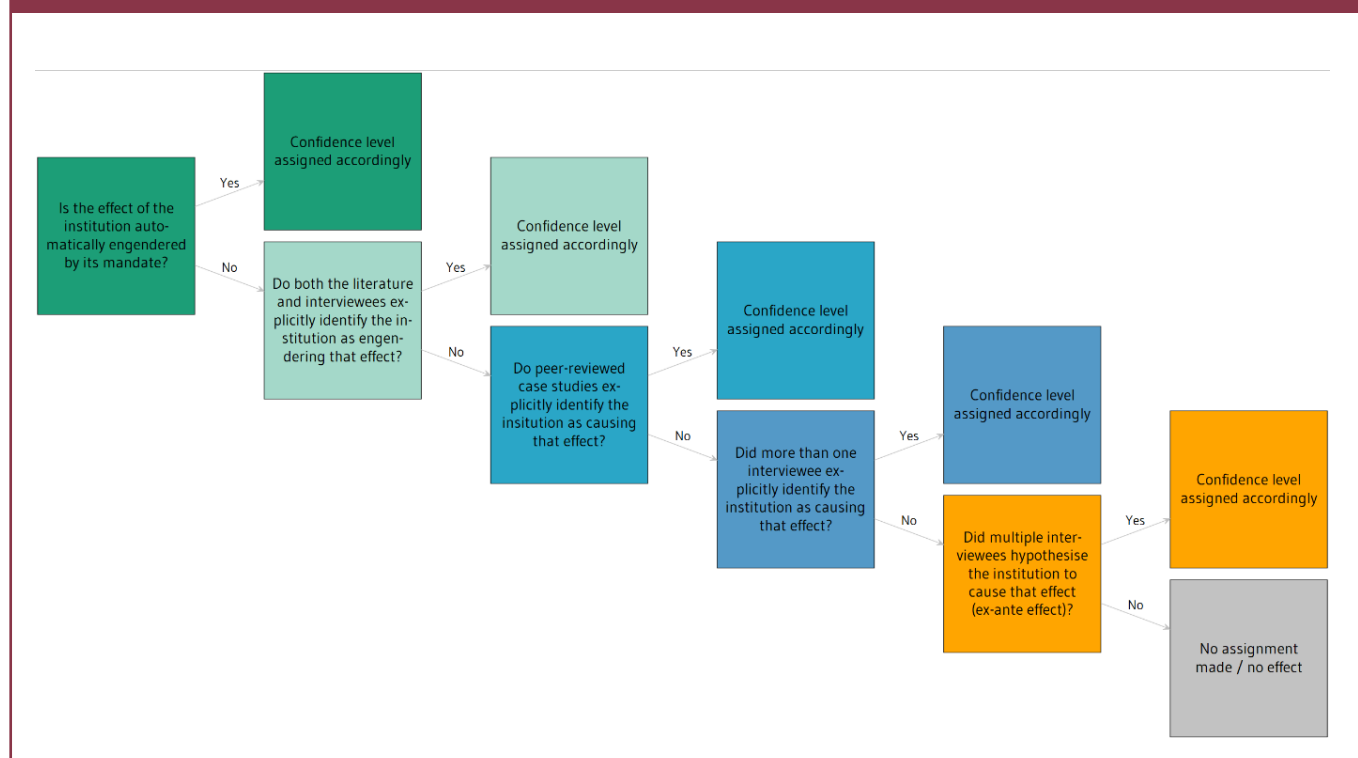
4.3.2.1 Agenda setting / agenda seeding

Across our sample, all six types of climate institutions have an agenda-setting effect in at least one country case – though two types of institutions, climate ministries and climate laws, stand out as especially important.

Climate ministries shape when and how climate policy becomes part of the polit-

Figure 9: Decision tree to identify confidence level of effects.

Source: Own illustration.



ical agenda in all four countries. This reflects ministries' importance – along with within-ministry climate units, and inter-ministerial coordination mechanisms – in developing climate policy and therefore setting the substance of the policy agenda, in concert with non-governmental actors and institutions. The ministry's agenda-setting power is, however, moderated by its place in the ministerial hierarchy. In some countries – including in Sweden, where the climate minister is the junior minister in the Ministry of Climate and Enterprise – the climate ministry is seen as less influential, implying that it has less clout to influence the political agenda. In Australia and Germany, however, the climate ministry has moved up the ministerial hierarchy recently, reflected in the appointment of Chris Bowen, a senior Labor politician, and Robert Habeck (Green Party) being Germany's deputy chancellor. In Germany, the ministry's agenda-setting effect operates via an idiosyncratic mechanism: the constitutionally enshrined *Ressortprinzip*. *Ressortautonomie* entails not only that the BMWK is primarily responsible for climate policy, but that the chancellery's power to impose its own agenda on the ministry is limited (see section 4.1). The BMWK has a fair amount of leeway to shape the specifics of the coalition's climate agenda – though the broad contours are spelled out in the coalition agreement (Coalition Agreement 2021, sec. 3).

Other institutions – including advisory bodies (via regular analysis of climate policy) and parliamentary committees (via regular scrutiny of climate legislation), but most notably climate laws – achieve agenda setting by establishing processes through which climate policy is developed and scrutinised. The mechanisms for climate laws' agenda-setting effect include: (1) establishing the long-term direction, or long-term 'agenda' of climate policymaking via setting targets and (2) establishing a regular process by which climate policymaking is conducted (e.g. through annual reports to parliament, or through the incorporation of climate policy planning into the budget cycle). The first mechanism enhances

agenda setting in all of our cases, but is strongest in the UK, where a precedent has been established whereby carbon budgets proposed by the UK CCC are (almost) invariably⁶¹ accepted by government. The second mechanism is also present in all our cases, but is arguably strongest in Sweden, where the government is required to publish a climate policy plan within a specified time frame at the outset of each new parliamentary term. This and other mechanisms by which climate policy is regularly returned to the political agenda, such as the ERK's annual reports mandated by the KSG and other regular reports published by other climate policy councils, help prevent climate policy from being eclipsed by other policy issues.

Finally, there are no climate institutions that have an agenda-seeding effect in all of our cases. Instead, interviewees emphasised – in line with some of the literature on the origins of elite ideological frameworks (e.g. Stecula and Merkley 2019; Hertel-Fernandez 2019) – that informal climate-related institutions, such as think tanks and informal consultation fora between bureaucrats and academics, are the principal institutional agenda-seeding devices. There are, however, two notable exceptions. (1) Parliamentary committees disseminate new ideas about climate policy (reform) via inquiries in both Sweden and Australia. (2) The UK climate advisory body (UK CCC) manages to seed ideas about what optimal climate policy might look like in the UK context by framing its ex-ante projections as de facto policy recommendations (see 4.2.2).

4.3.2.2 Knowledge and transparency

In all countries, we found that the same set of institutions – namely, climate advisory bodies, within-ministry climate units and parliamentary committees – facilitate the emergence of common knowledge. Arguably, climate advisory bodies are the main providers of common knowledge, which they do by conducting independent analysis and publishing reports on progress towards achieving emissions reductions targets

and other issues related to climate policymaking (e.g. hydrogen trade; carbon dioxide removals, or new instruments). By making this information available to the public – and with the additional, intervening variables of media attention on these reports and the use of their data and analysis in the broader climate policy debate – climate advisory bodies increase knowledge and understanding of climate policymaking among stakeholders outside government. Advisory bodies also foster common knowledge by acting as 'knowledge brokers': when their work is regarded as highly credible by all relevant political actors, as has increasingly been the case in the UK (Averchenkova, Fankhauser, and Finnegan 2021a), these bodies can promote a shared understanding of key domestic climate policy issues, which provides the evidential basis of the policy debate. It is (largely) through the same functions and mechanisms that climate advisory bodies – much like within-agency climate units, such as the UBA's Fachbereich V Climate Protection and Energy – promote external transparency.

Parliamentary committees also improve external transparency in all countries – mainly by reviewing climate legislation and calling on the expertise of external witnesses, such as academics, as part of their inquiries. This process, in turn, enhances common knowledge among members of the committee, who often develop expertise in climate policy, which they then share with their party colleagues. By scrutinising not only the work of ministers, but also high-level bureaucrats, parliamentary committees help members of the governing and opposition parties as well as non-climate ministers gain a better understanding of the mechanics of the climate ministry's legislative proposals and their implications. As a result, parliamentary committees promote internal transparency in each of our four cases.

Finally, key providers of internal transparency, particularly in the UK and Australia, are within-ministry climate units. The central mechanism is that these units provide climate expertise to the

⁶¹ While all governments have thus far accepted the UK CCC's recommended carbon budgets, the conflict in the run-up to the adoption of the fourth carbon budget (see section 4.2.2.1) illustrates the potential for governments to reject the committee's recommendations when the economic or political costs are perceived as too high.

ministry in which they are located, often by building up significant within-ministry analytical and modelling capacity. This improves understanding of general government climate policy within the department and knowledge of the risks and opportunities presented by climate change relevant to the core policy area of that ministry. These units also establish common knowledge within the government through the same mechanism.

4.3.2.3 Integration and coordination⁶²

All climate ministries help to achieve coordination and integration, as do all within-ministry climate units. In some climate ministries, integration is achieved through the co-location of climate with another ministerial portfolio. In Germany

and Sweden, for instance, climate is co-located with the economy portfolio, increasing the likelihood that economic and industrial policy decisions will take into account climate targets and vice versa. Co-location of climate with an influential portfolio may also increase the profile of climate concerns in the government, though depending on the structure of the ministry, the risk remains that climate is superseded by the other portfolio (this risk was identified in the Swedish case). In the UK and Australia, coordination and integration are achieved through the engagement of the climate ministry with other ministries, in particular in the context of developing policy through cabinet processes; and may be aided by the presence of climate units in other ministries.

There is only one country, Germany, whose climate framework legislation fosters policy integration, as Flachslund and Levi (2021) argue. This is because the KSG's sectoral targets incentivise all ministries, especially non-climate ones, to accord greater importance to emissions reductions, relative to other objectives (e.g. competitiveness). The abolition of sectoral targets in the *Klimaschutznovelle* threatens to reduce this effect, although there is also potential for greater focus on cross-sectoral policy measures to increase integration (see section 5).

Climate ministries also play a key role in coordinating the development and delivery of climate policy between ministries in all our countries. Similar to their integration-enhancing effect, climate minis-

Table 7: Variation in effects

CI / Effect	Agenda setting / seeding	Common knowledge	Transparency	Integration	Coordination	Accountability	Commitment	Consultation	Compensation	
Climate Law	DEU, GBR, AUS, SWE	All	All	DEU		Ex ante, informal	Informal (All)			
						Ex ante, formal				
						Ex post, informal				
						Ex post, formal: DEU				
Advisory body	Agenda-seeding: GBR	GBR	External (DEU, AUS)			Ex ante, informal: GBR	Informal: GBR, AUS	DEU (ERK), AUS (formal)		
	Agenda seeding: SWE, AUS		External (GBR, SWE)			Ex ante, informal: DEU, SWE, AUS				
	Agenda-setting: GBR, AUS, DEU (ERK), SWE	SWE, AUS, DEU	Internal				Ex post, informal: GBR	Formal		Informal: All
							Ex post, informal: SWE, DEU, AUS			
							Ex post, formal: DEU (ERK)			
Ministry	SWE, AUS, GBR (BEIS), DEU	SWE, AUS, GBR (BEIS), DEU	Internal: SWE, AUS, GBR (BEIS)	SWE, AUS, DEU, GBR (BEIS)	Horizontal: SWE, AUS, DEU, GBR (BEIS)		Informal: DEU	Formal: AUS, GER		
	GBR (DESNZ)		Internal: GBR (DESNZ)							External
Within-ministry / within-agency climate unit	SWE, AUS	Within-ministry	Internal	All	Within-ministry			Formal: AUS		
					Cross-ministerial: AUS, SWE, GBR					
Climate-focused inter-ministerial coordination mechanism	NA		NA	NA	NA					
	GBR, AUS		Internal: GBR, AUS	GBR, AUS	Cross-ministerial: GBR, AUS					
Parliamentary committee	All	All	All (internal + external)			All: Informal (ex ante and ex post)	Informal: SWE, GBR	Formal: All		
							Formal			
Key	In mandate	Literature + interviews	Only literature	>1 interviewee	Ex-ante	No effect				
<p>Notes: 'Formal' refers to an effect engendered as a result of formal mechanism (e.g. judicial review), which is often a part of the institution's formal mandate. 'Informal' refers to an effect engendered as a result of informal mechanism (e.g. reputation loss). 'Literature' refers to papers in the 'effects of climate institutions' literature review. 'Ex-ante' refers to effects that interviewees theorised would occur in the future. Some cells contain multiple instances of an effect category to capture different confidence levels. If a climate-focused unit is located in one of the central departments of government (e.g. the treasury or the cabinet ministry) then we code this as engendering 'cross-ministerial' coordination. Where we specify a sub-category in a cell, we imply that there are null effects for the other sub-categories – when we include these 'null' sub-categories we do so for emphasis.</p>										

⁶² Our case studies in section 4.2 suggest that the climate institutions in our sample of countries do not address the integration and coordination challenges as effectively as would be required for these countries to meet their (long-term) targets. A detailed analysis of integration- and coordination-related institutional deficits in the three non-German countries is – though critically important to improve the delivery of climate policy – beyond the scope of this report. In this section, we therefore focus on the institutions that countries rely on to achieve integration and coordination.

tries achieve horizontal coordination – both within and across ministries – by convening senior bureaucrats from other relevant ministries, by ushering climate legislation through the cabinet process, and managing the range of agencies and other bodies involved in the delivery, enforcement, and monitoring of climate policy. Based on our analysis, it does not appear that any of the climate institutions in any of our cases are significantly involved in vertical coordination with sub-national governments or institutions – but it may be that these dynamics were somewhat obscured by the scope of our study, which excluded institutions at the sub-national level.

4.3.2.4 Accountability

All climate advisory bodies and parliamentary committees help to achieve ex-post, informal accountability for the government to deliver on its stated climate targets, though only some advisory bodies and parliamentary committees promote ex-ante, informal accountability. By conducting ex-post analysis of the effectiveness of current policies in reducing emissions, and identifying gaps, climate advisory bodies hold the government to account through informal accountability mechanisms. Such mechanisms include negative media coverage of the government’s performance and potential loss of reputation for key ministers. All advisory bodies also have the potential to enhance accountability through ex-ante analysis, with similar mechanisms being at work: they might damage the government’s reputation by identifying where current policies are insufficient to meet future targets. This effect is more discernible, however, in the UK and Sweden, where climate advisory bodies – driven by policy entrepreneurial members – have in the past used their ex-ante analysis to criticise the government. Parliamentary committees, in contrast, achieve ex-ante and ex-post accountability by asking ministers and civil servants to justify their policies, including by gathering and synthesising expert assessments of the efficacy of these policies. By failing to justify proposed (ex-ante) or im-

plemented (ex-post) policies during parliamentary hearings, ministers or civil servants incur reputational and other political costs (e.g. bad media coverage, demotion, sacking); but doing so has no legal consequences, implying that parliamentary committee’s accountability power is merely informal.

While climate laws also address the strategic challenge of ex-ante, informal accountability, they are particularly consequential for ensuring ex-post, informal accountability across our sample of countries. By legislating medium- and long-term targets and creating monitoring infrastructure, at the centre of which are advisory councils, climate laws provide a focal point, allowing both elite non-governmental actors, including journalists and NGOs, and the broader public to assess whether the government has followed through on its promises. If the government is found to have missed its own targets, these actors can then sanction the government informally through, for instance, critical media coverage, lobbying, and protests.

Climate laws can, however, also boost ex-post, formal accountability. The mechanism that is common across all cases is that climate laws establish a legal basis for climate litigation – although this is limited in the sense that litigation tends to relate to the fulfilment of the government’s statutory obligations under the law, rather than delivery of appropriate climate policies or achievement of emissions reduction targets.⁶³ The UK High Court ruled in 2022, for example, that the UK government had failed to deliver a sufficiently detailed net zero strategy because it did not contain adequate information about policies and their projected effects (Dunne, Dwyer, and Evans 2023). Climate litigation also relies on, amongst others, the intervening variables of (i) an active eco-system of climate lobby groups, with the institutional, legal and monetary capacity to initiate such legal proceedings, and (ii) the strength of judicial review in a given country (Lijphart 2012, chap. 12). In the German case, an additional, idiosyncratic

mechanism is at work that explains why Germany’s main climate advisory body, the ERK, in combination with the KSG, is the only body in our sample which can hold the government formally accountable, albeit only ex-post. The ERK has a mandate to identify where a given sector has overshot its emissions budget for that year and to require that sector to develop an immediate action programme (*Sofortprogramme*) to compensate for the increase in emissions. Finally, it is worth noting that none of the climate institutions we identified exercise ex-ante, formal accountability in any of our cases. This means it is not possible for any institution to formally hold the government to account for actions – e.g. the removal of a subsidy supporting heat pump installation, or approving new fossil-fuel exploration – which imply they will fail to deliver on emissions reduction targets. This type of accountability is crucial for countries to achieve their climate targets because it prevents emissions from being emitted, before they can wreak climate damage, as opposed to extensively relying on ex-post measures, such as offsets.

4.3.2.5 Commitment

In all our cases, we found that climate laws are the key climate institution for enhancing formal and informal commitment to the government’s climate targets. There is variation in the additional informal commitment devices countries employ, with some relying on climate advisory bodies (UK), ministries (Sweden, Germany), and parliamentary committees (Sweden) bolster informal commitment.

The commitment-enhancing effect of climate laws is not a direct result of emissions reduction targets being enshrined in legislation. Although these targets are legally binding across our cases in a de jure sense, there is no de facto third-party enforcement of these targets, given that, within its boundaries, there is no higher agent of coercion than the government. Constitutional courts, such as the UK High Court (Dunne, Dwyer,

63 This points to the importance of what game theorists refer to as self-enforcement (Myerson 2004). Given that there is (in most instances) no third party that can force governments to abide by their obligations, as set out in climate framework laws, governments will only do so if the costs of non-compliance are sufficiently high. If this is not the case, governments may well ignore their obligations, even if they are legally binding in a nominal sense.

and Evans 2023) or the Bundesverfassungsgericht (Groß 2023), can rule the government to be in violation of these targets, but they have no legal power to force the government to abide by these targets. Instead, governments only abide by these targets or such rulings if they have some non-legal motivation to do so, such as the fear of losing power at the next election or reputational damage. Commitment therefore relies on increasing the political costs of overshooting, softening, or repealing targets. Politicians face more resistance to reducing climate policy ambition when this requires modifying existing legislation and climate laws increase the salience of targets such that overshooting them may imply greater reputational damage. By establishing the basis for climate litigation, climate laws can also include a formal, albeit relatively weak, sanctioning mechanism, giving investors and the broader public some confidence that the government will stick to its targets.

There is considerable cross-country variation in the institutions employed to bolster informal commitment. In Germany, it is the climate ministry, the BMWK, that functions as an informal commitment device. Its significant autonomy vis-à-vis the chancellery, entailed by the *Ressortprinzip*, increases the costs of repeal – at least when the ministry is led by a pro-climate minister. In such a scenario, the BMWK’s presence reinforces the commitment-boosting effect of climate legislation. In Sweden, by contrast, the cross-parliamentary committee has in the past enhanced commitment to the government’s climate goals by facilitating cross-party consensus on climate targets; but it is not clear whether this is a one-off effect or an ongoing one. Through this mechanism, private actors can be confident that changes in government, albeit potentially leading to reconfigurations of the instrument mix, will not lead to changes in the climate goals, which is illustrated by the consultation process that preceded the adoption of Sweden’s climate act (see section 4.2.3). In both the UK and Australia, informal commitment is enhanced by mandating the climate advisory body to advise the

government on emissions reduction targets. In the UK, this takes the form of the UK CCC advising on five-year carbon budgets and associated targets. In Australia, the Climate Change Authority must advise the Minister on updates to Australia’s Nationally Determined Contribution and the Minister must request this advice every five years. Given this provision was only adopted under Australia’s 2022 Climate Change Act, the strength of this informal commitment mechanism – how likely the government is to adopt the Climate Change Authority’s recommendation – remains unclear. In the UK case, governments have historically adopted the UK CCC’s proposed budget (see section 4.2.2), increasing the political costs of weakening the ambition of budgets in the future.

4.3.2.6 Consultation

Parliamentary committees are an important institutional means of consulting key non-governmental stakeholders in all our countries. Committees facilitate consultation by calling expert witnesses as part of their inquiries, and synthesising knowledge in the form of reports. This effect is especially strong when the committee’s members take a strong interest in climate policy and are willing to delve into the technical details of, for instance, the modelling upon which the government relies to justify its legislative and other initiatives. In only two countries, Australia and Germany, do climate ministries and within-ministry units also engage in consultation, primarily by convening consultation fora. The BMWK, for instance, gathers input from key stakeholders via the Koordinierungskreis terms of reference⁶⁴ as part of the Exportinitiative Energie.

Consultation is also an explicit part of the mandate of climate advisory bodies in Australia, where the Climate Change Authority must make provision for public consultation (Australian Government 2022, pts 4, 14 (3A)), and in Germany, where the ERK can elicit the views of experts, interest groups, and government entities (KSG 2019, secs 4, §12, (5)). Sweden’s Climate Policy Council pos-

esses the somewhat vague mandate to “foster more debate in society on climate policy” (CPC 2023) but it was unclear from interviews whether this involves formal consultation with external stakeholders. Consultation is not an explicit part of the mandate for the UK CCC, but in practice, it draws on supporting research from other expert bodies in the development of its progress reports – for example, the most recent progress report drew on research from Eunomia, a consultancy, on developing the UK’s heat pump supply chain (UK CCC 2023f, see ‘supporting research’).

Fossil Free Sweden is a unique institution for consultation with industry representatives about pathways to achieve climate targets within specific sectors (e.g. steel, forestry). Other countries likely achieve the same type of consultation through informal and ad hoc means (e.g. round tables with peak bodies).

4.3.2.7 Compensation

We noted above that compensation is a key challenge for climate governance: it is likely necessary to compensate potential losers from climate policy (e.g. firms and workers in carbon-intensive industries) to prevent these actors from undermining the development and implementation of climate policy. It is therefore notable that no climate institution we analysed delivers compensation – although, as we were finalising this report, Australia announced the establishment of a national body dedicated in part to compensation: the National Net Zero Authority. In other country cases, other types of institutions have emerged to address this challenge. The German “Kohlekommission”, for instance, was a temporary institution established to compensate losers (e.g. power plant owners) from the country’s phase-out of coal.

⁶⁴ Its specific terms of reference are to coordinate the actions of German ministries, federal states, and other institutions in promoting foreign trade and climate-friendly energy policy. To that end, the Koordinierungskreis seeks to primarily foster the exchange of information and views between various relevant stakeholders.

5. INSIGHTS FOR GERMAN CLIMATE INSTITUTIONS

In this section, we use our analytical framework to identify shortcomings in the landscape of German climate institutions and options for reform based on our comparative analysis. We outlined above in section 2.5 why our framework is a useful tool for generating reform options: the ‘strategic challenges’ element of our analytical framework helps us to diagnose key deficits in German climate institutions and its focus on mechanisms helps to identify which institutional features may (or may not) be replicated across contexts. Our methodology for identifying reform options is set out in more detail in the appendix.

Unlike in the previous sections, here we incorporate the changes to the *Bundes-Klimaschutzgesetz* proposed under the draft amendment to the law. Key changes contained in the *Klimaschutznovelle* include: (i) replacing targets based on ex-post emissions volumes with targets based on ex-ante emissions projections to 2030, (ii) replacing sector-based targets with overall, cross-sectoral emissions targets, (iii) replacing the sector-specific approach to devising *Sofortprogramme* – immediate action programmes, developed by the ministry responsible for a given sector, in response to overshoot of emissions targets in that sector in a given year – with a whole-of-government approach, which explicitly mentions the possibility of the inclusion of cross-sectoral measures, and (iv) empowering the ERK to examine and propose policy measures without the gov-

ernment explicitly having to request such analyses, as has been the case until now (BMWK 2023b). Assuming the June 2023 draft version is passed without (major) modifications, the *Klimaschutznovelle* will likely have profound implications for German climate governance – though a great deal of uncertainty remains about how the amendment will operate in practice and what effects it will engender over time.

Building on our results from section 4.2.1, we first summarise key institutional gaps in the landscape of German climate institutions, how changes under the *Novelle* might address these gaps, and what deficits are likely to remain. Table 8 combines insights from our initial analysis with our best guesses about the effects of institutions in light of the amendment.

Drawing on the table above, we next discuss the potential benefits of specific aspects of the *Klimaschutznovelle* and further options for reform. The institutional reform options we identify aim at improving three aspects of German climate policymaking: (i) integration and coordination, (ii) transparency and accountability, and (iii) agenda seeding and setting. Four caveats to the following section are necessary. First, because the *Klimaschutznovelle* has not yet entered into force, we can only make educated guesses about the impact of its various provisions based on the analysis we conducted prior to the publication of the

Table 8: Effects and gaps in German climate institutions

Key Black text: current effects of German climate institutions; red text: deficits and examples of other countries addressing these deficits (where relevant); orange text: changes under the *Klimaschutznovelle*; grey boxes: no effects in these categories

Climate institution	Agenda setting / seeding	Knowledge and transparency	Integration and coordination	Accountability	Commitment	Consultation	Compensation
Climate Law	<p>Legislates medium-term, long-term, and sector-based targets (under the unamended version of KSG) → set long-term direction of climate policy</p> <p>Requirement to produce a climate policy plan within twelve months of the beginning of the new legislative period → agenda-setting effect via medium term policy planning</p>	<p>Provides statutory basis for (i) institutions promoting transparency (e.g. ERK). Regulates climate protection and UBA reporting</p>	<p>Current sector targets have potential to enhance integration through sector-based policies</p> <p>Replaces sector-based targets with overall, cross-sectoral targets → uncertain effect on integration. Potential to reduce responsibility for specific ministries, but also for enhancing coordination and integration of policy reforms</p>	<p>Current <i>Sofortprogramme</i> → formal ex-post sanctioning, but no enforcement mechanisms for non-compliance + depends on political will</p> <p><i>Sofortprogramme</i> → formal, ex-ante sanctioning mechanism (based on projections), but less frequent (two consecutive years) and weaker formal accountability for specific ministries</p>	<p>Legislates long-term targets → increases cost of repeal → enhances commitment</p> <p>Requirement to publish climate policy programme within twelve months of new legislative term (reform proposal) → strengthen informal commitment (like in Sweden)</p>	<p>Provision to consult with stakeholders as part of development of <i>Klimaschutzprogramm</i></p>	
Climate advisory body	<p>ERK's regular reports → climate policy a fixed agenda item; WPKS advises on long-term direction of policy</p> <p>ERK empowered to provide policy advice via <i>Vorschlagsrecht / Initiativrecht</i> → potential for policy entrepreneurship similar to UK CCC → increase in agenda-setting / agenda-seeding power</p>	<p>ERK analysis and reports → influence enhanced by credibility of body → enhanced transparency + shared knowledge</p> <p>"Monitoring-Kommission" → gathers data + creates indices → enhanced understanding</p> <p>UBA Projektionsberichte → transparency about future emissions development, but assumptions unclear</p>		<p>Currently ERK can sanction ex-post via <i>Sofortprogramme</i></p> <p><i>Sofortprogramme</i> → mechanism for informal ex-ante accountability</p> <p>Both cases: no mechanisms for non-compliance + depends on political will</p>		<p>WPKS formally consults with stakeholders; otherwise, consultation informal</p>	
Climate ministry	<p>Develops climate policy → shapes policy agenda</p>	<p>Promotes within-government common knowledge and transparency</p>	<p>BMWK → works with other ministries to integrate climate → super-ministry increased political clout (intervening variable) → integration</p> <p>BMWK → coordinates with other ministries and agencies → act in concert</p>			<p>Consults with stakeholders (e.g. environmental NGOs, experts)</p>	<p>Compensation delivered by ad hoc commissions (e.g. "Kohlekommission") → potentially need for more encompassing compensation mechanism(s), e.g. Australian National Net Zero Authority</p>

Table 8: Effects and gaps in German climate institutions (continued)

Key	Black text: current effects of German climate institutions; red text: deficits and examples of other countries addressing these deficits (where relevant); orange text: changes under the <i>Klimaschutznovelle</i> ; grey boxes: no effects in these categories						
Climate institution	Agenda setting / seeding	Knowledge and transparency	Integration and coordination	Accountability	Commitment	Consultation	Compensation
Within-ministry / within-agency climate unit(s)	<p>UBA (Fachbereich V) produces emissions projections reports → framing and strategic timing of reports → targets based on ex-ante projections replace ex-post targets → agenda-setting effect of projections.</p> <p>Unclear how to deal with uncertainty about projections and implications for compliance with targets. UK CCC's Monitoring Framework uses a range of indicators and identifies data gaps to address uncertainty.</p>	<p>Promote within-ministry common knowledge and transparency</p> <p>Promote external transparency</p> <p>Lack of transparency about range of alternative projection scenarios → critical with increased importance of Projektionsberichte under the <i>Klimaschutznovelle</i></p>	<p>Support integration of climate policy objectives in 'home' ministry</p> <p>Support cross-government coordination of climate policy</p>	<p>UBA (Fachbereich V): contributes to annual emissions gathering emissions data → strategic framing of data → produces emissions projections reports → overshooting projected budget results in <i>Sofortprogramme</i> → support ex-ante accountability</p>			
Inter-ministerial coordination body for climate policy		Promote within-government knowledge and transparency	Promote integration of climate objectives into other policy areas → relies on political will Enhance coordination across ministries / agencies involved in climate policymaking		If led by Chancellery → demonstrate commitment of whole-of-government approach to climate policy	Consult with external experts and internal experts from <i>Spiegelreferate</i> and other within-ministry climate units	
Parliamentary committee(s)	Inquiries into specific issues → agenda seeding + agenda setting	<p>Scrutinise legislation + use of public funds → promote transparency</p> <p>Develop expertise on committee → common knowledge</p>		Scrutinise legislation from political perspective → informal accountability Scrutinise spending of public money → informal accountability	Process of developing cross-party consensus on Climate Policy Framework (inc. climate law, targets, and advisory body) in Sweden → enhanced commitment	Call witnesses (e.g. industry) → consultation	
Other		Fraktions-Arbeitsgruppen → common knowledge (between parties)				Consultation between climate policy experts of different parties	

draft amendment and on comments from reviewers. Second, our additional reform suggestions are subject to the same narrow scope conditions as this study: we focus on formal, cross-sectoral ('encompassing'), and national-level institutions dedicated to climate mitigation. Third, we wish to emphasise that these recommendations relate primarily to the process of climate policymaking in Germany and how institutions govern it, rather than the substance of policy itself. Finally, because this section is not intended as an exhaustive analysis of the deficits of German climate institutions; we do not aim at providing a comprehensive list of reforms. We rather aim to illustrate how our framework can be used to diagnose shortcomings in the current landscape and generate additional ideas to improve German climate institutions.

5.1 Integration and coordination

Our analysis in section 4.2.1.2 and Table 8 above shows that two key deficits of German institutions relate to integration and coordination. First, Germany's current institutional mix does not sufficiently support strategic climate policy planning, the ability to design and implement an integrated policy mix that is coherent across sectors and across time (across administrations). Second, our analysis shows that the development and delivery of German climate policy has been impeded by the weakness of institutional structures for achieving horizontal coordination between ministries and other government entities.

The *Klimaschutznovelle* responds to the challenge of integration in two ways. The first is its provision that governments will now be obliged to devise a climate policy programme (*Klimaschutzprogramme*) within twelve months of taking office. Our analysis of a similar provision

in the Swedish Climate Act (see section 4.2.3.1) suggests this can enhance strategic climate policy planning by (i) forcing governments to regularly devote attention to climate policy, and (ii) ensuring climate policy planning occurs on a regular, four-year cycle, in which roles and responsibilities for policy review and preparation are clearly defined.⁶⁵ In Sweden, the provision also had an informal commitment effect, in addition to an agenda-setting effect, because governments for whom climate policy is a low priority were still forced to consider it. In Germany, the provision – by making future climate policy planning obligatory – may reduce pressure to achieve agreement on complex climate policy in coalition treaty negotiations, while incentivising sustained and substantive interaction between coalition parties on this topic throughout the legislative term (*Legislaturperiode*).

The second response to the integration challenge is the *Klimaschutznovelle's* transformation of the *Sofortprogramme*: immediate action programmes developed when the government overshoots its emissions targets. The amendment adopts a whole-of-government approach to devising *Sofortprogramme* (BMWK 2023b, secs 2, §8). Because the *Klimaschutznovelle* abolishes the legally binding status⁶⁶ of the *Sektorziele* (annual targets for sector-based emissions) the obligation to present *Sofortprogramme* will now only arise when the sum of emissions across all sectors (aggregate emissions) exceeds the government's targets – not when a given sector fails to meet its sectoral target. The entire government will now be required to take corrective action, rather than the ministry responsible for a given sector – though responsible ministries will be nominally tasked with leading the process.⁶⁷ Critically, the amendment expli-

cally allows ministries to include cross-sectoral measures in the *Sofortprogramme* they submit for the whole of government to consider and approve, which can be interpreted as a way of encouraging the use of such measures (BMWK 2023b, secs 2, §8, (2)). The *Klimaschutznovelle* also adopts a prospective element: the *Sofortprogramm* mechanism will now be triggered if the projected sum of aggregate emissions between 2021 and 2023 exceeds Germany's annual emissions targets (now in two consecutive years, as opposed to a single year (BMWK 2023b, secs 2, §8)).

These changes may help to solve two notable problems with the *Sofortprogramme* as they currently operate under the unamended version. First, under certain assumptions,⁶⁸ sectoral targets can be inefficient – if they force each sector to achieve pre-defined annual emission reduction targets, the government deploys resources for abatement in relatively hard-to-abate sectors, meaning the same resources might, all else equal, achieve greater emissions reductions in other sectors of the economy. Second and relatedly, they can promote siloed thinking within ministries, rather than coordinated climate policy action across ministries and sectors. As a result, the *Sofortprogramme* by one ministry might not reinforce those by others or cross-sectoral policy options (e.g. carbon pricing) might receive less attention. It is important to note, though, that formally even the previous version of the KSG granted government considerable flexibility in adjusting sector emission budgets ex-post (e.g. KSG 2019, secs 2, §4, (5)).

The changes to the *Sofortprogramm* process may help to address these flaws by encouraging coordination and implementation of cross-sectoral measures: policy packages that account for negat-

⁶⁵ Although not analysed above, California employs a similar approach. The California Air Resources Board (CARB), an independent regulatory agency, develops a detailed climate policy plan as part of its five-year Scoping Plan process – although the CARB is also empowered to take some political decisions (Meckling and Nahm 2022).

⁶⁶ Sector targets are still defined in an annex to the *Klimaschutznovelle*, and the revised KSG would still require sector-based reporting of ex-post and ex-ante emissions by the UBA and the ERK. Sector targets, however, will no longer play a role in formally triggering the *Sofortprogramme*.

⁶⁷ "By way of facilitating the Federal Government's decision [to adopt a specific *Sofortprogramm*], all federal ministries responsible for the sectors that have contributed to overshoot [of the government's overall emission target], shall, within three months following the presentation of the assessment of the emissions data by the Council of Experts on Climate Change, submit measures for achieving emissions reductions in the sectors they are responsible for." (BMWK 2023b, secs 2, §8, (2))

⁶⁸ It is worth noting that, when abatement in hard-to-abate sectors, such as buildings, requires a sufficiently high level of investment in long-lived goods, it can be optimal to start with expensive options, rather than tackle sectors sequentially, in accordance with their position along the marginal abatement cost curve (Vogt-Schilb, Meunier, and Hallegatte 2018). In addition, the unamended version of the KSG included flexibility provisions, granting government the discretion to adjust sector targets ex-post, i.e. to adjust the distribution of abatement activity per sector, not the aggregate target.

ive and positive cross-sectoral externalities among measures. Policy packages are multi-sectoral when they contain measures that apply to multiple sectors without accounting for the negative and positive cross-sectoral externalities they give rise to. Cross-sectoral packages, by contrast, can take these externalities into account, thus ideally leveraging the increased flexibility afforded by the abolition of the sectoral targets. With the amendment explicitly enabling ministries to propose cross-sectoral measures, there will likely be greater incentives to flexibly and efficiently distribute abatement activity across sectors than with the somewhat more rigid *Sektorziele*. The need to develop cross-sectoral measures may in turn enhance policy integration by incentivising coordinated policy development.

Despite these potential benefits outlined above, the *Klimaschutznovelle* does not fully address the challenge of integration and coordination. We therefore suggest four, further options for reform: (i) establish processes for devising cross-sectoral *Sofortprogramme* ex-ante, (ii) establish processes for evaluating these programmes ex-ante, (iii) create inter- and intra-ministerial groups to enhance coordination and integration in climate policymaking, and (iv) reinstate the *Klimakabinett* to improve coordination and integration. These are discussed in turn, below.

Option 1: Establish processes for developing cross-sectoral *Sofort-* and *Förderprogramme* to realise the *Klimaschutznovelle*'s potential to boost policy integration.

The *Klimaschutznovelle* has potential to enhance integration by incentivising the use of cross-sectoral measures in the government's *Sofortprogramme*. Critically, however, it does not specify a procedure by which these measures will be developed – leaving open the risk that the *Sofortprogramm* measures do not take

advantage of their integration-enhancing potential. Given the *Sofortprogramme* are a uniquely German feature, we cannot draw lessons here from our comparative analysis. We therefore only tentatively suggest reform options to address this gap.

The government could clarify some cornerstones of the substantive process for developing the *Sofortprogramme*: One option might be to adopt an iterative two-step approach, with the first step consisting of the adoption of new or the adjustment of existing cross-sectoral measures to achieve the necessary emissions reductions. Once the potential for cross-sectoral measures to achieve the desired reductions is maximised, sector-specific measures could be considered in the second step to close the gap between the necessary emissions reductions and those likely achieved by the cross-sectoral measures. This would reflect the reality that important cross-sectoral measures, notably the EU ETS1 (and EU ETS2 from 2027 onwards) and BEHG, are already in place and de facto central pillars of the EU and German climate policy mix. First assessing the potential consequences of adjusting cross-sectoral instruments⁶⁹ and then considering remaining policy gaps to be filled with more targeted sectoral instruments – as well as the interactions, viz. the positive and negative synergies, between both types of instruments (e.g. van den Bergh et al. 2021; Dimanchev and Knittel 2023; Borenstein and Kellogg 2023) – could encourage better integrated design and evaluation of the climate policy mix comprising both *Sofort-* and *Förderprogramme*.

Option 2: Adopt additional criteria and processes for evaluating cross-sectoral *Sofort-* and *Förderprogramme* to realise the *Klimaschutznovelle*'s potential to boost policy integration.

The *Klimaschutznovelle* also currently lacks an encompassing approach to evaluate – both ex-ante and ex-post – *Sofort-*

fortprogramme and *Förderprogramme*.⁷⁰ Currently, the ERK is only mandated to evaluate whether immediate action plans are likely to achieve the necessary emissions reductions – as demonstrated in its ex-ante assessment of the BMDV's 2022 *Sofortprogramm*. Other important effects of the *Sofort-* and *Förderprogramme*, notably their (fiscal) cost⁷¹ and co-benefits,⁷² are assessed neither ex-ante nor ex-post. This is in contrast to other countries, notably the UK (HM Treasury 2022) and the US (Mitchell 2023), where (i) governments have set out guidelines for conducting assessments of regulatory measures and (ii) climate advisory bodies, like the UK CCC, consider a broader range of evaluative criteria, as borne out, for instance, by its recent analysis of the labour market impacts of decarbonisation (UK CCC 2023a).

There is therefore an opportunity to specify (i) a set of criteria for conducting ex-ante and ex-post assessments of climate-related regulatory measures in the *Sofort-* and *Förderprogramme*, and (ii) assign clear responsibility for these assessments to an entity (or set of entities) with the requisite analytical capacity to conduct them. A broader set of criteria for evaluation of *Sofort-* and *Förderprogramme* may include, for example, the fiscal costs, cost-effectiveness and distributive effects associated with different measures (Edmondson et al. 2023), in addition to their impact on emissions reduction. These criteria could also promote policy integration by making explicit the relative weighting given to different criteria and identifying trade-offs between them, and how these differ across different policy mixes.

Given that the evaluation of the *Sofortprogramme* falls within the ERK's remit and that the amendment aims at expanding the ERK's mandate, it makes sense to assign responsibility to the ERK to assess *Sofortprogramme* with an expanded range of evaluative criteria. This will likely require additional and suitable

⁶⁹ Note, national-level reform might involve an increase in the national carbon price and / or the introduction of a price floor.

⁷⁰ Note, *Förderprogramme*, i.e. subsidy schemes, can be implemented both as part of ministries' *Sofortprogramme* and broader government climate policy, though *Sofortprogramme* can, in principle, also contain other non-market-based measures and, even, market-based ones.

⁷¹ Fiscal costs include not only the initial costs of the programme, but also "the long-run effect of the [the programme] on the government's budget." (Hendren and Sprung-Keyser 2020, 1211)

⁷² We follow the IPCC's definition, which defined, in its fifth assessment report, defined co-benefits as "positive effects that a policy or measure aimed at one objective might have on other objectives, irrespective of the net effect on overall social welfare." (IPCC 2015, 121)

analytical capacity, especially to assess aspects like fiscal and distributive implications of climate policy instruments. There is also an opportunity, however, to assign responsibility for evaluations – in particular of Förderprogramme, which are more varied and complex than Sofortprogramme – to multiple advisory bodies, research institutions and / or think tanks. There may be specific bodies which are better equipped to deliver analysis of different programmes, where the ERK could potentially act as a ‘clearing house’, aggregating and synthesising (at least, reviewing) analysis and recommendations. Again, this would demand significant capacities on the part of the ERK.

Option 3: Create inter- and intra-ministerial working groups to support coordination and integrated climate policymaking.

We discussed above how the obligation to present a *Klimaschutzprogramm* within twelve months of the beginning of each legislative term and the explicit focus on cross-sectoral measures have the potential to boost policy integration. Yet, the challenge of integration will likely remain even if these changes are implemented as intended, given that they do not put in place institutional structures for devising and assessing *Klimaschutzprogramme* and *Sofortprogramme*. Sweden’s Climate Action Plan, by comparison, is primarily prepared by technical staff in SEPA, with support from the energy and other relevant agencies. The Ministry of Climate and Enterprise in turn sets the broad political agenda, reviews the political feasibility of the plan, and consults with other ministries as part of the cabinet process. This results in an authoritative planning document, which one interviewee told us is the ‘go-to’ source of information on all aspects

of Swedish climate policy.

It is unlikely that Germany would replicate this institutional arrangement through its own environment agency, given the broader administrative tradition in Germany (Peters 2021, chap. 4) and with the UBA having limited capacities to perform this task. An alternative option is therefore to establish and, where they already exist⁷³ informally, formalise intra- and inter-ministerial working groups⁷⁴ for climate policy development at both the permanent-secretary (Staatsekträr:innen-Ebene) and division-head level (Abteilungsleiter:innen-Ebene). These working groups would focus on climate policy monitoring, evaluation and development, including both short-term and long-term⁷⁵ policies, and would ideally be comprised of career bureaucrats and draw on expertise from various disciplinary and professional backgrounds (e.g. law, economic modelling, engineering, political science).

These inter- and intra-ministerial working groups could offer several benefits.⁷⁶ First, they would provide a forum for ongoing dialogue within and across ministries, such that specific climate policy measures can be developed collaboratively. This includes potential coordination of policy solutions among ministries with different partisan affiliations. Second, they could help to gather and synthesise the information from across the government vital to developing cross-sectoral policy measures. Third, they could elicit and aggregate expert views from Germany’s multiple climate advisory bodies (the ERK, WPKS, “Monitoring-Kommission”), as well as from external experts, to leverage the full technical capacity available to the government in policy analysis and planning. Consultation with experts could take the form of (i) man-

dated regular reports or hearings with representatives from different backgrounds, especially during the crafting of *Sofortprogramme* (ex-ante assessment) as well as after their implementation (ex-post assessment), and (ii) granting these working groups’ the right to request technical analysis or expertise from advisory bodies or others. This level of technical capacity is critical to developing and evaluating complex, multi-year climate policy plans.

Despite their potential to improve the technical capacity of cross-governmental climate policymaking, potential limitations of these working groups remain, with two being particularly significant. First, these working groups risk serving as legitimising devices for top-down government decisions, rather than as conduits for climate policy development. Second, similar groups in other countries have been plagued by short life spans, which can reduce institutional memory and increase transaction costs of establishing new inter- and intra-ministerial relationships.⁷⁷ Future work could focus on examining institutional reforms for addressing these (and related) risks.

Option 4: Improve horizontal coordination and integration by reinstating the Klimakabinet.

The *Klimaschutznovelle* does not specify how the delivery of existing and planned policies can be improved, especially how the government can enhance its capacity for horizontal coordination. Horizontal coordination between ministries on climate policy is a particular challenge in the German context – notably because of the *Ressortprinzip* (SRU 2023, 104). By granting ministries autonomy vis-à-vis the Chancellery, the *Ressortprinzip* requires the Chancellery to consult with ministries, meaning the Chancellor can-

⁷³ One of our interviewees mentioned that an informal Klimakabinet-type forum at the Staatsekträr:innen-Ebene had existed in the past. Given its informal nature, we have not been able to verify whether (and how) this body is still in operation.

⁷⁴ Establishing such working groups is particularly important for ministries that currently do not have them, but would be part of the reactivated Klimakabinet (see Option 4, below).

⁷⁵ Short-term policies refer to policies pursued by a given government, whereas long-term policies are those extending across multiple governments (Lindvall 2017).

⁷⁶ See Flachsland et al. (2021) for an analysis of such inter-ministerial working groups and how they might change the mode of inter-ministerial coordination from ‘negative coordination’ – iteratively reviewing other ministry’s policy proposals, effectively leading to a watering down to the least common denominator across ministries and political parties, as represented by the ministers – towards ‘positive coordination’ – jointly developing integrated policy packages.

⁷⁷ During his time as head of the Department for Environment, Food & Rural Affairs, David Miliband set up the Office of Climate Change (OCC) in the Cabinet Office in 2006, whose purpose was “to provide a cross-departmental resource to consider climate change issues and provide ministers with a shared analysis” (Rutter, Marshall, and Sims 2012, 117). It is not entirely clear when the OCC was disbanded, but it was no longer in operation when the Coalition government came to power.

not usually achieve coordination by simply giving orders to ministers (see section 4.1). Other countries – and previously Germany – have attempted to grapple with the coordination challenge using ‘climate cabinets’ run out of the cabinet or prime minister’s office. For example, the UK has recently established a Cabinet Office sub-committee for Net Zero (see section 4.2.2.2), which, given the UK’s majoritarian and highly centralised political system, has the potential to exert a strong influence over other ministries. A climate cabinet was also previously employed in Sweden and recommended by the Swedish Climate Policy Council (see section 4.2.3).

Following earlier research (Flachsland et al. 2021), we believe there is an opportunity for Germany to reactivate the currently dormant *Klimakabinett* to improve horizontal coordination and integration. The *Klimakabinett* was originally created in 2019 as a forum for fostering policy integration and formulating the measures outlined in the *Klimaschutzprogramm 2030*. While its exact mandate was only vaguely specified publicly (Stade 2019), the re-instated version might be envisaged as a forum where ministries with portfolios relevant to climate policy would integrate and coordinate the formulation, monitoring, and evaluation of climate policy, especially during periods of major reform. A reinstated *Klimakabinett* could be supported by inter- and intra-ministerial working groups discussed above. By drawing on responsible ministries’ and external expertise in planning and monitoring climate policy, the *Klimakabinett* could help pool dispersed expertise and clarify the assignment of responsibilities for implementing policies. In this way, it could boost both horizontal coordination and the government’s strategic climate policymaking capacity. In addition, the *Klimakabinett* could improve communication in policy formulation among coalition partners, speeding up and increasing the quality of the climate policymaking process.

The *Klimakabinett*’s success in improving integration and horizontal coordination,

however, depends on a crucial intervening variable – the government’s shared intention to maximise the efficacy of the delivery of climate policy. The *Klimakabinett* alone cannot induce such political will where it might be lacking. Nevertheless, the willingness of the present government and future ones to re-instate the *Klimakabinett* can be construed as an indicator for its prioritisation of climate policy: the importance it attaches not only to setting ambitious targets, but also to actually implementing ambitious climate policy in line with the pressing schedule implied by German and EU GHG reduction targets and timetables. This is particularly the case, with the government having explicitly committed itself to promoting a whole-of-government approach to climate policy, rather than a sectoral one, via the proposed *Klimaschutznovelle*. Such a whole-of-government approach can likely only succeed when there is some form of centralised horizontal coordination, with substantial involvement by the German political system’s centre of gravity in the Chancellery. As a result, the *Klimakabinett*’s presence or absence can also serve as a focal point, allowing elite actors – including the media, NGOs, and opposition parties – to coordinate their beliefs about the actual stringency of the government’s climate policy and, therefore, help establish common knowledge about it.

Re-instating the *Klimakabinett*, however, could be politically costly, particularly when key ministries are controlled by different parties, as is the case with the traffic-light coalition. Currently, the Chancellery, climate and economy, finance, transport, environment, and agriculture ministries as well as the Ministry of the Interior⁷⁸ are controlled by three different parties. Establishing a *Klimakabinett* would require ministries – particularly the BMWK – to be willing to cede some agenda-setting power to the Chancellery and therefore, in some instances, also to another party. Indeed, the Chancellor (and his / her political party) would have to be interested in exercising this agenda-setting power with the aim of adopting and / or implement-

ing more stringent climate policy. Both conditions may be unlikely to hold when the stakes associated with climate policymaking are high.

5.2 Transparency and accountability

In this section, we will examine the likely effects of the *Klimaschutznovelle* on transparency and accountability and outline two options for institutional reform to address the gaps that remain. Our analysis in section 4.2.1 and Table 8 shows that prior to the adoption of the amendment, German climate policymaking suffered from (i) the narrow scope and lack of transparency about the UBA’s modelling of the government’s climate policies that provides the basis for the ERK’s Prüfberichte, and (ii) the relatively low degree of ex-ante accountability. Limited ex-ante accountability was a result of the sectoral targets’ focus on ex-post accountability and the ERK’s mandate being limited to retrospective assessments of overshoot.

The *Klimaschutznovelle* does not address the first deficit (we discuss this in further detail, below). It does, however, increase ex-ante accountability by introducing a prospective element into the process for evaluating overshoot of emissions targets – overshoot will now be assessed based on actual plus projected emissions until 2030 (see 5.1, above). By taking into account projected emissions, the ERK’s Prüfberichte and the obligation to present a Sofortprogramm will serve as mechanisms to hold the government to account to deliver on current and future emissions targets. By elevating the formal status of the UBA Projektionsberichte, the amendment will also likely increase the impact of these reports.

It remains unclear, however, whether the amendment will have an overall positive effect on accountability in general. The reason for this is that it improves ex-ante accountability while weakening ex-post, formal accountability through the abolition of legally binding sector targets. Recall that, currently, the ‘bite’ of the ERK’s reports derives primarily from their ability to trigger the obligation for

⁷⁸ These seven ministries (excluding the Bundespresseamt) were the ones that comprised the original *Klimakabinett*. The re-instated version of the *Klimakabinett* may well be composed differently, especially as the housing portfolio has been moved from the Ministry of Interior (BMI) to a newly created ‘housing’ Ministry (BMWVBS).

underperforming ministries to devise *Sofortprogramme*. Without the legally binding sector targets, this ex-post accountability mechanism will be undermined and the degree to which the ERK can hold the government accountable will be reduced (Götze 2023; Zaremba 2023; ERK 2023a, sec. 7).

There is a risk that the reduction in ex-post accountability will not be offset by more stringent ex-ante (in)formal accountability, thus leading to an overall reduction in accountability. This risk is compounded by three factors: (i) the lack of processes for optimally leveraging the abolition of the sectoral targets, i.e. developing and assessing cross-sectoral *Sofortprogramme* (we addressed this above in section 5.1), (ii) the narrow scope and lack of transparency about of the modelling underlying ex-ante analysis, and (iii) the insufficient analytical capacity of the ERK to make the most of its expanded mandate for ex-ante analysis.

In this section, we therefore identify two opportunities to improve ex-ante analysis: (i) to implement more transparent modelling and (ii) to boost the ERK's technical capacity.

Option 5: Improve ex-ante analysis via more transparent modelling by the UBA.

The UBA currently produces ex-ante analysis of the future development of emissions in Germany as part of its *Projectionsberichte* (projection reports). This analysis is commissioned by the UBA and conducted by a consortium⁷⁹ of researchers, including Fraunhofer Institute for Systems and Innovation Research and Öko-Institut (Schuberth 2022). This analysis could be improved in two respects: (i) by making the technical approach to modelling more transparent, and (ii) by increasing the scope of the scenarios considered.

Currently, the UBA's modelling is not

available to external researchers – though Repenning et al. (2023, fig. 3) provide a conceptual outline of the modelling approach. This lack of transparency increases, inter alia, the risk of undetected technical errors and results that are highly sensitive to changes in key assumptions, such as the empirically plausible range of demand elasticities in various sectors, or the elasticities of substitution among producers. Ideally, the code used for the modelling and all other related resources would be publicly available for external researchers to replicate the findings and, potentially, suggest improvements. If, however, the modelling is proprietary, it is important to explore legal avenues for allowing external researchers to buy access to the consortium's modelling so as to interrogate its robustness.

Even if modelling transparency were increased, however, a conceptual deficit would remain – the narrow scope of the modelling approach. The UBA *Projectionsberichte* are based on modelling of the projected evolution of future emissions in each sector, with in the past only two scenarios being considered: (i) emissions with current policy measures,⁸⁰ and (ii) emissions with additional, planned policy measures (Schuberth 2022). In a recent UBA-commissioned report on how Germany can achieve its 2030 emissions targets, three scenarios were analysed: (i) containing instruments to achieve the 2030 goal, (ii) a scenario sensitive to the BEHG (Fuel Emissions Trading Act) price path, and (iii) a scenario based on current measures (Repenning et al. 2023).

This scope restriction on scenarios means policies currently not considered by the government are not modelled by the UBA. This implies that the UBA's modelling might not be able to examine the effects of potentially effective policy measures that the government of the day is not considering. Since the ERK's *Prüfberichte* are entirely based on UBA modelling this scope restriction ulti-

mately impinges on the ERK's ex-ante accountability powers. To prevent this 'upstream' reduction in ex-ante accountability, the UBA and the ERK could be endowed with capacities to model alternative scenarios containing policy measures the government is currently not considering (see below).

It is worth acknowledging the risk that the process of selecting the policy measures comprising such alternative scenarios could become politicised – i.e. become subject to the same political conflicts that characterise wider policy debates about alternative instruments (Edmondson et al. 2022). Building capacity to enable exploration of multiple alternative pathways – for instance, by the ERK and / or the inter-ministerial working groups suggested above (see section 5.1, option 2) – as well as consulting with stakeholders, including labour unions, peak business organisations, environmental NGOs, and the *Ausschuss für Energie und Klimaschutz*, could help to prevent this 'selection' process from becoming unduly politicised. This kind of capacity might, perhaps, even facilitate the resolution of disagreements about the advantages and disadvantages of alternative policy pathways.

Option 6: Improve ex-ante analysis by boosting the ERK's technical capacity.

The *Klimaschutznovelle* assigns the ERK the right (Initiativ- bzw. Vorschlagsrecht) to independently initiate analyses of policy measures (BMWK 2023b, secs 4, §12, (5)). Previously the ERK could only conduct such analyses as part of *Sondergutachten* (special reports) requested by the government or parliament (KSG 2019, secs 4, §12, (4)). Granting this power to the ERK has the potential to bolster ex-ante accountability; the ERK could use this kind of analysis to hold the government accountable ex-ante by identifying gaps in the government's policy mix and suggesting ways of filling these gaps.

⁷⁹ According to the *Klimaschutznovelle*, the composition of this consortium will be determined as follows: "To this end, the German Environment Agency shall commission a research consortium, the composition of which shall be agreed with the Federal Chancellor, the Federal Ministry of Finance, the Federal Ministry of Economics and Climate Protection, the Federal Ministry of Housing, Urban Development and Construction, the Federal Ministry of Digital Affairs and Transport, the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and the Federal Ministry of Food and Agriculture." (BMWK 2023b, secs 2, §5a)

⁸⁰ "The with-measures model (MMS) projects the greenhouse gas mitigation impacts and energy consumption of current climate change policies and measures, i.e. calculates the level of greenhouse gas emissions using a computational model and numerous assumptions ... in the future, taking into account current policies and measures." (Schuberth 2022)

To effectively identify policy gaps and provide recommendations requires detailed ex-ante analysis of policy instruments, mixes, and pathways⁸¹ Such detailed analysis would include, inter alia,⁸² assessments of policy instruments' relative cost-effectiveness, their co-benefits (see section 5.1, above), and distributional effects. This requires not only capacity for modelling the likely future evolution of emissions at the sectoral level – but also the ability to run, for instance, economic analyses.

There is a concern that currently the ERK lacks sufficient analytical capacity to fulfil this expanded mandate and therefore deliver increased ex-ante accountability. The ERK has a relatively small scientific staff (~14 full-time scientific staff, ERK (2023b)), compared to, for instance, the UK CCC (~30 staff members) and to date has mostly focused narrowly on analysing the UBA's modelling of emissions gaps. The ERK will likely not be able to conduct such complex modelling exercises, which could in turn reduce the effectiveness of the *Initiativrecht* provision as an ex-ante accountability device. Ensuring that the ERK can optimally use its expanded mandate for ex-ante analysis is crucial, given the amendment's decision to attach greater importance to ex-ante accountability.

We see three options for increasing the analytical capacity of the ERK. First, the government could endow the ERK with greater resources, allowing it to contract external research more extensively by, for instance, the consortium producing the *Projektionsberichte* and other modelling and policy analysis teams. Second, the ERK could team up with other independent advisory bodies, research institutes or academic think tanks. For instance, the ERK could cooperate with the Institut für Arbeitsmarkt- und Berufsforschung to evaluate the labour market impacts of climate policies, or modelling teams which already produce ex-ante analysis of German climate policy (including in the Ariadne project, e.g. [Ariadne's interactive pathfinder tool](#)).

Third, more resources could be devoted to building up in-house modelling capacity. This would free the ERK from having to rely on external research, which may not ideally suit its analytical needs. Investing in such modelling is, however, time-consuming – it would likely take several years for the in-house modelling team to become fully operational.

5.3 Agenda seeding and setting

We have highlighted throughout this report the importance of agenda setting to ensure climate policy is regularly returned to the political agenda, and agenda seeding, to promote new policy ideas and approaches. Climate advisory bodies can play an important role in achieving this – the UK CCC, for instance, has acted as a 'policy entrepreneur' in shaping the climate policy agenda, in particular through its provision of detailed recommendations backed up by authoritative analysis (see section 4.2.2.1). The ERK, however – as shown by our analysis in section 4.2.1.1 and Table 8 – has thus far played little role in seeding ideas about climate policy or setting the climate policy agenda. Indeed, the ERK has shied away from ex-ante policy recommendations, partly because its mandate was mainly focused on ex-post analysis.

The *Klimaschutznovelle* partly addresses this gap by expanding the ERK's mandate via its *Initiativrecht*, as discussed above. However, much depends on how the ERK intends to use this expanded power, and whether it has sufficient resources to play a role similar to that of the UK CCC. We therefore discuss the following reform option:

Option 7: Strengthen agenda setting and seeding via more active policy entrepreneurship by the ERK.

To take advantage of the potential for agenda setting as a result of the ERK's expanded *Initiativrecht*, there is an opportunity for the body to take on a more active role as a 'policy entrepreneur'.

This could involve a range of activities, such as shaping recommendations in such a way that they respond to political constraints or windows of policy opportunity; engaging with a range of stakeholders to understand the range of views on climate policy and potential barriers to implementation; and engaging more actively with the public and the media on issues related to climate policy.

While the *Klimaschutznovelle* creates incentives for the ERK to adopt a more entrepreneurial role, there are risks associated with this change in strategy. So far, the body has played the role of 'notary': checking and validating the government's assumptions about the emissions reduction potential of certain policies. Arguably, this approach has allowed it to gain credibility as a relatively neutral observer – credibility that is potentially enhanced by the fact that the body is not associated with a specific government ministry (see section 4.2.1.1).

There is a risk that if the ERK begins to make stronger policy recommendations – empowered by the *Initiativrecht* under the *Klimaschutznovelle* – and take a stance on the optimal policy mix to achieve Germany's climate goals, it will be perceived as overly 'activist' and lose the respect of political actors who disagree with its interventions. Being perceived in this way could in turn undermine the credibility of its analysis more broadly, with potential knock-on effects on the ability of its reports to enhance transparency and help to return climate policy to the political agenda. On the other hand, a more conservative stance might well mean that the ERK will not realise the potential, created by the amendment's *Initiativrecht*, to engage more actively in agenda setting and seeding, as outlined above.

It is therefore a fine balancing act for the ERK to realise the benefits of acting as a policy entrepreneur while maintaining its credibility in the eyes of a range of political actors. One way to help to resolve this tension is to expand the ERK's ana-

⁸¹ See Edmondson et al. (2022) for a methodology for assessing climate policy instrument pathways. See also table 10 in the ERK's recent Prüfbericht (ERK 2023a, 124–25).

⁸² In its assessment of the draft version of the amendment, the DGB called for an evaluation of a broader range of effects: "In forecasting the evolution of future emissions and assessing the effects of climate policies, not only the policies' likely effect on future emissions should be considered, but also their economic, social, labour market, and regional effects." (DGB 2023, 2)

lytical capacity, as argued for above. Extensive technical expertise to model potential policy pathways and provide support for recommendations is a key feature of the UK CCC's approach, which has allowed it to perform a more activist role while remaining credible. If the ERK's technical capacity were enhanced, it could increase the credibility of its policy recommendations by grounding them in rigorous scientific analysis and modelling of alternative policy pathways. This would help to ensure the ERK can deploy its *Initiativrecht* in a way that drives agenda seeding and setting in an impartial manner.

6. CONCLUSION AND OUTLOOK

The aim of this study was to answer three research questions: (1) what are climate institutions and how can we characterise them across countries, (2) what effects do they have on climate policymaking, and (3) what lessons can we draw from analysing climate institutions and their effects in the UK, Sweden, and Australia for German climate governance? This was in recognition of two lacunae in the literature: first, that we lack a conceptual definition of climate institutions that enables us to compare them across countries, and second, that no framework exists to analyse their specific effects.

To answer the first two questions, we developed an analytical framework to capture the effects of climate institutions and the 'stylised causal chains' through which they engender these effects. We applied the framework to the climate institutions present in four country cases, drawing on literature on the effects of climate institutions and interviews with climate policy experts.

Our comparative analysis yielded three key insights. First, we found there is a rich landscape of climate institutions in all our country cases, as well as many other climate-relevant institutions that fall outside of our tight definition. This is in contrast to the literature on climate institutions, which tends to highlight two types: climate advisory bodies and climate laws.

Second, variation in the functions, or design of institutions is greatest among climate laws and climate advisory bodies. For example, Sweden's climate law imposes a requirement that each new government must develop a climate policy plan within one year after being elected; Germany's government has announced its intention to adopt a similar provision; and the UK has a similar provision, but with no time limit. Climate advisory bodies all provide ex-post analysis of the effectiveness of policies in reducing emissions, but they differ in the degree to which they provide ex-ante analysis of the potential of current policies to achieve future targets.

These specific design features, in combination with intervening variables, determine the effects of institutions. In the Swedish case described above, the requirement for a new government to develop a climate policy plan likely enhances commitment, especially if that government would have otherwise avoided doing so. In another example: the regular timeline by which climate advisory bodies publish their reports analysing climate policy performance helps to keep climate change on the political agenda, but this also depends on how these reports are used by political actors, civil society, and the media to scrutinise the government.

Third, when we examine a matrix of climate institutions and their effects on strategic challenges present in climate

policy, it becomes clear that climate institutions primarily address attention-related and epistemic strategic challenge, and that their effectiveness in doing so depends crucially on policy entrepreneurship and governments' political will. All institutions in our sample have some kind of agenda-setting or agenda-seeding effect. Many promote transparency – both within government and for the public – and contribute to establishing common knowledge. Fewer institutions ensure accountability for the government to deliver on its stated climate goals; and most deliver this effect informally. Similarly, institutions designed to facilitate horizontal coordination between ministries exist, but tend to be weak. No institution, except for Australia's recently created National Net Zero Authority, delivers compensation to groups that stand to lose from climate policy; although in Germany, this function has been delivered by sectoral ad hoc commissions, like the 'Kohlekommission'.

Our analytical framework and comparative analysis are useful tools to analyse the potential benefits of the proposed amendment to the KSG, the *Klimaschutznovelle*, and assess what deficits in the landscape of German climate institutions are likely to remain. Based on this, we outline a series of reform proposals. We suggest integration and coordination could be enhanced by (i) establishing processes for formulating and assessing cross-sectoral *Sofort- and Förderprogramme*, (ii) establishing inter- and intra-ministerial working groups to support strategic climate policy planning, and (iii) re-instating the dormant Klimakabinett. Transparency and accountability could be improved by (i) broadening the scope and transparency of the modelling used to produce the *Projektionsdaten* and (ii) ramping up the ERK's analytical capacity. Finally, there is an opportunity to increase the ERK's role in driving agenda seeding and agenda setting through greater policy entrepreneurship.

Before outlining avenues for future research, it is worth dwelling on four especially important limitations of our study because they imply our findings and recommendations are still tentative. First,

research on climate institutions is still in its infancy. Though our analytical framework engages with literature on the role of institutions in climate policymaking, it cannot draw on an existing theory of climate institutions. We therefore inductively derive a series of strategic challenges that are relevant to climate institutions from the literature, but we do not claim this is as a definitive list. As we note above, these challenges – and our analytical framework more broadly – is intended as a heuristic to structure the interpretation of our results, not as an encompassing theory of the impact of climate institutions.

Second, the paucity of existing research also limits our confidence in the effects we identify. We seek to distinguish between different confidence levels in our effects using a decision tree that captures the rules of thumb we rely on to assign these levels (see Figure 9). Applying these rules of thumb shows that we can identify only very few effects with high confidence (see Table 7). Our confidence in the effects we identify is also limited by the small number of interviews we conducted per country (~5). Third, we deliberately adopt a 'moment-in-time' perspective of climate institutions, which ignores important factors driving the emergence of institutions and how their effects evolve over time. Indeed, our understanding of institutions in the UK is stronger, for instance, than in Australia, because the UK institutions have been established for longer and more studies exist analysing their effects. All these factors limit the robustness of our results.

Finally, our study, like much of the work on the effects of political institutions, is subject to the challenges associated with drawing causal inferences about the effects of these institutions (Acemoglu 2005; Persson and Tabellini 2006; Przeworski 2007; Voigt and Gutmann 2019). The primary challenge is that institutions exhibit relatively little variation over time and across countries, and only a small portion of the variation that exists is likely to be plausibly exogenous. Without such plausibly exogenous variation in the presence of climate institutions, it is

difficult, if not impossible, to identify their causal effects as well as quantify the magnitudes and confidence levels of these effects. Given this limitation⁸³ of quantitative methods for causal inference, we have here pursued a qualitative approach. This approach, by design, does not allow us to identify the magnitudes of the effects discussed above – nor to rigorously quantify the level of confidence we have in their existence. Instead, it helps us demarcate the set of plausible causal effects these climate institutions might have, which, in turn, can inform future theory building and quantitative work.

This project nonetheless provides an important foundation for future research in at least five ways. First, as we acknowledged above, our definition of climate institutions is deliberately narrow – focused on domestic, multi-sectoral, climate-mitigation institutions. There is scope to broaden this definition by extending it to further categories of institutions, such as sub-national institutions, sectoral institutions, and institutions for climate adaptation. The challenge with operationalising broader definitions will be to modify our definitional criteria in a way that ensures replicability across countries and time. Second, future work could strive to 'micro-found' the set of strategic challenges discussed above. This means deriving a list of strategic challenges based on systematic analysis of the strategic interactions between policymakers, on the one hand, and citizens, interest groups and businesses, on the other.

Third, using the definitional criteria set out in 2.1, future work could include building a panel dataset of climate institutions in a larger sample of countries, based on data collected at different points in time. This would allow us to use our analytical framework to identify effects in multiple countries and to potentially identify clusters of institutions associated with specific macro-political or other variables. Fourth, based on a richer set of country comparisons, including the mechanisms by which climate institutions have effects in a range of countries, future work should focus on theory

building about the effects of climate institutions on climate policy outcomes, including on instrument choice, target setting, and overall policy stringency (see 'NA' edges in Figure 2). Finally, the dynamics of multi-level governance have been found to affect the incentives for politicians to create domestic climate-related institutions, such as environmental ministries (Aklin and Urpelainen 2014). Extending our analytical framework to account for these dynamics and examining them empirically is an important avenue for future research.

There is significantly more work to do to understand the overall effect of climate institutions on climate policymaking: how much and what difference climate institutions make to countries delivering their climate mitigation goals. We wish to note, however, that even if we could identify and implement 'optimal' climate institutions, these would not be a silver bullet. It is still possible for institutions to be undermined or rendered ineffective by (groups of) actors opposed to ambitious climate policy. Ambitious climate policy platforms, especially by parties other than the Greens, elite-level policy entrepreneurship, and mass public demand for climate action remain crucial ingredients for climate action – which institutions can help to translate into stringent climate policy. This report is one step in the direction to better understanding these complex relationships; we hope our definition and framework provide solid foundations upon which to build.

Abbreviations

Abbreviation	Description
BEHG	Brennstoffemissionshandelgesetz (German Fuel Emissions Trade Act)
BMDV	Bundesministerium für Digitales und Verkehr (Federal Ministry for Digital and Transport)
BMEL	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food and Agriculture)
BMF	Bundesministerium der Finanzen (Federal Ministry of Finance)
BMI	Bundesministerium des Inneren und für Heimat (Federal Ministry of the Interior)
BMUV	Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection)
BMWi	Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy)
BMWK	Bundesministerium für Wirtschaft und Klimaschutz (Federal Ministry for Economic Affairs and Climate Action)
BMWSB	Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (Federal Ministry for Housing, Urban Development, and Building)
CCA	Climate Change Authority
CPC	Climate Policy Council
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DGB	Deutscher Gewerkschaftsbund (Confederation of German Trade Unions)
ERK	Expertenrat für Klimafragen (Council of Experts on Climate Change)
EU	European Union

EU ETS I	European Union Emissions Trading Scheme I. Places a price on emissions in the energy and industry sectors.
EU ETS II	European Union Emissions Trade Scheme II. Will place a price on emissions in the transport and heating sectors from 2027 onwards.
FFS	Fossil Free Sweden
IPCC	Intergovernmental Panel on Climate Change
“Kohlekommission”	Kommission für Wachstum, Strukturwandel und Beschäftigung (Commission on Growth, Structural Change, and Employment)
KSG	Bundes-Klimaschutzgesetz (Federal Climate Change Act)
“Monitoring-Kommission”	Expertenkommission zum Monitoring der Energiewende (Expert Commission for Monitoring the Energy Transition)
NGO	Non-governmental organisation
SEPA	Swedish Environmental Protection Agency
SRU	Sachverständigenrat für Umweltfragen (German Advisory Council on the Environment)
UBA	Umweltbundesamt (Environment Agency)
UK CCA	Climate Change Act 2008
UK CCC	United Kingdom Climate Change Committee
WPKS	Wissenschaftsplattform Klimaschutz (Scientific Platform on Climate Change)

Glossary of key German terms

Term	Description
Ausschuss für Klimaschutz und Energie	Climate policy-focused parliamentary committee (Bundestag)
Bundeskanzleramt	Chancellery
Bundesländer (<i>Länder</i>)	German states
Bundesregierung	German federal government
Bundesrat	Upper chamber of German parliament (state governments represented)
Bundestag	Lower chamber of German parliament
Bundesverfassungsgericht	Germany's constitutional court
Förderprogramme	Government-funded subsidy schemes
Fraktions-Arbeitsgruppen	Intra-party working groups
Grundgesetz	German constitution ("Basic Law")
Initiativrecht	Right to initiate analyses without request by government or parliament
Klimaschutznovelle	Amendment to <i>Bundes-Klimaschutzgesetz</i> (KSG)
Klimaschutzplan 2050	Long-term strategy, adopted in 2016, that sets out key principles and objectives of German climate policy
Klimaschutzprogramm 2030	Package of measures, adopted in 2019, aimed at implementing the <i>Klimaschutzplan 2050</i>
Koalitionsausschuss	While not a formal institution, the <i>Koalitionsausschuss</i> is a well-established forum, comprised of key figures in the coalition parties, for resolving intra-coalition disagreements or conflicts
Kommunen	Umbrella term for within-state administrative units, encompassing districts (<i>Lankreise</i>), municipalities (<i>Gemeinden</i>), cities (<i>Städte</i>), and city districts (<i>Stadtbezirke</i>)
Projektionsberichte	UBA reports on projected future evolution of emissions at the sectoral level
Projektionsdaten	Data on future evolution of emissions based on UBA modelling

Prüfberichte	ERK reports on UBA's <i>Projektionsdaten</i>
Referentenentwurf des BMWK: Entwurf eines zweiten Gesetzes zur Änderung des Bundes-Klimaschutzgesetzes	Draft version of the <i>Klimaschutznovelle</i> , drawn up by BMWK
Referentenentwurf	Legislation is usually drafted by the ministry primarily responsible for the policy area(s) to which a given piece of legislation pertains. These drafts are referred to as <i>Referentenentwürfe</i> .
Ressortprinzip	"The Federal Chancellor shall determine and be responsible for the general guidelines of policy. Within these limits each Federal Minister shall conduct the affairs of his department independently and on his own responsibility. The Federal Government shall resolve differences of opinion between Federal Ministers. The Federal Chancellor shall conduct the proceedings of the Federal Government in accordance with rules of procedure adopted by the Government and approved by the Federal President." (Federal Republic of Germany 2022, art. 65)
Sektorziele	Sector-specific emissions reduction targets
Sofortprogramme	Immediate action programmes to correct overshoot of emissions targets
Spiegelreferate	Mirror departments located in Chancellery

*Interview analysis*List of interviewees

The following table contains a list of the experts we interviewed for this study. Where interviewees were not willing to have their name or affiliation published, we have indicated this with NA.

Table 1: List of interviewees

Name (where possible)	Position	Group	Country
Karsten Sach	Former Director General of the division "International and European Policies, Climate Protection", BMU	Government	Germany
Susanne Dröge	Head of division, "Nachhaltigkeitsstrategien, Ressourcenschonung und Instrumente", UBA	Government	Germany
Oliver Geden	SWP, Senior Fellow	Think tank	Germany
Brigitte Knopf	Member of ERK, Director General MCC Berlin	Climate advisory body	Germany
NA	NA	NA	Germany
Matthew Lockwood	Professor, University of Sussex	Academia	United Kingdom
Vivian Scott	Team Lead – International and Greenhouse Gas Removals, UK CCC	Climate advisory body	United Kingdom
Sam Fankhauser	Professor, University of Oxford	Academia	United Kingdom
Alina Averchenkova	Distinguished Policy Fellow, Grantham Research Institute on Climate Change and the Environment	Academia	United Kingdom
Tom Sasse	Associate Director, Institute for Government	Think tank	United Kingdom
Howard Bamsey	Professor, Australian National University	Academia	Australia
Brad Archer	CEO, Climate Change Authority	Climate advisory body	Australia
Peter Christoff	NA	Academia	Australia
Frank Jotzo	Professor, Australian National University	Academia	Australia

NA	Civil servant	Government	Australia
Karin Bäckstrand	Professor, Stockholm University	Academia	Sweden
NA	NA	NA	Sweden
Åsa Persson	Research Director and Deputy Director, Stockholm Environment Institute	Academia	Sweden
NA	NA	NA	Sweden
NA	NA	NA	Sweden
Naghmeh Nasiritousi	Professor, Stockholm University	Academia	Sweden
NA	NA	NA	Sweden

Tables

Strategic challenges in the literature

The following table summarises each of the strategic challenges we selected as part of our analytical framework, where they appear in the climate policy literature, and where they appear in the broader political science literature.

Table 2: Strategic challenges in the literature

Strategic challenge		Description	Examples of works in climate policy literature	Examples of works in broader (political science) literature
Agenda	Seeding	Spreading ideas about climate policy to public and elite actors	NA	Wasow (2020)
	Setting	Putting climate policy on the agenda and increasing the likelihood that it will remain on the agenda	Pralle (2003, 2009), Leppänen and Liefferink (2022), Guy, Shears, and Meckling (2023)	Kingdon (1997), Jones and Baumgartner (2005), Baumgartner et al. (2009), Beyer et al. (2022)
Common knowledge		Policy elites and other actors have shared understanding of issues relevant to climate policy and know that this is shared by other elites who, in turn, know that others know and so on	Pielke (2007), Averchenkova, Fankhauser, and Finnegan (2021b)	Brandenburger and Dekel (1989), Rubinstein (1989), Bacharach (1992), Geanakoplos (1992), Reny (1992), Dekel, Fudenberg, and Morris (2006), Suk-Young Chwe (2013), Basu (2018)
Transparency		Increase knowledge and understanding of climate policy among politicians, civil society and broader public	Averchenkova and Nachmany (2017), Weaver, Lötjönen, and Ollikainen (2019), Duwe and Evans (2020), Evans and Duwe (2021)	Meijer (2013), Erkkilä (2020)
Accountability		Holding government to account to deliver on its stated targets via (in)formal sanctioning in the case of non-compliance	Bennett (2018), Evans and Duwe (2021)	Przeworski, Stokes, and Manin (1999), Maskin and Tirole (2004), Gailmard (2009a, 2009b), Ashworth and Bueno de Mesquita (2017), Ashworth and Ramsay (2022), Patty (2023)

Strategic challenge	Description	Examples of works in climate policy literature	Examples of works in broader (political science) literature
Integration	Integrating climate objectives into the formulation of all aspects of policy, particularly in non-climate policy areas	Flachsland and Levi (2021), Matti, Petersson, and Söderberg (2021)	Candel and Biesbroek (2016), Candel (2021)
Consultation	Gathering input from non-government stakeholders on proposed policies or the formulation of objectives	Dubash and Joseph (2016), Dubash, Valiathan and Bhatia (2021), Dreyer and Ellis (2021), Nasiritousi and Grimm (2022)	Austen-Smith (1993), Esterling (2004), Ober (2013), Cotton and Dellis (2015), Schnakenberg (2017), Cotton and Li (2018), Dellis and Oak (2019), Ellis and Groll (2020), Backus and Little (2020), Blumenthal (2022), Little (2023), Awad (2020, 2023)
Coordination	Increase the probability that either the actions of different units at one level of government are conducive to the efficient implementation of formulated policies (horizontal) or that units across different levels of government act in this way (vertical)	Johannson (2020), (2020), Neby and Zannakis (2020), von Lüpke, Leopold, and Tosun (2023)	Gailmard and Patty (2012), Peters (2018), Patty (2021), Hassel and Wegrich (2022), Li, Sasso, and Turner (2023)
Compensation	Providing compensation, e.g. funding, payoffs, to actors who are adversely affected by climate policy	Wiseman, Campbell, and Green (2017), Kono (2020), Green and Gambhir (2020), Mijin Cha (2020), Morris, Kaufman, and Doshi (2021), Furnaro et al. (2021), Gaikwad, Genovese, and Tingley (2022), Zucker (2022, 2023), MacNeil and Beaman (2022), Mares, Scheve, and Toenshoff (2022), Bolet, Green, and Gonzalez-Eguino (2023), Gazmararian and Tingley (2023), Gazmararian (2023),	Trebilcock (2014), Lindvall (2017), Rickard (2015, 2020), Rodrik and Stantcheva (2021), Blanchard et al. (2021, chap. 2), Kim and Pelc (2021a, 2021b, 2021c) Garritzmann et al. (2022a, 2022b), Sallee (2022), Cavaillé (2023)

Strategic challenge	Description	Examples of works in climate policy literature	Examples of works in broader (political science) literature
		Colantone et al. (2023), Donnelly (2023)	
Commitment	Indicate long-term direction of climate policy and boost credibility of long-term promises, thus reducing the risk of policy reversals	Helm, Hepburn, and Mash (2003), Brunner, Flachsland, and Marschinski (2012), Lockwood (2013), Lockwood et al. (2017), Dorsey (2019), Averchenkova, Fankhauser and Finnegan (2021a), Lockwood (2021a, 2021b), Gard-Murray and Henderson (2022), Gazmararian and Tingley (2023)	Kydland and Prescott (1977), North and Weingast (1989), Rodrik (1989), North (1993), Levy and Spiller (1994), Dixit and Londregan (1995), Dixit (1999), Gilardi (2002), Maskin and Tirole (2004), Amador, Werning, and Angeletos (2006), Tommasi, Scartascini, and Stein (2014), Jacobs (2016), Miller and Whitford (2016), Jacobs and Matthews (2017), Lindvall (2017)

Approach to coding interview transcripts

The following table contains the codebook we used to code interview transcripts in the qualitative analysis software MAXQDA. For each code we include the relevant sub codes, a description of the meaning of the code (which was used to ensure inter-coder reliability) and examples of how the code was applied, where none were given in the text. These examples illustrate how the different codes were operationalised, therefore helping ensure the reproducibility of our coding decisions.

Table 3: Coding system

Code	Sub-codes (if relevant)	Description	Examples (where not specified in the main body)
Importance of institutions	NA	Answers to the question about how important institutions are in climate mitigation policy	“the prime driver here for emissions reductions is the Department of Climate Change [in Australia]”
Macro-political institutional context	NA	Macro-political institutional features of a given country. E.g. in Sweden, the convention that decisions are taken collectively by the Cabinet	See section 4.1
Governance levels	General	Comments relating to climate policy at different levels of governance, excluding the	NA

		domestic / national level which is our main focus	
	Supranational	Mentions of supranational organizations such as the European Union or the United Nations	“there are (...) some, let's say problems because the implementation of these Bundes-Klimaschutzgesetz in the European framework is not easy and there are some kind of overlapping policies which makes it difficult and complex. And there could be a better adjustment or harmonisation between the European frameworks with ETS, with Effort Sharing Regulation and how to translate that, and into the Bundes-Klimaschutzgesetz.”
	International	Mentions of other countries as well as bi- or multi-lateral relations	“I think what is also quite interesting is that we have now the climate issue in the Foreign Ministry. Yeah, I think this is also quite important. I mean that, Annalena Baerbock was at the COP, so that was also a sign. And I mean, Jennifer Morgan, she's a really heavyweight in the arena. And I think this is, or could in principle, could in principle be an interesting division of labo[u]r (...).”
	Federal	Mentions of federal contexts	“a lot of responsibilities that are relevant to the implementation of climate policy sit, particularly on mitigation, sit with state and territory governments. And so that's another aspect of institutional arrangements, which is quite important. And I don't think the federal government has yet sort of fully resolved those arrangements in terms of how they're going to (...) to operate”
Emergence of institutions	NA	Mentions of factors relating to the creation of climate institutions	“So that's why the Greenhouse Office was established, really, to bring it all together and have a focus within government. But then when, ten years later when Kevin Rudd came to power, it had to step up yet again. So there was a Department of Climate Change, established to do pretty much what the Greenhouse Office had been doing.”

Deficits	General	Mentions of institutional deficits	NA
	Deficits within institutions	Issues within specific institutions, e.g. "The Ministry of Climate and Enterprise could benefit from more coordination within the institution" or 'the climate act could be improved by the presence of stronger enforcement devices'. Includes suggestions of reforms to specific institutions.	See sections 4.2.1.2, 4.2.2.2, 4.2.3.2, and 4.2.4.2
	Deficits in the climate governance system	Deficits within the broader climate governance system, rather than within specific institutions. For example, if people mention the lack of coordination between different ministries. This also includes suggestions for new institutions or overall reforms to the climate governance system	
Challenges		Answers regarding questions of challenges of national climate institutions. Also, challenges that are raised unprompted. For example, political polarisation, or public support	"Over the years, it has been very difficult to engage with treasury for people who were working on climate change in the UK, which is the case actually globally. We are finding ministry of finance well, they perceive to have a mandate that is different, which is actually not true anymore, climate by default because it affects physical stability of the country. It affects investment strategy. Yes, climate is now by default part of the mandate but not all of the ministries of finance and government treasuries have realized that."
Other effects		Effects excluding the ones mentioned below under effects	Creation of climate ministry enables clear attribution of responsibility: "Firstly, it creates portfolio responsibility and with it cloud in cabinet, and therefore make, tends to make it easier to make progress on emissions reductions within government of all, right? It is the responsibility of a minister, it is the responsibility explicitly of one department, and so effort tends to be focused on that. And the

			responsible minister has a greater opportunity for follow through in political decision-making within government. I would nominate that as the biggest effect of having an institution such as Department of Climate Change"
Other institutions	NA	Institutions excluding the ones mentioned below	See Table 1
Climate institutions	General	Climate institutions that match our definition of a 'climate institution' – a formal, state institution established to steer the development and / or implementation of national climate mitigation policy from a multi-sectoral perspective	See section 4, in particular
	Climate law	Encompassing legal framework dedicated to climate change mitigation, which guides other climate policy instruments and planning processes	
	Climate advisory body	Dedicated, national body established to advise the government on climate change mitigation. Common functions include advising on emissions reductions targets, advising on policy approaches, and monitoring / evaluating the effects of policies. Other names include: 'climate council', 'scientific advisory council', 'scientific advisory body'	
	Climate ministry	Government ministry or department with competence for developing and / or implementing climate change policy	
	Within-ministry / within-agency unit	A division, branch, or other formal government grouping dedicated to climate change policy, located in a Ministry or Department which does not have climate change policy as its core competence	

	Inter-ministerial coordination mechanism	A body – often a committee – established to coordinate the process of developing and implementing climate policy among various relevant ministries (e.g. Transport, Industry, Energy)	
	Parliamentary committee(s)	Committee comprised of members of parliament – who are usually assigned to these committees by the leadership of their respective parliamentary parties – focused on climate policy (e.g. reviewing legislation, undertaking inquiries into issues related to climate change, and scrutinising the work of climate-focused ministries as well as bureaucratic agencies)	
Effect of institution	Agenda setting / agenda seeding	See section 3.1	See section 4
	Common knowledge		
	Transparency		
	Integration		
	Accountability		
	Consultation		
	Compensation		
	Commitment		

Generic questionnaire

We have developed a definition of what constitutes a climate institution for this project and defined scope for which types of institutions we include. This table summarises this definition, lists the institutions in scope, and the corresponding institutions in [country X].

Definition and criteria
<p>We define a 'climate institution' as a formal, state institution established to steer the development and / or implementation of national climate mitigation policy from a multi-sectoral perspective (see criteria below).</p> <p>Our criteria for climate institutions:</p>

- **State:** executive and / or legislative,
- **Formal:** established, discernible,
- **National:** operating at federal government level,
- **Climate mitigation:** focused on measures to reduce GHG emissions to achieve climate neutrality,
- **Encompassing:** multi-sectoral and / or cross-sectoral focus,
- **Permanent:** established with intent of ongoing role in climate policymaking,
- **Steering:** designed to steer development and / or implementation of policy (not policy instruments themselves).

We **exclude** institutions which focus on specific sectors and / or issues, as well as sub-national and supra-national climate institutions.

Type of climate institution	Climate institution in [country X]
Climate law	See relevant column in Table 5
Climate advisory body	
Climate ministry	
Within-ministry / within-agency climate unit(s)	
Inter-ministerial coordination body	
Parliamentary committee(s)	
Other	

1. How has your **professional experience related to climate institutions** in [country X]?
2. Referencing institutions in Table 1, above:
 - a. What do you perceive as the **most important climate institution(s)** in [country X]?
 - b. For **each of the institutions** in Table 1:
 - i. What **function** does this institution serve in climate policymaking in [country X]?
(We define 'function' as what the institution is intended to do)
 - ii. What **effect** does the institution have on climate policymaking? (We define 'effect' as an outcome or consequence of an institution's action)
3. Are there any **other institutions** you deem to be important for national climate policymaking in [country X]?
4. What **deficits**, if any, do you see in the mix of institutions we have discussed?
5. Would you suggest **reforms** to any of the above institutions? If so, to which institution(s) and what reforms would you suggest?
6. Who would you **recommend for further interviews** for this study? This should be an expert perceptive of climate institutions and their role in climate policymaking in [country X].

Overview of effects

The following tables summarise the stylised causal chains we identified in each country case. The arrows in the text of the tables illustrate the sequence of function, intervening variable(s), and effects. Note, these tables do not include the full range of potential causal chains that may exist for each institution in each

country – they are simply those linked to the main effects we identified and discuss in more detail in section 4 (see Table 7).

Table 4: Overview of the effects of UK climate institutions

Key	Black text: current effects of UK climate institutions; red text: deficits when compared to other countries; grey boxes: no effects in these categories						
Climate institution	Agenda setting / seeding	Knowledge and transparency	Integration and coordination	Accountability	Commitment	Consultation	Compensation
Climate law	<p>Requirement to respond to advice of UK CCC → media attention / regular cycle → climate policy remains on and is returned to agenda</p> <p>Provides powers to establish trading schemes to limit GHG emissions → policy → influences instrument choice</p>		<p>Does not include sector-based emission reduction targets (e.g. <i>Sektorziele</i> in Germany)</p>	<p>Government must respond to advice of UK CCC → media attention (int. var., see) → informal accountability</p>	<p>Legislates long-term targets → increases cost of repeal → increases commitment</p> <p>Legislates mid-term targets via carbon budgets → requires nearer term delivery → enhances commitment</p> <p>Report on policies to deliver budget ('as soon as reasonably practicable') → hesitant government → uncertain effect on commitment (compare Sweden, within one year)</p>		
Climate advisory body	<p>Advice on carbon budgets / targets →</p>	<p>Ex-post analysis and monitoring → credibility of UK CCC → external and internal</p>		<p>Publication of progress towards achieving targets →</p>	<p>UK CCC proposes carbon budgets → delegation ensures insulation from</p>	<p>Australian CCA obliged to consult with stakeholders wh</p>	

	<p>sets medium-term agenda</p> <p>Ex-ante analysis → policy entrepreneurship in the form of proposing policy alternatives → agenda seeding</p>	<p>(within-government) transparency + common knowledge</p> <p>Ex-ante analysis → external and internal transparency</p>		<p>political / media attention → informal accountability (e.g. loss of reputation)</p>	<p>short-term political pressures → government tends to accept targets (int. var.) → enhances commitment</p>	<p>en developing advice</p>	
Climate ministry	<p>Develops policy → advocates climate policy in cabinet → political clout of climate minister → agenda setting</p>	<p>Builds climate policy capacity → promotes internal transparency</p>	<p>Encourage other ministries to include climate policy objectives → integration</p> <p>Other countries integrate climate ministry with economic ministry → within-ministry integration</p> <p>Coordinates policy development and delivery with agencies + works with other ministries through cabinet process → horizontal coordination</p>			<p>Formal consultation with industry, civil society, and individuals</p>	

Within-ministry / within-agency climate unit		Climate Policy Team in Treasury → internal analysis of climate policy → internal (within-government) transparency	Integrate climate objectives into Treasury policy → influence of Treasury → integration			<i>Not analysed</i>	
Inter-ministerial coordination body for climate policy		Regular contact between ministries on climate policy → promote common knowledge	Integrates climate objectives with policy of other ministries Coordinates climate policy development and delivery across ministries → horizontal coordination	<i>Not analysed</i>	Cabinet committee → political influence → demonstrates commitment		
Parliamentary committee(s)	Inquiries into specific issues → policy entrepreneurship of chair → agenda seeding	Calls witnesses + publish reports → public transparency		Scrutinises climate legislation → informal accountability		Calls witnesses → consultation (e.g. with Industry)	

Table 5: Overview of the effects of Swedish climate institutions

Key	Black text: current effects of Swedish climate institutions; red text: deficits when compared to other countries; grey boxes: no effects in these categories						
Climate institution	Agenda setting / seeding	Knowledge and transparency	Integration and coordination	Accountability	Commitment	Consultation	Compensation

Climate law	Government must present annual climate report as part of budget process → attention of civil society + media → climate change remains on political agenda		Obligation to present annual climate report with budget bill → integrate climate policy with other economic priorities Does not include sector-based emission reduction targets (e.g. <i>Sektorziele</i> in Germany)	Government must present annual report, including where <i>additional action</i> is needed to deliver climate targets → informal accountability No formal accountability mechanism codified in the law	Legislates long-term targets → increases cost of repeal → enhances commitment Each new government must produce a climate policy plan → enhances commitment		
Climate advisory body	Assesses government's policy plan and recommends improvements → agenda setting Annual assessment reports → media attention → climate policy returns to political agenda	Ex-post and ex-ante analysis → analytical capacity (<i>limited</i>) → enhances transparency		Identifies deficits in climate policy plan → reputational damage to the government → informal accountability No formal accountability mechanism (e.g. compared to Germany) if the government overshoots targets or does not respond to policy plan	No power to set interim targets through carbon budget mechanism (e.g. compared to UK)		

				assessments in due time			
Climate ministry		Small ministry (feature of Swedish political system) → less knowledge in ministry compared to agencies	Works with other ministries to integrate climate goals into other policies → decisions in cabinet taken by consensus → integration Coordinates development and delivery of policy with relevant agencies → less technical capacity in ministries than agencies → coordination			Consults with other stakeholders → Sweden's consensus-focused political culture → consultation	
Within-ministry / within-agency climate unit	Climate units in large agencies with strong technical expertise develop detailed policy proposals → set policy agenda (more than in other countries)	Environment Agency reports on emissions, progress on targets → transparency	Agencies work in concert with other agencies → coordination SEPA develops climate policy plan with input from multiple agencies + climate ministry → integration			Agencies consult with stakeholders (industry, civil society) → understand feasibility of policy options	

Inter-ministerial coordination body for climate policy	Climate policy given a prominent place on Prime Minister's agenda		Provides a forum for integrating climate goals with other ministries Provides a forum, where ministries responsible for climate policy can coordinate with one another (lack of a body for ministerial and agency coordination and across-agency coordination)		Creation of Ministerial Working Group for Climate policy demonstrated priority placed on climate policy by Prime Minister → enhances commitment		
Parliamentary committee(s)	Commissions reports on specific issues (e.g. emissions from consumption) → seed new policy ideas	Mandated inquiries into specific issues → have enhanced internal and external transparency		Scrutinises legislation from a political perspective → informal accountability	Facilitate cross-party consensus on policy proposals → increased commitment	Calls witnesses → consultation (e.g. with Industry)	
Other (Fossil Free Sweden)	Roadmaps from various industries → influences the political debate → agenda seeding + agenda setting				Sector-specific industry roadmaps → signal industry commitment to climate mitigation	Produces strategies and roadmaps in consultation with industries	

Table 6: Overview of the effects of Australian climate institutions

Key	Black text: current effects of Australian climate institutions; blue text refers to a potential, but uncertain effect; red text: deficits when compared to other countries; grey boxes: no effects in these categories						
Climate institution	Agenda setting / seeding	Knowledge and transparency	Integration and coordination	Accountability	Commitment	Consultation	Compensation
Climate law	Government must present annual climate statement → attention of civil society + media → climate change remains on political agenda		Subsidiary legislation places net zero target in mandates of portfolio agencies (e.g. CEFC) → guards against divergent, potentially conflicting priorities → enhances integration Does not include sector-based emission reduction targets (e.g. Sektorziele in Germany)	Legislates targets → tougher benchmark against which policies are measured → (informal) accountability	Legislates long-term targets → increases cost of repeal → precedence for repeal → enhances commitment		
Climate advisory body	Regular reports → media attention → climate policy remains on agenda	Ex-post and ex-ante analysis → analytical capacity and ideological position of adv. body (int. var.)		No formal accountability mechanism (e.g. compared to Germany) if government overs	Advises on targets (similar to UK CCC design) → delegation ensures insulation from short-term	Consults with stakeholders in development of advice	

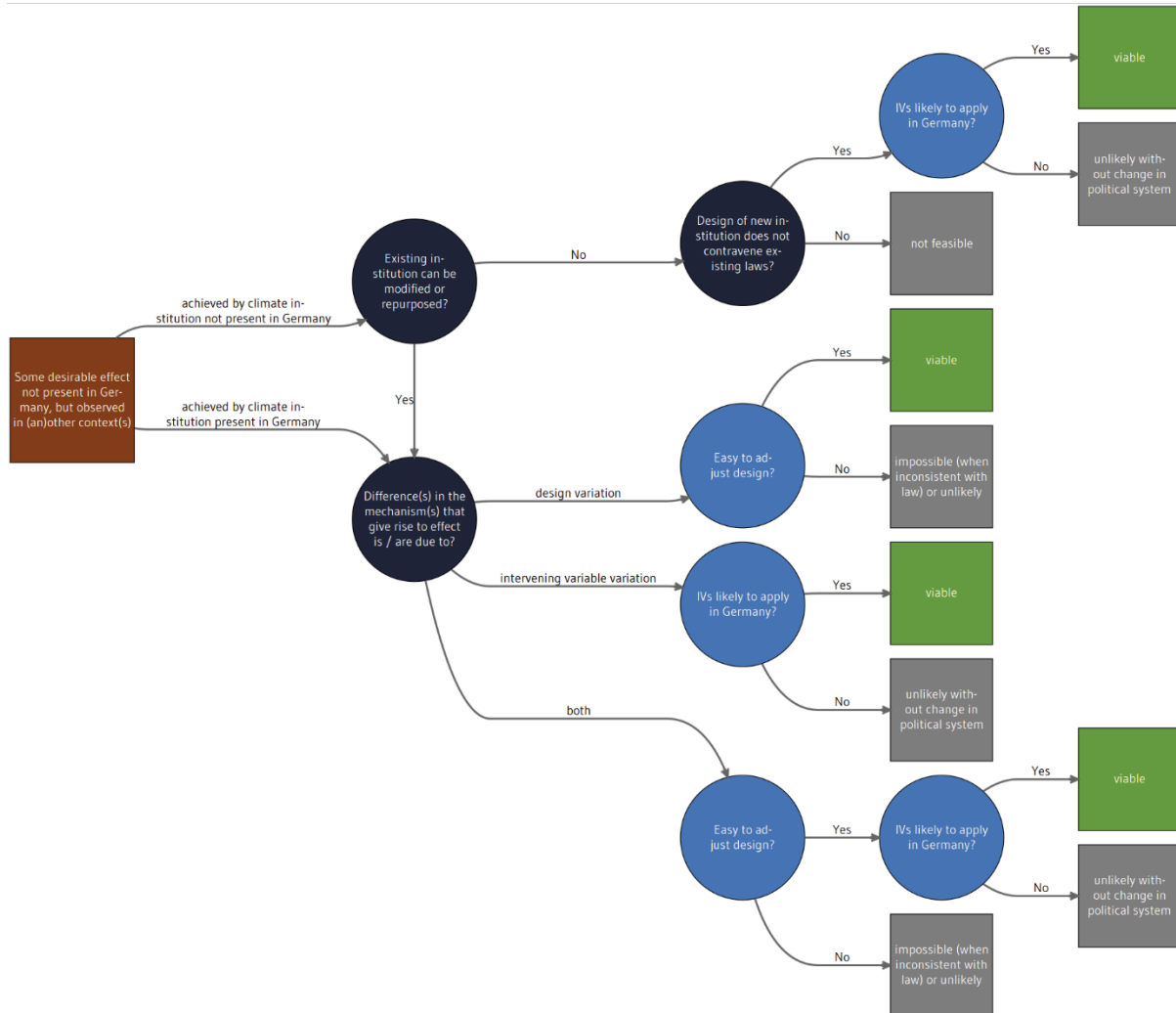
	<p>Ex-ante analysis + policy recommendations → ideological position of body → setting agenda on direction of policy</p> <p>Reports on specific issues → seeding new policy ideas</p>	<p>→ enhances transparency</p> <p>Publishes reports → independent, common source → polarisation surrounding climate change → common knowledge</p>		<p>hoots targets. Less stringent scrutiny (compared to e.g. UK CCC) means less informal accountability.</p>	<p>political pressures → increased commitment</p>		
Climate ministry	<p>Develops climate policies and promotes through cabinet process → policy entrepreneurship of bureaucrats → sets agenda</p>	<p>Promotes within-government transparency about climate policy</p>	<p>Co-location of climate and environment → climate impacts severity in Australia → enhances integration</p> <p>Not integrated with resources and fossil fuel export policy</p> <p>Coordinate with other ministries on climate policy → relative clout of climate minister → coordination</p>	<p>Monitors portfolio agencies + delivery of climate programmes → accountability</p>		<p>Formal consultation on development of new policies</p>	

Within-ministry / within-agency climate unit	Climate policy units in central ministries → place climate on their agenda → clout of ministries → climate policy on agenda across government	Promote within-government transparency about climate policy → increase common knowledge across government	Integrate climate policy into policy of home ministry Coordinate with other ministries on delivery of climate change			Formal consultation on development of new policies (e.g. on vehicle emissions standards)	Potentially provided by Net Zero Economy Taskforce in PM&C (excluded because new and likely temporary)
Inter-ministerial coordination body for climate policy	Keeps climate change policy on the agenda of the Prime Minister and Cabinet				UK: Cabinet Office sub-committee → political influence → demonstrates commitment		
Parliamentary committee (s)	Inquiries into specific issues → agenda seeding + agenda setting	Scrutinise legislation + use of public funds → promote transparency Develop expertise on committee → common knowledge		Scrutinise legislation from political perspective → informal accountability Scrutinise spending of public money → informal accountability		Call witnesses (e.g. industry) → consultation	Swedish committee cross-party consensus → long-term commitment

Methodology for deriving options for institutional reform

The starting point for deriving recommendations for the German case based on comparative analysis is to, first, identify the institutions in other contexts that address those strategic challenges that German climate institutions currently do not address or address only insufficiently. Determining the institutional gaps in Germany’s climate governance landscape helps us identify our strategic challenges of interest – to understand what effects we are primarily interested in when examining non-German contexts.

Figure 1: Decision tree for identifying pathways to viable institutional reform. Source: Own illustration.



The second step is to determine whether other types of institutions that have these desirable effects in other contexts exist in Germany. If the climate institution does not exist in Germany, the third step is to assess whether the mandate or design of an existing institutions can be modified to achieve a similar effect in Germany, and, if so, how easy or difficult it would be – both legally and politically – to do that. This will depend on how likely the mechanisms and intervening variables through which the institution addresses a given strategic challenge in another context are to operate in Germany (see upper branch of Figure 10).

If the same type of institution exists in Germany (or an existing one can be suitably modified), then the third step is to understand why the same kind of institution addresses the strategic challenge of interest in a non-German country, but fails to do so in Germany (see lower branch in Figure 10). As discussed in section 3.2, this difference in effects may be attributable to design or intervening variable variation (or both). Design variation refers to institutions’ different mandates giving rise to the difference in effects. Intervening variable variation means that, despite their similar mandates, effects vary by virtue of different

intervening variables, such as varying levels of policy entrepreneurship by climate advisory bodies, being at work in the different contexts.

Depending on the source of variation, we fourthly evaluate (i) how easy it is to adjust the German institution's design (in the case of design variation) and / or (ii) how likely the intervening variables driving the effect in the non-German country are to apply in the German context (in the case of intervening variable variation). Only if it is either relatively easy to modify the German institution's mandate or if we can be reasonably confident the same intervening variable(s) will operate in the German context is the institutional reform proposal viable. Viability, it is worth noting, does not necessarily mean the reform is likely to succeed – merely that it does not conflict with existing laws or with central planks, whether formal or informal ones, of Germany's political system.

The above methodology is intended as a heuristic for structuring discussions about the potential for institutions that successfully address certain strategic challenges in one country to help remedy institutional deficits in other countries. The general approach, however, extends beyond the German case, to which we applied it here. We hope that following the structure outlined in Figure 10 will improve the quality of such discussions. Ultimately, however, beliefs about the replicability of certain institutional arrangements rest on difficult judgement calls as to (i) the political costs of modifying existing institutional arrangements, and / or (ii) the compatibility of certain intervening variables with a given political system. Following the above methodology will not resolve disagreements about these judgement calls – but, we hope, it will make them more productive, helping those involved in these discussions to articulate their reasons as clearly as possible.

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Who is Ariadne? In Greek mythology, Ariadne's thread enabled the legendary hero Theseus to safely navigate the labyrinth of the Minotaur. This is the guiding principle of the Ariadne energy transition project, in which a consortium of 27 partners is providing guidance and orientation for shaping the energy transition through excellent research as a joint learning process between science, politics, business and society.

We are Ariadne:

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