Actors, objectives, context: A political economy framework of energy and climate policy applied to India, Indonesia, and Vietnam

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Abstract

Devising policies that facilitate a transition to low-carbon energy systems requires a close understanding of the country-specific political economy of energy and climate policy. We develop a generalized AOC ('Actors, Objectives, Context') political economy framework to inform and enable comparison of country-specific case studies of how economic structure, political institutions, and the political environment shape policy outcomes. Our actor-centered perspective is built on the assumption that those policies are implemented that best meet the objectives of actors with the greatest influence on policy decisions. Applying the framework in practice includes four basic steps: i) identifying the societal and political *actors* most relevant for the formulation, implementation and enforcement of energy and climate policies; ii) spelling out these actors' underlying *objectives*; iii) assessing the economic, institutional, discursive and environmental *context* which determines how certain objectives matter for certain societal actors; and iv) analyzing the dynamic *interactions* among these factors leading to aggregate policy outcomes. Context factors determine how societal actors influence political actors engaged in formal public policy formulation, implementation and enforcement, and how the dynamic interplay of different political actors' interests results in energy and climate policy outcomes. The framework can accommodate a wide range of theoretical perspectives. We illustrate how the framework enables conducting comparable energy and climate policy country case studies, using the example of coal use in India, Indonesia and Vietnam. Finally, we discuss how the framework can contribute to the identification of entry points that could bring about policy change.

Keywords: Political economy, policy design, climate and energy policy, coal, vested interests

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1. Introduction

The goal of reducing greenhouse gas emissions has been recognized on the international level, for instance within the Paris Agreement of the United Nations Framework Convention on Climate Change (1). The large majority of countries have stated their intention to contribute to this target in the form of voluntary 'Nationally Determined Contributions' (NDCs) as well as national climate change strategies and plans.

Nevertheless, in many countries we still observe substantial new investments in fossil fuel based energy infrastructure, in particular coal-fired power plants. This development not only contradicts climate change mitigation target, but also carries substantial social costs, e.g. related to public health issues arising from local air pollution. Taking these costs appropriately into account would make a transition to clean energy sources worthwhile for most countries even from a purely national short-term perspective (2).

This paper is built around the hypotheses that policy makers frequently fail to adopt such 'no-regret' options because political decisions on energy and climate policy are not exclusively driven by considerations to improve overall well-being, but are also heavily influenced by special interests. These include, inter alia, public demand for low energy prices, lobbying from powerful interest groups, or the desire to create jobs and accelerate structural change. The extent to which such political issues hinder the transition towards a clean energy system crucially depends on the specific context, e.g. a country's endowment with fossil fuels, its potential for alternative energy sources, its industrial structure, public attitudes towards climate change.

Continued investments in coal-fired power plants would lock in emissions and impede the implementation of climate measures in the future, as this infrastructure has a life-time of several decades. For instance, if all coal-fired power plants that are currently announced, planned or under construction were actually built, the 2°C-target would likely be out of reach (3). In order to devise strategies that prevent such developments and instead highlight possible entry points for ambitious climate policies, it is useful to gain a better understanding of why individual countries currently build up carbon-intensive energy systems. Despite obvious benefits of climate change mitigation policies for the public good, particular interest groups might lose from more ambitious climate policy. They might even have the power to veto any reform that would change the status quo. In order to identify politically viable entry

points into ambitious climate policy, one needs to understand the underlying political economy, i.e. how economic structure, political institutions and the political environment shape policy outcomes. This paper contributes to the literature on conceptual frameworks to combine different theories to analyze the political economy of energy and climate policy formulation (4–8). This framework could in principle be applied to describe a broad range of political economy issues. Due to its focus on structural variables and the interplay between different actors, this framework is particularly well suited for the analysis of energy and climate policy. It builds on the central assumption that policies reflect the objectives of those actors that have the greatest influence in the decision-making process – very similar to approaches modeling policy formulation as an interplay of demand from interest groups which meets supply by policy makers (9,10).

We adopt the perspective that energy and climate policies emerge from a complex interplay of a diverse set of actors, such as influential individuals, key ministries, industry groups, and unions, voters, that have different objectives as well as different means for influencing policy-making. This generic framework is not intended to explain or predict policy outcomes. Rather, it acts as a tool to structure analyses of the political economy of energy and climate policy, which may draw on a wide range of theoretical approaches, in a coherent manner. This general structure is especially valuable to conduct comparative case study work.

The proposed framework includes three central elements: First, the societal as well as political actors most relevant for the formulation, implementation and enforcement of energy and climate policies. Second, these actors' underlying objectives. Third, the context in which policy decisions are made. Empirically analyzing the interactions of these three elements reveals how certain policy objectives matter for certain actors and how these actors can influence policy formulation to achieve specific policy outcomes.

This paper proceeds as follows. Section 2 briefly reviews the literature on the political economy of energy policy and places our contribution within this literature. Section 3 develops the theoretical framework by discussing how to conceptualize key actors, their underlying objectives as well as their influence on policy formulation and provides examples for each of these three categories. Section 4 demonstrates how our framework can be applied to analyze dynamics in three countries that currently plan expanding their coal firing capacities, namely India, Indonesia, and Vietnam. Section 5 discusses how this descriptive framework can be

employed to identify politically feasible entry points for climate policies, with a focus on policies to avoid coal expansion. Section 6 concludes.

2. Literature Review

The study of the political economy of policy formulation, implementation and enforcement is firmly established in a range of policy fields, including, for example, trade (11) and environmental policy (9,12,13). Public policy scholars have advanced and empirically tested a range of theories of the policy process (14,15). These emphasize different factors, including the role of the construction of interests and policy learning of key actor groups (16), policy entrepreneurs (17) and institutional contexts (18). Gilens and Page (19) point out the differing power of voter and interest groups in affecting policy outcomes, with economic elites and organized business interest groups having higher influence than median income voters in the US context.

Research on the political economy of climate and energy policy often builds on insights from literature on the political economy of environmental policy developed in earlier decades. Oye and Maxwell (10), for example, distinguished between 'Stiglerian' settings, in which the beneficiaries of an environmental policy are well-organized and costs widely dispersed (thus making policy adoption more likely), and 'Olsonian' settings, in which costs of regulation are concentrated but benefits are dispersed (making policy adoption more difficult due to free-riding problems in interest group formation). These considerations have also sparked a substantial amount of work examining how special interests lobby to achieve favorable regulation, e.g. by providing contributions for electoral campaigns (20).

Previous studies on the political economy of climate and energy policy focused on explaining fossil energy system lock-in (21–23), and on the challenge of transitioning towards a low-carbon energy system (24). These studies identified a combination of powerful rent-seeking incumbent interest groups, technological infrastructures favoring fossil fuel use (such as grids built around large-scale coal and gas power production), and regulatory regimes stabilizing this configuration. Various studies have examined potential mechanisms by which transition towards more sustainable energy systems might be politically feasible, including notions of niche development of renewable technologies (25), polycentric governance approaches

emphasizing decentralized efforts at sustainability transition (26,27), and the role of building 'green' constituencies that would counteract the interest of incumbent veto players (28). Concerning the latter, Meckling et al. (29) argue that it is essential to build up renewable energy technology interest groups first, to enable more ambitious climate policy formation in later stages. Pahle et al. (30) advance this line of research on climate policy sequencing by suggesting a typology of barriers to climate policy stringency and options to relax these over time. Hughes and Urpelainen (31) develop a political economy model that emphasizes public opinion and special interests as drivers of economy-wide and sectoral policies.

In addition to research examining the strategic interplay of actors with diverse objectives in specific institutional and technological settings, a more recent line of research is systematically investigating a broader range of structural political economy factors by applying econometric techniques on large cross-country samples (32–35). Other studies explore support for different kinds of climate policy instruments (36), including the factors determining the adoption and level of domestic carbon pricing in depth (37–39) or focus on carbon market design (40,41) and revenue recycling (42,43).

Another recent line of research, which is closely related to our paper, synthesizes theoretical and empirical insights on the political economy of climate and energy policy. Biber et al. (44) review the literature and discuss a long list of political economy factors influencing energy and climate policy. In a similar vein, Karapin (45) identifies a range of structural and process factors in the literature, and applies these in a comprehensive comparative case study on California, New York and the US federal level. However, neither proposes a generalized framework suited for organizing political economy analysis of climate and energy policy, which is the aim of this paper. Finally, a meta-theoretical framework to analyze the interplay between techno-economic, socio-technical and political factors in energy system transitions is provided by Cherp et al. (4).

The aforementioned studies provide a wide range of important insights into the political economy of climate and energy policy, ranging from drivers of outcomes and structural constraints on energy transitions to strategies that can relax these constraints, such as policy sequencing. Our framework builds on this literature, and our contribution is to provide a flexible, generally applicable framework for comparative case analysis that simultaneously considers actors, objectives, and context as potential drivers of outcomes. We follow the

approach for building analytical frameworks outlined by Ostrom (46) to allow for a flexible combination of different theories that consider individual sub-systems and more specific causal effects that are relevant for the understanding of political processes. By aiming for comprehensiveness we consciously trade off theoretical detail, but we consider this particularly justified in view of a future research agenda that aims at developing systematic comparative political economy of climate and energy policy including (comparative) case studies, and large-n meta-analysis of case studies. Following the example of Ostrom (18,47) and her broader research agenda aiming at stimulating case-study and experimental research, theory development and comparative large-n analyses, we believe that a general framework will be useful in establishing common terminology enabling later comparison and analysis of specific studies. Another advantage of our framework is that it is in principle compatible with a range of disciplinary approaches, including political science, social choice and neoclassical welfare economics. We return to this point below, and develop the analytical framework building on the literature next.

3. The Analytical Framework

The framework to analyze the political economy of energy and climate policy builds on three central elements, namely (i) the relevant *actors*, (ii) their *objectives*, as well as (iii) the *context* determining how a certain objective matters for each actor and how these actors can influence policy formulation. Throughout the paper, we use the shorthand AOC ('Actors, Objectives, Context') when referring to this framework.

This section first describes these elements in detail and then discusses how they can be linked to describe policy formulation. We then discuss how our approach can incorporate a large variety of perspectives on the political economy of energy and climate policy and finally provide an outlook how analyses conducted along this framework can help to inform policy-making.

3.1. Actors, objectives, and context

First, our AOC framework aims at identifying the most important *actors* that influence the formulation of climate and energy policies. We divide this category into *societal actors* and *political actors*. Societal actors include unions, industry associations, civil society organizations

and voters as well as international organizations and bi- and multilateral development banks. Political actors include, among others, political parties, the parliament, key ministries, regulatory agencies, and the president. While the behavior of political and societal actors is embedded within a set of formal and informal institutions constituting a society's polity, we suggest a strong focus on actors as a core unit of analysis because these are the driving forces of policy change or continuity. Choosing actors as a key unit of analysis is also helpful to facilitate empirical access to the field (e.g. via interviews, stakeholder analysis), and to consider strategies available to different actor groups in policy advice.

Second, the AOC framework entails establishing a list of *objectives* which matter for these actors. This perspective acknowledges that energy and climate policies are usually implemented with multiple policy objectives in mind (48,49), and that objectives and their prioritization differ across groups (50). The scientific literature has identified numerous trade-offs and synergies of energy and climate policies with other policy objectives, including economic costs and their distribution, industrial development, job creation, energy security considerations, and ambient air quality. Hence, we assume that in general, each actor's stance towards energy and climate policy may depend on their relative weighting of several (but not necessarily all) of these policy objectives. For instance, environmental civil society organizations may be most concerned about environmental issues, unions about employment and wages, and the private sector about profits. Yet, each of these groups may also care about other aspects more directly concerning other groups, such as distributional implications. We assume that for societal actors, these objectives matter directly (societal objectives) and that political actors are concerned about the interests of the societal actors they represent but may also have additional idiosyncratic objectives, such as being reelected or increasing their standing or power (political objectives). As an example, the ministry of the economy might be most responsive to the demands of key industries, while the ministry of the environment might be more amenable to lobbying by environmental NGOs. Which policies eventually are implemented will be determined by the complex interplay of the interests of these political actors mediated by political process dynamics. For the analysis, it is helpful to distinguish between objectives that are directly affected by energy and climate policy, such as low energy prices or security of supply, and those that relate in a more indirect fashion, such as employment and structural economic change.

Third, our AOC framework examines the general *context* in which policymaking takes place. In our formulation, context is a broad category including economic, environmental, institutional, and discursive aspects. Economic factors include, for example, the level of development, the economic structure (e.g. share of energy-intensive industries), or the energy resource endowments (e.g. fossil or renewable energy resource-base) of a country. Formal and informal domestic institutions structure both how societal groups interact with policy actors, and how formal policy decisions are being taken (e.g. electoral system, constraints on lobbying) and implemented. Beyond domestic institutions, the international embeddedness of a country may also matter for domestic climate and energy policy formation in varying forms and degrees (e.g. Paris Agreement, access to international financial markets). Discursive factors include public opinion (e.g. the share of the population believing in global anthropogenic climate change, political polarization, or the level of government support) or the governance and behavior of media actors. Environmental factors include affectedness of a country or more specific regions by local (e.g. air pollution) and global (e.g. climate change) environmental problems.

Context matters in four ways. First, it specifies how specific policy objectives matter for individual societal actors (10). For example, the way in which profits matter for utilities likely depends on whether electricity generation is mainly carried out by private or state-owned companies (i.e. organization of the power sector). Second, context determines the form and degree in which societal actors have an influence on political actors (19). For example, the extent to which organized lobby groups can influence policy decisions can be expected to depend on the formal and informal forms of interest group representation, the prevailing level of corruption, political ideologies and trust in government. Third, context matters for how political objectives matter for individual political actors (51). For instance, decision makers might be able to place higher importance on their personal influence in authoritarian regimes compared to more democratic settings. Fourth, context structures the form and degree of how these political actors can influence policy making, implementation and enforcement (52). For example, parliament chambers and ministries likely have different powers in presidential and parliamentary systems, and the power of political parties can be expected to differ between proportional and majoritarian electoral systems.

In applying the AOC framework, carefully characterizing the dynamic relationships and power structures determining political actors' objectives is important. These are shaped, first, by the objectives of societal actors that can influence political actors inhabiting formal positions of power in various ways (e.g. campaign financing, voting behavior). Second, distinct objectives of political actors such as ministries aiming at increasing their political power need to be accounted for as well. These also interact with the objective functions of other political actors (such as the president) via bargaining and power struggles in the policy process.

Our analytical AOC framework is based on the idea that decision makers can choose from a given set of policy packages. We presume that those policies will be implemented that best meet the objectives of those actors that have the most pronounced influence on policy formulation, implementation and enforcement, either directly in their role as political actors, or indirectly, in the role of societal actors that can influence political actors. National as well as international context variables shape both the formation of objectives of actor groups, as well as the broader economic, institutional and discursive context in which they aim to advance them. In this sense the AOC framework is based on the view that policies are supplied by decision makers to fulfill a demand by certain interest groups, in line with the seminal contributions by Stigler (53), Oye and Maxwell (10) and Keohane et al. (9) that pioneered the political economy of environmental policy. Note that even though the analogy of supply and demand is helpful to illustrate that actors who are affected by certain policies have an interest to influence their implementation and enforcement, some qualifications are due. First, there might well be a certain degree of entanglement between private and public interests (54,55). Second, political decision-making does not take place on perfectly competitive markets with atomistic actors. Rather, certain actors might have the power to influence the supply and demand curves in their favor.

We do not presuppose a particular mechanism of how actors' interests are aggregated into policy outcomes in the policy process, as these will vary by context and are to be determined in empirical-descriptive studies. Due to this general structure our AOC framework can accommodate a large variety of empirical settings and theoretical perspectives. These range from developing to developed countries, and from well-governed cases that achieve outcomes which in the welfare economic perspective can be considered to be close to the social optimum, to clientilistic regimes and interest-group based explanations of public policy

in which policies are adopted to serve a narrow political and economic elite. The AOC framework does not assume rational policy design in the sense of an optimization procedure. It is applicable both in contexts where policies are implemented to predominantly serve the interests of those actors that have disproportional influence on policy-making, or in settings where the interests of majority (and minority) voter groups are shaping policy adoption. Thus, the AOC framework enables transparent comparison of normative social welfare perspectives on policy formulation with positive analyses focusing on interest group influence on policy formulation. It also enables policy analysis in a welfare theoretic perspective of political economy constraints (30).

Table 1 provides some examples of potential societal and political actors, as well as potential environmental, socio-economic and strategic objectives relevant for climate and energy policy formulation. It also displays a number of factors that might matter for the techno-economic, institutional, discursive, and environmental context. This list is far from being comprehensive. Instead, each individual country and policy package will require carefully examining which actors, objectives and context factors are relevant in a particular case.

291 *Table 1: Examples of actors, objectives and context factors relevant for the political economy of climate and energy policy*

Societal Objectives	**Societal Actors**
Environmental Climate change mitigation Local air quality **Socio-economic** Economic costs and efficiency Employment and wages Diversifying the economy, structural change Poverty alleviation Social inclusion Health Distribution Public revenues and investments Profits **Strategic** Technology transfer Energy security, energy sovereignty	Voter groups Unions Energy-intensive industries Utilities Resource owners Financial institutions Industry associations Researchers, academia Multi-national corporations, investors Civil society (e.g. NGOs, religious groups, local citizens International NGOs
Political Objectives	**Political Actors**
Reelection Increasing influence and political power International standing	Influential individuals (e.g. president) Key ministries and agencies (across differen governance levels) Political parties (e.g. via parliament) Regulators, implementing agencies
Context	
Techno-Economic Economic situation (GDP, business cycle, fiscal deficit, population density, inequality…) Fossil fuel endowments, dependence on fossil imports/exports (Global) market developments for fossil fuels and renewable technologies RE potential Grid infrastructure and existing generation capacities Industrial structure (e.g. share of manufacturing and energy-intensive industries) **Institutional** Organization of the power sector Representation of interest-groups Political and judicial system (e.g. democracy, parliamentary vs. presidential, electoral system) Government capacity International agreements (climate, trade, investment, technology) **Discursive** Political events (champions for green policies, media attention, framing, socio-environmental conflicts, COP o similar event in country under consideration) Ideational factors (climate change knowledge, right-left polarization, international diffusion of ideas) Trust in government **Environmental** Vulnerability to climate change Focusing events (climate-related impacts, Smog episodes, power cuts)	

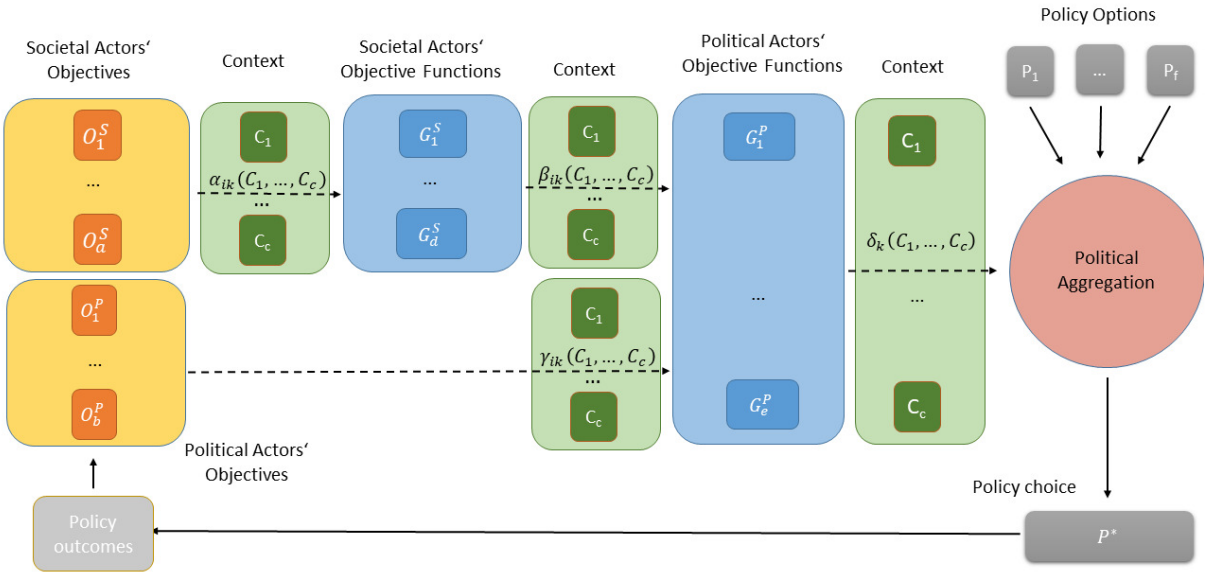
3.2. Combining the elements of the AOC framework

The interactions between actors, objectives and context are depicted in Figure 1. Let there be a number of *a* relevant *policy objectives* that matter for *societal and political actors*, denoted by O_1^S to O_a^S and O_1^P to O_b^P, respectively. The *context factors* are labeled C_1 to C_c. The weights α_{ik}, state the importance of policy objective *k* for societal actor *i*. In a similar vein, we regard each political actor to have two sets of objectives: first, idiosyncratic objectives, such as ensuring reelection or increasing influence, where the weight political actor *i* puts on objective *k* is given by β_{ik}. Second, we regard societal actors as influencing political actors, such that the importance societal actor *k* has for political actor *i* is given by weight γ_{ik} (if an objective or societal actor is not relevant for a certain political actor, the respective weight is zero). Finally, let us denote the degree to which political actor *k*, via the policy process, influences policy outcomes, implementation and enforcement by δ_k.We assume that all weights α_{ik}, β_{ik} , γ_{ik} and δ_k are determined by the context factors C_1 to C_c.

We denote the set of *f* possible policies (in the sense of policy packages that combine different instruments, such as taxes, subsidies, performance standards, transfer payments) that can be implemented by P_1 to P_f. Each policy will result in a specific outcome vector, over time, for each of the objectives of societal and political actors, i.e. O^S *and* O^P. Then, the *policy package* that yields the maximum political support at a given point in time will be chosen, implemented and enforced because it best meets the objectives of those actors that have the most influence on policy formulation.

The key aspects of this approach are summarized in Table 2. This approach can be regarded as an analogy to the comparative static approach in economic theory that describes how an equilibrium between supply and demand (in our case for policies) arises and allows an assessment of how this equilibrium would dynamically change as a result of changes in certain parameters of the system. A mathematical formulation of the AOC framework is sketched in the Appendix.

Figure 1: Graphical representation of the AOC framework



This approach can also be conceptualized to study the dynamic aspects of policy change and inertia due to resistance of powerful interest groups to change, creating path dependence and lock-in of fossil infrastructures. This can be achieved by including future outcomes in the list of societal and political actors' objectives in conjunction with how they form expectations on future developments. For instance, certain actors might strive for short term objectives (such as influencing public opinion or changing the institutional environment), which do not directly meet their immediate priority objectives (such as profits or political power), but facilitate their achievement in the future.

Table 2: Key elements of the AOC framework

Framework Element	***Notation***
Societal actors' objectives	$O^S_1 \dots O^S_a$
Political actors' objectives	$O^P_1 \dots O^P_a$
Context factors	$C_1 \dots C_c$
Importance of objective *k* for societal actors *i*	α_{ik}
Influence of societal actor i on political actor k	β_{ik}
Weight of political objectives for political actors	γ_{ik}
Power of political actor k	δ_k
Policy packages	$P_1 \dots P_e$

3.3 Integrating multiple perspectives

This approach does not need to presume any specific mechanism of how actors' objective functions are aggregated in the policy process. Instead, it simply states that different actors have different objectives and that these actors' interests influence policy formulation in a predictable way, taking relevant context factors into account. Hence, the AOC framework can accommodate different theoretical perspectives (including combinations of these) and empirical settings of how policy decisions are actually taken, as summarized in Table 3.

A number of studies (50,56) aim at empirically mapping and analyzing societal actors' multiple and differing objectives in climate and energy policy. Some recent contributions examine how material and techno-economic characteristics of energy generation and distribution, which can be in our framework be understood as context factors, affect political power relations (7,57,58). Approaches describing the historical evolution of institutions (59) can help to shed light on the question of which context factors determine the influence of different societal actors on political actors, and the influence of these political actors on the policy process. This could contribute towards better understanding political power from the perspective of co-evolving technologies and political institutions (25). The literature on the formation of social preferences can provide important insights to assess which objectives matter in which way for which actors. In this regard, it has been pointed out that attitudes towards climate change depend on several socio-political factors (60); for instance, individuals' positions are highly dependent on political orientation rather than knowledge of scientific facts (61).

Actor-focused approaches such as public choice theory (52,62) can be drawn upon to assess the role of voters and voter groups as the most important societal actors as well as their main objectives. The political system (e.g. presidential or parliamentary democracy) then determines how exactly their voting behavior matters for political actors. Theories of lobbying can be employed to represent the influence of powerful vested interests (22,63). Lobbying can be represented by either accounting for firms' financial contributions in the objective functions of political actors (i.e., firms will contribute the more the better their demands are fulfilled), or including the strategic provision of information by firms in a way that induces policy makers to adopt regulations that are beneficial for those firms. In a similar vein, theories of corruption can further the understanding of how societal actors can exert illicit influence

363 on political actors, and hence policy formulation, implementation and enforcement to
364 advance their objectives (38,64).

365 A large strand of literature has highlighted that in the absence of credible commitment
366 devices, long-term energy and climate policies might be subject to time-inconsistency (65).
367 That is, regulators may have an incentive to deviate from previously announced targets, which
368 creates incentives for firms to strategically respond, for instance by under-investment in clean
369 energy technologies (66).

370 Recent contributions on policy sequencing could help to shed light on the question of which
371 instruments policy makers may employ in which order to ease political resistance from
372 potential losers and to create winning coalitions that support the introduction of certain
373 policies (29,67). For instance, it has been argued that even though carbon prices would be
374 reasonable from an economic point of view, it might be impossible to implement them right
375 away, i.e. without an initial phase-in period of performance standards of renewable support
376 schemes.

377 Finally, in order to describe how certain policies impact on different policy objectives, the
378 literature on costs and benefits of different energy and climate policies (68), their
379 distributional implications (69) and potential co-benefits, such as local air quality (70), will
380 provide useful tools for analysis requiring context-specific application.

381 Our AOC framework does not constitute an alternative to these theories. Instead, it provides
382 a convenient way to combine a large variety of perspectives focusing on different actor
383 groups, objectives and policy aggregation functions, and interplay among them in a flexible
384 way.

385

386 *Table 3: Illustrative overview of how different dimensions of political economy can be represented in the AOC framework.*

Dimension considered	Examples for related Literature	Integration in Framework	
Actors' objectives	Joas et al. (50), Leipprand and Flachsland (56)	Societal and political actors' objectives.	$O^S_1 \dots O^S_a$ $O^P_1 \dots O^P_a$
Material and techno-economic characteristics	Balmaceda (57), Burke and Stephens (7), Malm (58)	Context factors.	$C_1 \dots C_c$
Institutions and power structures	Lockwood et al. (59), Geels et al. (25)	Context factors.	$C_1 \dots C_c$
Social Norms and Behaviour	Kahan (61), Jakob et al. (71)	Weight of individual objectives for societal actors.	α
Public choice, voting	Cremer et al. (52), Habla and Roeder (62)	Political Actors' objectives. Weight of political objectives and influence of societal actors on political actors	$O^P_1 \dots O^P_b$, β, γ
Lobbying, vested interests	Moe (22), Aidt (63)	Weight of political objectives and influence of societal actors on political actors. Relative power of different political actors	β , γ, δ
Corruption	Fredriksson and Svensson (64), Rafaty (38)	Societal Actors' Objectives. Weight of political objectives and influence of societal actors on political actors.	$O^S_1 \dots O^S_a$, β , γ
Time-inconsistency	Kalkuhl et al. (65), Brunner et al. (66)	Context factors.	$C_1 \dots C_c$
Sequencing	Meckling et al. (29), Pahle et al. (67)	Policy Packages.	$P_1 \dots P_e$
Policy outcomes	Goulder and Parry (68), Dorband et al. (69), Nemet et al. (70)	Societal and political actors' objectives.	$O^S_1 \dots O^S_a$

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388 *3.4. Understanding policy change*

389 How can policy change be depicted in this framework? Three different channels why policy
390 makers may change policies over time are conceivable. First, the context factors C_1 to C_c,
391 determining how (a) either individual objectives matter for the relevant societal and political
392 actors, (b) how societal actors' interests influence political actors, or (c) how these political
393 actors' interests are reflected in policy formulation, implementation and enforcement may
394 change. This may, for instance, come about due to rising incomes, structural economic change,
395 changing beliefs regarding climate change initiated by policy entrepreneurs, focusing events
396 such as extreme weather events or, smog episodes, as well as institutional reforms that may
397 strengthen or weaken the power of certain key policy actors such as ministries. Under

changing circumstances, actors might change their preferences over objectives. Second, the feasible combinations of O^S_1, …, O^S_a and O^P_1, …, O^P_b that can be achieved as a result of policy choice might change. This could happen, for instance, as a result of cost reductions for low carbon energy sources due to technological progress, additional funding options from international climate finance, or changing political leadership. Third, learning and new ideas about policy options can expand the space of available policy packages to attain different possible combinations of O^S_1 … O^S_a. and O^P_1, …, O^P_b.

4. Applying the framework to countries ramping up coal use

Despite the need to phase out coal use (without CCS) globally by 2050 to achieve internationally agreed climate targets (72) and the rapidly declining costs of clean energy sources, many countries still witness substantial coal investments. In this section we demonstrate the application of our AOC framework to the political economy of energy and climate policies in India, Indonesia and Vietnam.

Many individual case studies highlight the importance of politics for energy transitions (see e.g. Baker et al. (73) for the case of South Africa and Dubash (74) for India). The country-specific literature has identified political economy forces behind maintaining and growing coal markets as the main barrier to renewable energy in India and Indonesia (75). For Vietnam, vested interests and close ties between SOEs and ruling elites have been highlighted to undermine the countries' energy- and sustainability strategies (76). Some papers explicitly compare various countries following a common framework. For Australia, South Africa, India and China, Spencer et al. (77) find stranded assets in the context of regional employment and fiscal revenues to be a major challenge to transitions away from coal.

Even though these case studies are insightful, it is hard to derive robust insights due to the heterogeneity of approaches employed. We demonstrate how our AOC framework provides a 'common language' to compare political economy factors across three countries with different political and economic circumstances that have announced significant coal investments. While Indonesia is the world's second largest coal exporter, Vietnam relies on imports for newly developed coal fired plants since 2015. India relies heavily on domestic coal

in some regions, but imports coal in other regions. Moreover, political systems and traditions are very different in those three countries.

This section draws on semi-structured interviews that (parts of) the author team have conducted or supervised in India (78) (28 interviews, October – November 2018), Indonesia (79) (50 interviews, March – May 2018) and Vietnam (80) (24 interviews, April 2018). Interviews across these three countries were conducted following the AOC framework with comparable interview guidelines (adapted to country circumstances). We compare the roles of actors, objectives and context factors that interviewees deemed to be important in these countries. Our AOC framework can thus be used to highlight common factors that impede a transition away from coal in all three countries. These include common policy objectives, such as economic growth and energy security[4], as well as the political clout of vested interests in the industry. While this exposition serves to demonstrate the usefulness of our framework, a full assessment of the actors, objectives and context that shape energy and climate policies in these countries needs to be left for future work.

4.1 Actors

Table 4 summarizes most the important *actors* in India, Indonesia and Vietnam. Note that we do not take a particular stand on their relative importance at this point but focus on their comparability.

First, coal development is of political relevance at the top level in all three countries. Notably, in all countries, inside governments, various ministries with partly conflicting interests and different power resources shape investment decisions in the electricity sector. In all countries, ministerial silo mentalities have been reported, i.e. a lack of cooperation across ministries on respective topics. Environmental ministries that are in charge for climate regulations have little political influence. For example, in Indonesia climate protection and hence emission reductions are narrowly framed as a forestry issue. At the same time, energy issues are dealt with by the three ministries governing the state owned utility PLN, namely the Ministry of Finance, the Ministry of Energy and the Ministry of SOEs.

[4] Note that a clear definition of energy security is context specific (81) and the concept itself is found to be a discursive construction (82). Yet, two broad themes can be identified that are relevant for energy security, including availability and distribution of resources, and variability and reliability of energy supply (83, Chapter 9). Here we understand energy security in the context of policy makers' concern for access to stable energy supply.

In multi-level political systems regional actors seem to have a stabilizing effect on coal investments. In India, regional parties from coal mining regions often have played an important role in forming governmental coalitions at the national level. In Indonesia, regional governments across the country get a share of coal revenues. Their role is in particular important given attempts of political decentralization in Indonesia. In Vietnam provincial people's committees need to be involved in the decision to include plants in the national power development plan, a key planning tool for the government.

Table 4: List of important actors in India, Indonesia and Vietnam based on interviews (see 78–80) clustered into political and societal context factors. Similarities are highlighted.

India	Indonesia	Vietnam
Political		
Prime Minister	***President***	***Prime Minister***
Line Ministries (Power, Coal and Railways, Heavy Industries, Environment, Renewable Energies)	***Line Ministries (SOEs, Mines and Resources, Finance)***	***Line Ministries (Industry and Trade, Planning, Finance, Environment)***
National parties (BJP, Congress)	*Regional governments*	*Communist Party*
Regional parties (TDP, SAD)		*National Assembly*
Supreme Court		*Party committees*
		Provincial People's Committees
Societal		
SOEs (Coal, manufacturing)	***SOEs (Electricity)***	***SOEs (Electricity, Petroleum, Coal)***
State owned Banks	*Coal owners (oligarchs)*	***NGOs***
Independent power producers	*Coal mining industry*	*International Donors (World Bank, EU, GIZ)*
Electorate	*Electorate*	*Independent power producers*
Farmers	***NGOs***	*RE project developer*
NGOs		*Coal constructing companies (esp. from China, RoK and Japan)*
Renewable generation companies		*Coal exporting countries*
DISCOMs		*Energy intensive industries*
Energy Intensive Industries		*Low skill manufacturing companies*
Indian Railways		

State owned enterprises (SOEs) are key actors in all three countries. In particular utilities (PLN in Indonesia, EVN in Vietnam and power distribution companies (DISCOMs) in India) can

exercise substantial political influence. But, other SOEs also play important roles, for example 'Coal India Limited' or BHEL (a steam turbine manufacturer) in India.

NGOs (national and international) are present and shape public discourses in all three countries, often aiming to put environmental objectives higher on the political agenda. However, their direct influence on national policy making is rather limited.

Notably, energy intensive industries are important actors in India and Vietnam. In contrast, in Indonesia the dominating industry actor is the coal mining industry, while other industry sectors (i.e. the energy demand side) are less present.

Despite the similarities discussed above, there are also important country-specific particularities. In India, coal is tightly linked to Indian Railways, which uses earnings from coal transport to cross-subsidize low passenger fees. In addition, Indian (state-owned) banks have been heavily involved in financing coal capacity and have a strong interest in avoiding stranded assets resulting from more ambitious climate policy. In Vietnam, international donors play an important role, both in terms of finance in the energy sector as well as in terms of general funding (84). In Indonesia, as one the world's most important coal exporting countries, the coal mining industry is a powerful political actor that has inter alia financed the current President's election campaign.

4.2 Objectives

The objectives of energy security, employment opportunities, poverty eradication as well as economic and industrial development play an important role for key policy makers in all three countries (see summary in Table 5). Those objectives are enshrined in development plans or specific policies. For example, in Indonesia explicit calls for resource sovereignty are reflected in policies that cap the amount of coal that may be exported. Coal in this respect is seen as a national resource that should be used domestically to cover the (expected) growth in energy demand. In India and Vietnam, coal is regarded to have a prominent role to play in securing the reliability of electricity supply (85). Providing electricity access and keeping electricity prices low, both for households and industry, are key objectives to diversify the economy in all three countries. In this respect, coal is explicitly seen as a means to foster industrial development.

Notably, politicians' desire to remain in power is closely linked to the energy sector. More specifically, in all three countries policy makers see little political leeway to increase electricity prices from their current low (and often subsidized) levels. In India and Indonesia, keeping electricity prices affordable has been a key promise in recent election campaigns.

Table 5: *List of objectives in India, Indonesia and Vietnam based on interviews* (see 78–80) *clustered into political and societal context factors. Similarities are highlighted.*

India	Indonesia	Vietnam
Political		
Re-election and staying in power	***Political stability, staying in power***	***Political stability, avoid social unrest***
Centralization of federal power	*Serve interests of political supporters in light of new elections*	*Access to donor financing*
International standing		*Sustain individual profits*
Political finance		
Societal		
Affordable and sufficient electricity supply	***Affordable and sufficient electricity supply***	***Affordable and sufficient electricity supply***
Increase electricity consumption	*Increase rural electrification rate*	*Promotion of energy industry (SOEs) and related personal and political rents*
Create jobs	*Develop infrastructure*	
Sustain economic growth	*Reorganize public budget*	*Climate change vulnerability highlighted*
Reduce local air pollution	*Secure markets for the coal industry (create domestic demand for coal)*	
Climate change mitigation	*Local water and air pollution increasingly critical*	

In Indonesia and India, royalties from coal mining are significant for the national as well as federal states' budgets. Securing revenues and stabilizing public finance is a key objective of governments, not only but in particular powerful ministries of finance. By contrast, Vietnam has moved from being a net-exporter to a net-importer of coal in 2015, such that reducing the fiscal costs of imported coal (in a state-owned power generation system) is an important policy objective.

All three countries have adopted explicit targets for reducing greenhouse gas emissions or at least aim to slow down their growth, as stated in their NDCs. Environmental policies are however often supervised by environmental ministries, which are considered to have less political influence in all country contexts. For example, in Indonesia the three ministries in charge of energy policy face strong incentives to promote coal use: the Ministry of Finance

aims to generate revenues, the Ministry of Energy aims to reduce system costs (while not being allowed politically to increase tariffs, see above) and the Ministry of SOEs aims to provide infrastructure at least costs.

Environmental concerns are however given a higher priority if they can threaten other political goals, e.g. remaining in power or keeping political stability. In Vietnam, environmental objectives, including climate change and air pollution, seem to have become more important for policy makers after an accident in a steel plant that caused environmental pollution in 2017 and related public protests. Air pollution in Indian cities – even though not necessarily related to coal – plays an increasingly important role in discussions of the country's policy.

4.3 Context

Table 6 compares key context factors in India, Vietnam and Indonesia. It is worth noting that all have long coal mining traditions. While India and Vietnam increasingly need to import coal to satisfy their domestic demand, Indonesia is among the top coal exporting countries (ranked second). However, high quality coal for export is increasingly depleted and export markets in Asia and Europe are expected to shrink. This situation has provided an incentive for the – politically well-connected – owners of coal mines to lobby the government to increase domestic coal-fired capacity to raise domestic coal demand and thus compensate for declining export markets.

Further, in all three countries the power sector is characterized by monopolies on the supply side, most notably exerted by state owned companies (CIL in India, EVN in Vietnam and PLN in Indonesia). This has led to strong personal ties between the coal industry and regulators, which may explain why coal-fired power generation receives more favorable regulatory treatment than other energy sources.

Despite decreasing costs (86), country specific frictions in the energy market design in all three countries lead to high (relative) risks for renewable energy investments, hence increasing financing costs of capital-intensive renewable energy sources. For example, the conditions for investing into coal and renewables, respectively, have been very different in Vietnam. Independent power producers (IPPs) investing into coal get revenues guaranteed over 20 years, while for renewable energy IPPs were only guaranteed to receive revenues for one year (74). This increases the risk premiums for investors and often makes (capital intensive) renewable energy more expensive (in terms of capital costs) than coal in all three countries.

Comparable patterns that hamper renewable investments can also be found in India and Indonesia (75).

Finally, for all three countries rapid economic development has led to sharp increases in energy and electricity demand. For example, in Vietnam electricity demand has been rising by over 12 per cent per year since 1990 (85). A history of central planning and the Communist Party's pledge to provide basic infrastructure services for the whole population at low prices have set economic development on an energy-intensive path. Likewise, in Indonesia, the drive for economic growth in conjunction with abundant national coal reserves has been mentioned as a reason for 'resource nationalism', which regards coal as national capital that should be used to spur economic development.

Table 6: List of context factors in India, Indonesia and Vietnam based on interviews ((see 78–80)) clustered into political and societal context factors. Similarities are highlighted.

India	Indonesia	Vietnam
Techno-Economical		
High RE potential	***High RE potentials***	***High RE potential***
Large coal reserves	*Large coal reserves, large coal exports*	*High electricity demand growth rates and fast economic growth*
Jobs in structurally weak regions (Eastern states)	*Sustained economic growth >5%*	*Import dependence on fossil fuels*
Low electrification rates and low electricity consumption	*High capital costs for RE*	*High capital costs for RE*
Stressed assets in the power sector		
Slowing GDP growth rates		
Institutional		
Parliamentary Democracy	*Presidential democracy*	*Deep incumbencies, 'revolving doors'*
Federal Structure	*Overcoming dictatorship (since 1997), "young democracy"*	*One-Party regime; communist economic planning & SOEs*
Recent switch in party hegemony	*SOE driven infrastructure development*	*High and increasing public debt*
		Regulatory uncertainty
Discursive		
'CoalGate' corruption scandal in 2014	*Forthcoming national elections*	*Accident in Formosa steel plant causing major environmental problems an protests*
	Politically sensitive decentralization process towards more regional autonomy	
	Resource nationalism	

Environmental		
Pollution in major cities	***Pollution in major cities***	***Pollution in major cities***

557

558 *4.4. Preliminary lessons for policy making*

559 From our comparison we can provide some insights why phasing out coal (and even refraining
560 from new investments) constitutes a substantial political challenge in all three countries. A
561 few lessons can be generalized and serve as potential entry points to learn about coal phase
562 out policies (and respective challenges how to implement them) that go beyond specific
563 country cases.

564 First, energy and hence coal is deeply intermingled with fundamental policy objectives, such
565 as economic growth, development, poverty eradication or energy security. Alternatives are
566 not convincingly serving those goals, be it out of technological skepticism (e.g. in Vietnam) or
567 economic realities, such as high upfront costs for renewable energy systems that are not
568 compatible with budget constraints or the political impossibility to increase electricity prices.
569 Providing energy cheaply and reliably is (often seen to be) decisive for political survival.

570 Second, coal receives significant political support from well-established networks and
571 interests with deep ties to policy makers. These dominate – at least in the current situation –
572 the influence of other actors that promote different policy outcomes. These dynamics are
573 reinforced by powerful regional players that have vested interests to promote coal. Regions
574 that benefit from coal (e.g. with regard to royalties or regional employment) frequently have
575 the power to shape national decisions, independent of their constitutional role. This might
576 require specific compensation policies to facilitate coal phase-outs.

577 In this regard, a dimension that might deserve further attention is the role of SOEs in the
578 formulation of climate and energy policies and shaping of energy markets. Highly regulated
579 power markets frequently favor (public) coal investments and disincentivize (private)
580 investments into alternatives. The existing literature implies that international support can
581 indeed foster reforms to change the political economy determinants in this respect (87).

582 It is interesting to note that our analysis does not suggest prominent roles for some factors
583 that might have be expected to be important beforehand. One example is political freedom
584 and the ability to conduct political discourses openly (88). Notably, there are important

differences in rights of people to express their opinions and conduct political discourses across the three countries. However, we find that public opinion (and resistance) to coal investments is taken into account by policy makers in all three countries and serve as an important constraint for decision makers at the top level. In this regard, in all three countries the (public demand) for cheap and stable electricity is apparently weighted higher than (often local) environmental concerns.

For the future, carrying out comparative analyses based on a large number of country case studies could help to further identify stylized facts and establish typologies of countries that are similar with regard to some aspects that matter for coal use. Such insights could help to structure the discussion on how to take into account the specific (institutional, economic and political) situation of particular countries when devising plans and policies to phase out coal.

5 From description to policy

Our framework enables a descriptive account of the political economy factors shaping climate and energy policy formulation. In this section, we discuss how it could help to assess the political feasibility of options for transitioning towards a low-carbon energy system. The political economy perspective adopted here deliberately departs from the 'first-best' thinking of neo-classical economics. Instead of asking which outcome would be socially optimal, it posits that those policies will be adopted that best fulfill the objectives of those actors that have the greatest say in policy-making. From this angle, the social optimum would only serve as a benchmark to which to aspire, and policymakers interested in implementing the social optimum (or states close to it) would need to consider policy packages (and possibly sequences of policies over time) that maximize the political feasibility under condition of real world power politics.

New actors supporting certain policy options could affect the balance of power and accelerate policy change. Examples include the participation of civil society in public discussions and decision making, as well as nascent 'green' industries that demand a change in energy policies. Policy makers can play an active role in this regard, e.g. by fostering the emergence of 'green' industries via means of targeted subsidies and regulations (29) – even if these may be less appealing in traditional welfare economic analysis.

In terms of underlying objectives, it is conceivable that external developments, such as technological progress or changing market conditions, allow for novel opportunities that broaden the option space for policy makers. For instance, declining costs for low-carbon energy sources permit to better meet some actors' demand for affordable energy supply. In a similar vein, the framework highlights the potential for previously not considered policy options, such as compensation schemes that ensure political buy-in of groups that would otherwise be negatively affected by climate policy. Given that climate policy is still a relatively new phenomenon and all relevant actor groups are part of a rapid learning process, there may be significant scope for increasing the politically feasibly policy space via innovative policy designs.

Regarding the context in which policy decisions are taken, institutional reforms can strengthen the political influence of some actors and weaken the influence of others. For instance, liberalization of the power sector would likely decrease incumbents' political power and provide opportunities for new entrants, and changes in the political system could allow a higher influence for green parties. Moreover, changing public attitudes can be expected to increase the demand for climate policies. Such change of attitudes could result from new scientific findings that increase the belief that climate change is a serious threat to human well-being, focusing events (such as hurricanes or smog episodes, see Karapin (45)), a transition to 'post-material values' (89) and more generally rising income and valuation of environmental protection.

Ideally, the information outlined above would be available in the form of a detailed toolkit for policy design in combination with examples from countries in which certain policies have been (un)successfully applied. Those interested in advancing clean energy policies could then aim at identifying those actors that exert the most resistance to policy change (such as key ministries, utilities, energy-intensive industries, or unions) as well as those that would likely welcome or even actively promote change (e.g. clean energy producers or NGOs). Options to alter outcomes for these actors include either alleviating negative impacts on objectives that matter for actors who would otherwise oppose policy change or promoting the objectives of supportive actors (or, most likely, a combination of both). Moreover, our framework could help to assess which institutional reforms would dampen the influence of some interest

groups while at the same time increasing the influence of others in a way that allows for low-carbon energy policies to be politically feasible.

6 Discussion and conclusions

Based on the idea that policy formulation can be understood as a result of demand from interest groups and supply by policy makers, this paper proposes the AOC framework to analyze political economy issues from the perspective of i) actors, ii) their underlying objectives, and iii) the context in which decisions are taken. Even though the AOC framework is sufficiently general to allow application in a broad range of political economy settings, our intention was to discuss how it can be used to analyze the formulation, implementation and enforcement of energy and climate policies. Eventually, the usefulness of this framework can only be demonstrated by means of practical application to carry out case studies in selected countries.

Using this theoretical basis to conduct a large number of country case studies in a collaborative research effort would lend the credibility of an established and tested approach to each individual study. For future research, we aim to put into place such a joint undertaking to further contribute towards building up an extensive database of country experiences that can be used for comparative analysis. A role model in this regard may be the case studies conducted under the Institutional Analysis and Development (IAD) framework, originally developed by Elinor Ostrom and colleagues (18). Rigorous comparative work would, for instance, help to better understand the reasons why countries in relatively similar situations appear to often adopt quite different energy and climate policies. The varieties of capitalism literature offers inspiration in tems of in establishing a novel research field for comparative study of policy fields (90). Techniques to carry out systematic reviews and meta-analyses that are common in other areas but have only rather recently gained prominence in research on energy and climate policy may offer valuable methodological inputs for this kind of analysis (91).

Within such a broader research effort the framework allows to formulate hypotheses and test them in single-country as well as comparative case studies. While we leave it for further work to develop and test specific hypotheses, these may feature climate and energy policy choices (e.g. type and level of ambition of policies) as dependent variables and consider relationships among various independent variables identified by the framework. Formulation and testing of hypotheses can proceed by both deductively drawing on existing political economy theory in the field, as well as inductively using pioneer case studies applying the framework to

formulate new hypotheses that can then be tested, refined, and expanded in further empirical applications. Another interesting analogy in this respect is the Advocacy Coalition Framework, which has been used to develop and test hypotheses about policy change processes for more than two decades (92).

With regard to value of the framework for policy-makers, a closer understanding of the political economy of climate and energy policy would also facilitate the design of politically feasible policies. That is, it could inform building 'winning coalitions' in favor of climate policies, while at the same time pre-empting political resistance by powerful interest groups that might oppose the implementation of such policies. We hope that by developing the framework and research program proposed in this paper, such efforts might build on a more robust empirical and conceptual scientific basis than what is currently available.

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Appendix: A simple formalization of the AOC framework

The AOC framework can easily be formalized, which is helpful for further explicating key analytical categories and their relationships. This exposition should not be regarded as a full-fledged model. Rather, it illustrates the basic idea that actors use their political influence to support policies that best meet their objectives.

Let there be a number of *a* relevant *policy objectives* that matter for *societal and political actors*, denoted by O_1^S to O_a^S and O_1^P to O_b^P, respectively. The *context factors* are labeled C_1 to C_c, and the objective functions of societal and political actors G_1^S to G_d^S and G_1^P to G_e^P, respectively. Finally, we assume that the objective functions of all political actors can be aggregated into a *policy support function J*, and that the *policy packages* P_1 to P_f will be chosen that yields the maximum political support at a given point in time, i.e. results in the maximum value of *J*.

Each societal actor's objective function *G* can be expressed as a weighted sum of all policy objectives (if a policy objective does not matter for a certain actor, the respective weight becomes zero). The weight α_{ik}, which states the importance of policy objective *k* for societal actor *i*, can then be expressed as a function of the context factors *F*, i.e. as $\alpha_{ik}[C_1, \dots, C_c]$. The objective function of societal actor *i* can hence be written as:

$$G_i^S = \sum_{k=1}^{a} \alpha_{ik}[C_1, \dots, C_c] O_k^S \quad (1)$$

In a similar vein, we regard each political actor's objective function to depend on two factors: first, on their idiosyncratic objectives, such as ensuring reelection or increasing influence, where the weight political actor *i* puts on objective *k* is given by β_{ik}. Second, we regard societal actors as influencing political actors, such that the objective function of each social actor *k* enters the objective function of each political actor *i* with weight γ_{ik} (if an objective or societal actor is not relevant for a certain political actor, the respective weight is zero). We can again express both these weights as functions of the context factors *F*, i.e. as $\beta_{ik}[C_1, \dots, C_c]$ and $\gamma_{ik}[C_1, \dots, C_c]$::

$$G_i^P = \sum_{k=1}^{b} \beta_{ik}[C_1, \dots, C_c] O_k^P + \sum_{k=1}^{d} \gamma_{ik}[C_1, \dots, C_c] G_k \quad (2)$$

Finally, let us assume that all political actors' objective functions G^P can be aggregated into a political support function *J*. This political support function captures, in a very stylized manner, how power struggles are conducted and deals are brokered between political actors. We express *J* as a sum of interests weighted by each political actor's political power. We allow the weights δ to be functions of the context variables C, i.e. the degree to which the interest of political actor *k* influences policy decisions is given by $\delta_k[C_1, \dots, C_c]$:

$$J = \sum_{k=1}^{e} \delta_e[C_1, \dots, C_c] G_k^P \quad (3)$$

As each G_k^P is a function of the context factors *C* and societal actors' objective functions G^S, which in turn are functions of the context factors *C* as well as societal and political actors' objectives O^S *and* O^P, *J* can be expressed as a function of the objectives and the context factors, i.e.:

$$J = J[O_1^S, \dots O_a^S, O_1^P, \dots, O_b^P, C_1, \dots, C_c] \quad (3')$$

We denote the set of *f* possible policies (in the sense of policy packages that combine different instruments, such as taxes, subsidies, performance standards, transfer payments) that can be implemented by P_1 to P_f. Each policy will result in a specific outcome for each of the objectives of societal and political actors, i.e. O^S *and* O^P. These objectives can hence be written as functions of the policy in place, i.e. $O_1^S(P), \dots O_a^S(P)$ and $O_1^P(P), \dots O_b^P(P)$. Then, the policy P^* that receives the most political support under the constraint of a given set of context factors and a specific constellation of societal and political actors *C* will be adopted:

$$p^* = \underset{p}{\operatorname{argmax}} J[O_1^S(P), \dots O_a^S(P), O_1^P(P), \dots O_b^P(P), C_1, \dots, C_c]. \quad (4)$$