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Advocacy coalitions in the acceleration phase of the European energy transition

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ABSTRACT

Actors play a key role in promoting or hindering sustainability transitions and their positions and the coalitions they form may adjust during this long-term process. Literature widely recognizes the importance of coalitions to create legitimacy and build support for sustainability transitions. The question of how coalitions change in the third, acceleration phase of a transition has, however, remained insufficiently explored. This paper analyses advocacy coalitions in the acceleration phase of the European energy transition and sheds light on the dynamics between niche and regime level actors when the transition is already well underway. Whereas earlier studies identified one renewable energy coalition, we find three distinct coalitions in the EU's electricity policy system that support the transition but with preferences for different policy instruments. Our study shows that rather than coalition decline and growth, the ongoing development involves the emergence of new coalitions and new alliances between them.

Introduction

Sustainability transitions have been conceptualized as long-term processes of change that typically proceed through three or four phases (Geels, 2019; Safarzyńska et al., 2012; Schot and Kanger, 2018; Verbong and Loorbach, 2012). The first phases are the pre-development and up-scaling phases, in which new technologies occur and momentum builds up. Most scholars posit that this is when niches occur and niche protection and nurturing will be particularly important. The third phase has been termed the acceleration or diffusion phase and denotes the point of time when the market uptake of the new technology or practice expands and accelerates[2]. Finally, a fourth stabilization phase occurs when a new dynamic equilibrium is reached.

Numerous scholars have applied such a multi-phase concept when analyzing transitions, yet less attention has been devoted to the question of how the political dynamics and advocacy coalitions change throughout the different phases. In spite of a surge in studies of politics and policy within sustainability transitions in the last few years (Köhler et al., 2019), only a few have empirically explored the political dynamics that play out in more advanced transition phases (Kanger and Schot, 2016; Kivimaa et al., 2019).

Actors (e.g. companies, associations and NGOs) play a crucial role as they try to enable and speed up sustainability transitions or slow them down. To advance their cause, actors build coalitions, mobilize resources and try to influence the public opinion. Although the importance of coalitions within sustainability transitions is widely recognized (Hekkert et al., 2007; Hess, 2014; Jacobsson and

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[2] For simplicity, we will use the term 'acceleration phase' throughout the article.

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Lauber, 2006; Roberts et al., 2018), only a couple of studies have looked at how coalitions change over time (Markard et al., 2016; Schmid et al., 2019). Indeed, the role and formation of advocacy coalitions in the acceleration phase of sustainability transitions is still insufficiently researched. The literature on sustainability transitions generally posits that there will be one "technology-specific advocacy coalition" (Jacobsson and Lauber, 2006) that supports the transition. This coalition is hence associated with the niche level of the socio-technical system and opposes the coalition(s) that represents the socio-technical regime. The niche concept denotes a protected space for immature technology and contrasts with the regime level, which represents the established technologies. However, this dualistic approach to coalitions on the niche versus regime level is most representative for a transition in its early stage when the niche is still clearly separated from the regime. While incumbents often take an opposing stance towards new, so-called niche technologies in early transition phases, recent studies show that incumbents can also play a more proactive role in transitions (Berggren et al., 2015; Steen and Weaver, 2017)

Recent work on competing transition pathways suggests that the advocates of a transition might be a more diverse group of actors possessing very different views on several aspects of a transition, including policy design and system configuration (Lilliestam and Hanger, 2016; Lindberg et al., 2019). While scholars posit that some incumbent chose to "enter the niche" in a sustainability transition (van Mossel et al., 2018), we know little about how the shifting strategies of key actors affect the formation of advocacy coalitions in more advanced phases of sustainability transitions. Therefore, this paper asks: What are the main advocacy coalitions in the acceleration phase of the European energy transition?

We take the EU's electricity policy during the negotiations of the Clean Energy Package in the period 2015-2016 as a case of an energy transition which has advanced into the acceleration phase. In 2015, wind accounted for 10% of the total electricity generation in the EU 28, whereas solar PV accounted for 3% (IEA, 2021).

By studying coalitions in the acceleration phase, the paper contributes to shedding light on how technological development affects the policy preferences and beliefs of key actors, which again will influence politics and policy. In general, the effect of technology on politics is not yet sufficiently understood in the literature (Schmidt and Sewerin, 2017). This "technology-politics feedback link" (Schmidt and Sewerin, 2017) will first become visible in the acceleration phase when the new technology has gained improved cost-competitiveness and becomes more mature. Assessing coalitions in this phase enables us to observe the changes in the policy system at a stage of the transition when technological change has already altered the previously stable socio-technical system.

Earlier studies on EU energy policy found that there were three main coalitions within the EU's electricity policy in the first phases of the transitions: The energy-intensive industry coalition, the utilities coalition and the environmental/renewable energy coalition (Boasson and Wettestad, 2013; Gullberg, 2013; Ydersbond, 2014, 2018). Moreover, these advocacy coalitions in the policy subsystem had clearly distinct preferences regarding renewable energy policies and targets. These findings are valuable in describing the previous coalitions and show that in the early phase of a transition, the same types of actors form individual coalitions. However, as transitions advance, and some utilities engage more strongly with renewables than others, it is important to trace the positions and policy beliefs of each individual actor. Our structural assessment documents important lines of distinction also within certain actor types. This provides novel empirical insights about how niche-regime dynamics play out in advancing transitions and contributes to enriching the literature on niche-regime interaction in different phases of sustainability transitions (Geels and Schot, 2007; Smith and Raven, 2012).

A main finding is that the coalition structure in the electricity policy system has changed significantly compared to earlier phases. We now observe five advocacy coalitions, where the "utilities coalition" and "renewable energy coalition" have each split into two distinct coalitions, with the energy-intensive industry remaining largely unchanged. This shows that advancing transitions are not strictly a "for-or-against" battlefield but are becoming increasingly pluralized. The advocates of renewable energy are no longer a unified group with harmonized preferences and beliefs. Instead, we identify important distinctions, both within groups of established incumbents and groups of actors previously considered 'niche actors'. Our analysis suggests that the coalitions can no longer be classified as either niche or regime in the advanced, acceleration phase of a transition. Instead, we show how some renewable associations and some progressive incumbents work actively to create the new, emerging regime.

The paper is structured as follows. We continue the paper in section 2 by discussing the transitions literature and the role of coalitions and incumbent actors in various phases of transitions. Also, we briefly lay out the theoretical foundations of the Advocacy Coalition Framework (ACF) before we establish our hypotheses. In section 3, we present the empirical setting and account for policy developments over the past decade. Section 4 describes the methods for determining our sample and identifying policy core beliefs, which builds largely on the ACF. Section 5 presents the results of our analysis. Section 6 discusses the relevance of our contributions for the Multi-Level Perspective (MLP) and the broader transitions literature. Section 7 concludes.

Theory

The phases of sustainability transitions

The Multi-Level Perspective has proven very useful as a theoretical framework for analyzing historical and ongoing transitions. Originating from innovations theory, the MLP conceptualizes a transition as a dynamic process in which there is a shift or transformation of the dominant regime within a specific socio-technical system. (Geels, 2002, 2004a; Verbong and Loorbach, 2012) Since the transition within a given sector includes changes not only in technology, but also in institutions, practices, values and cultural meanings, the term "socio-technical system" is used to represent the interrelatedness of all these elements (Geels et al., 2004).

Table 1
Transition phases and their descriptions

Articles	PHASE 1	PHASE 2	PHASE 3	PHASE 4
Rotmans et al. (2001) Safarzyńska et al. (2012)	predevelopment	take-off	acceleration	stabilization
Verbong and Loorbach (2012)	predevelopment	take-off	reconfiguration or acceleration	stabilization
Kanger and Schot (2016); Schot and Kanger (2018)	Start-up		acceleration	stabilization
Geels (2019)	experimentation	stabilization	diffusion, disruption	institutionalization, anchoring
Kivimaa et al (2019)	pre-development and exploration phase	destabilization (can precede or follow acceleration)	acceleration and embedding phase	stabilization

The MLP distinguishes between three analytical levels for describing and explaining technological change: the landscape, regime and niche levels. The socio-technical regime is the "deep structure" of a socio-technical system and consists of the dominant institutions, practices, paradigms and economics that guide the activities within the system (Geels, 2011). The 'landscape' serves as an external context for actors in regimes and niches, and is more difficult to change than the other levels (Geels, 2004b). The term 'niche' has its origin in innovation literature, where it refers to a space that is protected from normal market selection (Kemp et al., 1998). Niches in sustainability transitions both protect and nurture radical innovations and empower niche actors to press for institutional change in incumbent regimes (Smith and Raven, 2012). Regimes typically generate incremental innovations, while radical innovations are generated in niches (Geels, 2004b). A large body of literature points to the importance of specific policies and market shielding to help new technology reach market maturity (Raven et al., 2016).

Transition scholars describe the advancement of a transition as involving three or four consecutive phases (Geels, 2019; Rotmans et al., 2001; Safarzyńska et al., 2012; Schot and Kanger, 2018; Verbong and Loorbach, 2012). See Table 1 for an overview of the phases and their descriptions in the literature. Phase 1 is the experimentation or predevelopment phase, where radical technologies are tested in laboratories and demonstration projects. In the second take-off phase, the innovation technology stabilizes into a dominant design, often helped by market niches. Other scholars conceptualize both of these initial phases as one uninterrupted start-up phase (Schot and Kanger, 2018) whereas Kivimaa et al. (2019) posit that niches start to build up in the acceleration and embedding phase.

Our focus in this paper is on the third phase when the niche is growing and gaining larger market shares. Geels defines this as the diffusion and disruption phase in which "the radical innovation diffuses into mainstream markets" (Geels, 2019, p. 6). Here, niche-innovations gain internal momentum, which again triggers adjustments in the existing system (Geels et al., 2017). This requires that the innovations have improved and matured to such an extent that they start to compete with existing technologies. Other transition scholars call this the reconfiguration or acceleration phase (Safarzyńska et al., 2012; Verbong and Loorbach, 2012, p. 10). In this paper, we use the term "acceleration phase". As niches expand, existing institutions are incrementally redefined. Verbong and Loorbach (2012) describe the regime shift at the end of the acceleration phase as a process where "elements of the old regime and novel elements are combined to form a new dominant regime" that eventually enters a fourth phase of stabilization. In this period, the dichotomy between niche and regime disappears and some niche actors turn into new regime actors (Kivimaa et al., 2019).

The acceleration phase is characterized by struggles on multiple dimensions. Here, the niche threatens the regime in a different way than previously. There is economic competition between new and existing technologies, business struggles between new entrants and incumbents, political conflicts and cultural and discursive struggles (Geels, 2019). The struggles in this phase arise when further diffusion of new technologies implies decreasing market shares for existing technologies and companies. Often, the new technologies require some changes in infrastructure and system reconfiguration and these needs will increase along with the growth in market shares (Lindberg et al., 2019; McMeekin et al., 2019). This again harbors considerable potential for new conflicts.

The transitions literature has increasingly recognized that incumbents react differently to transition processes. However, the different strategies of incumbents have not yet been explicitly linked to the different phases of the transition, to which we turn next.

The role of incumbents

The transitions literature often conceptualizes the incumbents as the dominant actors within a regime. Actors that are deeply involved in the regime will react to the threat of an emerging niche and embark on different strategies to maintain their positions in the socio-technical system.

In early transition phases, incumbents are inherent representatives of the regime level. Coming from the innovation studies literature, where the focus is on the emergence and upscaling of innovations, the literature on sustainability transitions has been overly occupied with the dynamics of early phases of transitions (Turnheim and Sovacool, 2020). Incumbents will initially have a reluctant and hostile stance toward new, radical innovations, as they challenge their existing business models. Not surprisingly, many studies have documented how incumbents resist change and try to prevent policies for promoting transitions (Hess, 2014; Jacobsson and Bergek, 2004; Stirling, 2014). Geels (2014) explicitly speaks about "incumbent regime actors" and elaborates on their strategies to resist change. He highlights the proximity of regime actors to policy makers and how this provides incumbents with ample possibilities to influence politics (Geels, 2014).

Recent studies find that incumbent firms can take a proactive role in the transition (Berggren et al., 2015; Steen and Weaver, 2017). Hence, there is increasing interest around the ability of incumbents to change and whether and how they can act as a driving force, particularly in the more advanced phases of transitions. See Turnheim and Sovacool (2020) for a review of incumbency in the transitions literature.

Drawing on organizational theory, scholars have identified four main strategies that incumbents pursue to cope with ongoing changes in the socio-technical system during a transition. These are "first to enter niches", "follow into niches", "delay the transition" and "remain inert" (van Mossel et al., 2018). Various organizational theories suggest that these strategies will relate to incumbent characteristics. For example, firms that are first to enter niches might have a high amount of slack according to behavioral theory[3], while the resource-based view suggests that they have dynamic capabilities and "excess resources that can be exploited in a niche" (van Mossel et al., 2018). Note that these are mainly theoretical propositions, and that these strategies are not yet empirically documented.

Coalitions in transitions

In the first phases of sustainability transitions, actors engaging with new technology need to organize in what Jacobsson and Lauber (2006) have called "technology-specific advocacy coalitions" to build a broader constituency behind a specific technology. Referring to the work of Sabatier (1998), Jacobsson and Lauber conceptualize advocacy coalitions as made up of a range of actors sharing a set of beliefs that compete in influencing policy. To promote specific types of technology, such coalitions must engage in political debates and gain influence over institutions. Advocacy coalitions have an important role as to creating legitimacy for a new technology; they put it on the political agenda and lobby for resources and favorable policy regulations (Hekkert et al., 2007). Several empirical studies of energy transitions in various countries or regions illustrate the importance of coalitions for promoting renewable energy (Hess, 2014; Leiren and Reimer, 2018; Negro et al., 2007; Stokes, 2013).

In an advancing transition, the niche becomes stronger and more embedded in the socio-technical system. As a result, its technology-specific advocacy coalition will become more influential in the policy subsystem (Jacobsson and Lauber, 2006). In their study of coalitions in the Swiss energy transition, Markard et al. (2016) identify two main coalitions within Swiss energy policy, which broadly correspond to a niche and a regime coalition. Over the course of a decade, the minor (niche) coalition has grown and the two coalitions are approaching each other. In the same vein, Schmid et al. (2019) have assessed coalitions in the German transition. They find that some actors have left either the coal or nuclear coalition and entered the renewable energy coalition. Hence the latter has grown over time.

A more recent study by Kammermann and Ingold (2019) assesses preferences of actors in the acceleration phase of the Swiss energy transition. The study unveils diverging preferences among utilities because of 1) their different asset portfolios and 2) because the commercially viable potential for renewables varies across regions.

Breetz et al. (2018) study how political coalitions change along different stages of the 'experience curve'. The experience curve refers to the inverse relationship between production costs and cumulative production quantity. This can largely be transposed to represent the phases in transitions. The top of the experience curve corresponds to the first two phases of experimentation and market formation, where costs are high, while the middle of the curve corresponds to the acceleration phase when technologies become increasingly cost competitive. At this stage, incumbent industry may feel threatened and might therefore start opposing the transition more vigorously than earlier (Breetz et al., 2018). Thus, the conflict between advocates for new technology and incumbent industries becomes more prominent. The last stage features cost-competitiveness between new and incumbent technology[4]. This means that there is a new role for policy and politics. Some technologies will continue their market expansion although subsidies are phased out, implying that this type of market protection becomes obsolete. In other cases, various measures are needed to address system-level challenges that require new forms of managing the system or complementary technologies and infrastructure.

The Advocacy Coalition Framework

To identify the main coalitions in the policy system, we use the advocacy coalition framework (ACF) as a tool. The ACF maintains that actors with similar beliefs form alliances that affect the output of the policy process. During the past few decades, the ACF has been applied several times to EU policy. Even though the ACF was primarily developed as a framework for studies at national levels, numerous contributions have shown the validity of using it to identify coalitions within various EU subsystems (Feindt, 2010; Nedergaard, 2008; Nohrstedt, 2013; Weber and Christophersen, 2002).

The purpose of the ACF is to explain major policy change (Sabatier, 1987). The underlying assumption is that actors who share similar policy beliefs join loose coalitions through which they influence the policy process. Changing beliefs may cause coalitions structures to change and thus influence the policy output of a political process.

[3] Van Mossel et al (2018) define organizational slack as a pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output, which buffers a firm against environmental change and variations in performance.

[4] We would like to mention that cost-competitiveness is a contentious notion that depends on a series of factors, including a level playing field, infrastructure and access to finance. See discussion in Gu Choi et al. (2015) about these factors for the electricity sector.

The ACF approach defines advocacy coalitions as "actors sharing policy core beliefs who coordinate their actions in a nontrivial manner to influence a policy subsystem" (Jenkins-Smith et al., 2014). The policy subsystem represents the formalized process of policy making. Policy subsystems are characterized by topic, territorial area, and stakeholders. They usually consist of a variety of participants that engage in a topic at the national, sub-national and international level (Jenkins-Smith et al., 2014). In this paper, we consider EU electricity policy as our demarcated policy subsystem.

According to the ACF, policy core beliefs represent the fundamental normative commitments, causal perceptions and value priorities across a policy domain (Sabatier, 1998). Examples of policy core beliefs that we use in this paper are the orientation of actors as to i) the seriousness of the problem, ii) proper distribution of authority between government and market, iii) the proper distribution of authority among levels of government and iv) the priority accorded various policy instruments. Sabatier (1998) lists these as potential policy core beliefs and we identified them as relevant categories in our data set (see section 4 for more information about how we arrived at the empirical policy core beliefs). Policy core beliefs can be mapped onto so-called belief dimensions, which have been described extensively both theoretically and empirically (see e.g. Kammermann and Angst, 2020; Markard et al., 2016; Sabatier, 1998). Belief dimensions are a spectrum of attitudes on a specific topic, such as whether economic or environmental aspects should be prioritized in the infrastructure sector (Weible et al., 2015); whether the state or the market should intervene in the subsystem (Kammermann and Angst, 2020); or whether a policy focus should be on energy efficiency or energy production (Rosenow et al., 2017). An account of the translation of the policy core beliefs to the belief dimensions and to our empirical subsystem is provided in Table 4. Policy core beliefs can be translated into secondary aspects, which reflect actors' preferences for specific options, e.g., policy instruments, budgetary allocations and other tangibles (Kammermann and Angst, 2020; Weible et al., 2015).

In this study, we focus on interest organizations as coalition members. Previous studies have found the focus on interest organizations to be a fruitful approach for applying the ACF to the EU level (Weber and Christophersen, 2002). This matches our research interest in exploring the characteristics of advocacy coalitions in the acceleration stage of the EU energy transition.

Coalitions in the early phases of the European energy transition

Several studies have documented the coalitions within EU electricity policy in the predevelopment and take-off phases of the European energy transition. In 2008-2009, which was the period preceding the adoption of the 2020 Climate and Energy Package, scholars identify two main coalitions in the electricity subsystem: the established electricity industry (i.e. the utilities) and a broad RE coalition of green organizations, especially the RE industry (Boasson and Wettestad, 2013; Gullberg, 2013; Toke, 2008; Ydersbond, 2014). These two coalitions opposed each other regarding the steering method of renewable energy deployment, i.e., the 'technology development versus market' dimension (Boasson and Wettestad, 2013). The manufacturing industry largely supported the utilities, but they did not play a critical role in this process as their focus was on the Emissions Trading Scheme (ETS) (Nilsson et al., 2009). The RE coalition advocated strongly for binding RE targets (Gullberg, 2013) and for RE policies to be designed according to principles of technology development, i.e. national, technology-specific support schemes where developers receive a fixed remuneration for their production. The established electricity industry had a strong preference for a harmonized Single European Market policy and tried to prevent the possibility of member states developing their own, national renewable policies (Boasson and Wettestad, 2013). Further, they strongly opposed binding renewable energy targets, both on the EU-level and for member states (Gullberg, 2013). Their preferred policy solution was an EU-wide market-based support scheme (i.e. a green certificate scheme), which had proven much less successful in triggering renewable energy deployment (Cointe and Nadaï, 2018). This was one of the most contentious discussions during the 2020 Framework.

The literature documents the inferior position of the RE coalition in this period. The renewable energy industry was far smaller than the economically powerful electricity industry in Europe. Yet the RE coalition successfully mobilized their resources and managed to achieve their preferred policy solution (Gullberg, 2013; Toke, 2008). The 2009 RE directive is dominated by instruments adhering to the 'technology development' principle. Boasson and Wettestad (2013) hence compared the outcome of this policy process to "David beating Goliath".

Scholars have found that the same coalitions persisted until 2013-2014, when the 2030 Framework was negotiated. Ydersbond (2018) applies the advocacy coalition framework to distinguish three main advocacy coalitions in this period and identifies the energy-intensive industries as forming a coalition of their own. Policy core beliefs of the green coalition were strong climate and RE targets, rapid climate action, and reformation of the energy system to enable full decarbonization by 2050. The electricity industry also had rather pronounced climate beliefs – they had developed a strong preference for the ETS as the primary instrument for decarbonization and they preferred market solutions to the climate problem. The energy-intensive industry perceived climate change as less urgent and a topic that should be handled in the context of other problems such as competitiveness and unemployment. They too preferred market-based solutions. However, they perceived the ETS as functioning well. As to the policy preferences of these coalitions in this period, the green coalition advocated distinct RE support schemes and that RE policies should co-exist with other measures in the EU policy mix. The utilities wanted the ETS to be main policy instrument and advocated abolition of RE support, which they claimed was distorting the electricity market (Lindberg, 2019). According to Fitch-Roy (2017) both the utilities and energy-intensive industries promoted the ETS and highlighted the negative interactions with RE policies as an argument against distinct RE targets and measures.

A few years later, in the negotiations for the Clean Energy Package and the revised Renewable Energy Directive, some utilities have shifted their policy positions and express their preference for continued renewable energy support (Lindberg, 2019). As mentioned earlier, we conceptualize this period as the acceleration phase of the European energy transition. Moreover, an important distinction between actors preferring a centralized versus decentralized transition pathway can be observed in the same period (Lindberg et al., 2019).

The main takeaways from these studies are that early transition phases exhibit a) large degree of consensus among the same types of actors, b) the traditional 'incumbent versus newcomer' pattern and c) a preference for technology-specific support among niche actors and for technology-neutral policies, including the ETS and an EU-wide renewable support scheme, among established regime actors. In the acceleration phase, we expect larger diversity among actors, resulting in greater variation in policy preferences and beliefs for actors supporting the transition.

Hypotheses

Transition scholars posit that there will be one main advocacy coalition associated with the niche-level in a socio-technical transition (Markard et al., 2016; Roberts and Geels, 2019). Jacobsson and Lauber (2006) refer to such niche-innovation coalitions as "technology-specific advocacy coalitions" since their main function is to create legitimacy and political support for the new technology (Hekkert et al., 2007). We use these propositions to develop our first hypothesis:

H1: In sustainability transitions, there will be one main coalition that represents the niche level, which clearly contrasts with the advocacy coalition(s) of established actors (regime).

Building on the proposition that incumbents will either enter niches or resist them, we expect that actors who venture into niche technologies also join the technology-specific advocacy coalition that advocates further expansion of this specific technology. As outlined above, scholars have identified four main strategies that incumbents pursue to cope with ongoing changes in the socio-technical system during a transition (van Mossel et al., 2018). In our analysis, we use the policy core beliefs as an indicator of the various actors' respective strategies. Our second hypothesis thus reads:

H2: Incumbents that pursue either one of the strategies 'first to enter niche' or 'follow into niche' will also join the (technology-specific) niche coalition.

As the transition advances into the acceleration phase - or the middle of the cost experience curve - scholars posit that this period will be characterized by more conflict and struggles on multiple dimensions (Breetz et al., 2018; Geels, 2019). When the new technologies gain market share, they also generate more political controversy as the need to also phase-out certain elements of the socio-technical system becomes more obvious. Recent studies of the European energy transition suggest that there is now more disagreement about the direction of the transition than whether it should take place at all (Lindberg et al., 2019). Our third hypothesis hence contradicts the first two hypotheses and expects that increasing conflict will involve new distinctions also within previous coalitions:

H3: In the acceleration phase of sustainability transitions, there is increasing conflict among actors also on the niche level, manifesting as new distinctions within previously harmonized coalitions.

Context: European electricity policy

Our empirical focus is on European electricity policy, which we consider as a policy subsystem within European energy and climate policy. This section provides a brief overview of main developments within European energy and climate policy in the period 2008-2019.

The main technologies in the European energy transition are wind and solar. Recently, scholars have questioned whether these technologies are still 'niche technologies', as their cost levels have decreased and they are acquiring regime characteristics (Kirshner et al., 2019; Strauch, 2020). In our analysis, we focus on the years 2015-2016 in which these technologies were expanding rapidly, but still represented considerably smaller market shares than established generation technologies. In 2015, wind accounted for 10% of the total electricity generation in the EU 28, whereas solar PV accounted for 3% (IEA, 2021). In line with the conceptualization of Geels et al. (2017) we therefore consider wind and solar as niche-innovations that gain internal momentum at this point in time.

European legislation on energy and climate is organized within different 'packages', which consist of a set of directives, regulations and specific targets. In 2008-2009, the EU adopted two distinct packages: the 'third energy package' and the '2020 climate and energy package'. Both packages placed strong provisions on the electricity sector. The third energy package provided guidelines for the liberalization of the electricity sector and the introduction of the internal electricity market in the EU, primarily through the electricity market directive 2009/72/EC and the electricity market regulation 714/2009. The 2020 climate and energy package aimed at ensuring decarbonization and renewable deployment, and intervened strongly in the electricity sector through the renewable energy directive 2009/28/EC (Skjærseth et al., 2016).

In 2014, the EU adopted the '2030 Energy and Climate Framework', which established policy targets for GHG emission reduction, renewable energy and energy efficiency by 2030. The framework was highly relevant for the electricity sector because a distinct target for renewable energy necessitated continued deployment of renewables and reconfiguration of the sector.

In the wake of the '2030 Framework', the European Commission started preparations for the Clean Energy Package (CEP). The package gathers the legislation on energy, electricity and climate into one single 'policy package'. The electricity policy negotiations for the CEP spanned several issues, including RE support, cross-border trade, harmonization of national regulations and market design. High on the agenda was the endeavor of revising the current electricity market regulation to provide "a market fit for renewables"

Table 2
List of actors in the cluster analysis by actor type

Electricity producer associations	CEDEC, Eurelectric, Foratom, CEEP (4)
Utilities	EDF, Enel, Eon, Iberdrola, RWE, Statkraft, Total, Dong (Ørsted), Vattenfall, Fortum, CEZ (11)
Traders and exchanges	Europex, EFET (2)
System operator associations	EDSO, Entso-E (2)
RE industry associations	BEE, EREF, EWEA (WindEurope), SolarPower Europe (4)
Storage and smart energy associations	EASE, BNE (2)
Environmental NGOs	CAN, Greenpeace, WWF, E3G (4)
Industry associations	BusinessEurope, CEFIC, Eurochambers, IFIEC (4)
Technology companies	General Electric (1)

Table 3
Policy core beliefs – four coding dimensions

Main coding belief dimensions	Policy core beliefs – theoretical propositions (Sabatier, 1998)
1 - The role of the market	proper distribution of authority between government and market
2 - State intervention (regulatory policy)	proper distribution of authority between government and market, AND priority accorded to various policy instruments.
3 - EU harmonization vs national state	proper distribution of authority among levels of government
4 - Climate Change	the seriousness of the problem

(European Commission, 2015). This reflected the need to reconfigure the electricity system to accommodate for increasing shares of variable renewable energy. While the negotiations preceding the '2020 climate and energy package' were dominated by discussions concerning renewable energy support and the ETS, electricity market regulation became a more prominent and highly contested issue in the CEP negotiations (Purchala, 2019)[5]. Also, there were large discussions about whether measures for market protection like priority dispatch and exemptions from balancing responsibilities should be still allowed – and if so for whom. After several years of negotiation, the various legislations in the CEP were adopted in 2018-2019.

Tracking the stepwise processes for all these policy outcomes is beyond the scope of a single paper. Instead, we explore the overall pattern of policy core beliefs for the key actors involved in these policy processes.

Methodology

To identify advocacy coalitions, we carried out a cluster analysis based on the policy core beliefs of influential actors in the European electricity policy system. The ACF postulates advocacy coalitions are made up of actors that share policy core beliefs and coordinate their activities in a non-trivial manner. However, in the sustainability transitions literature, several studies focus on the first criteria of shared beliefs and do not account for degree of cooperation (e.g. Jacobsson and Lauber, 2006; Markard et al., 2016). In this study, we identify coalitions based on a structured assessment of policy core beliefs, where closeness in beliefs on several belief dimensions qualifies as participation in a coalition. Given that these actors are active in the EU energy and policy community, we know from the literature that many of these actors coordinate their policy positions (Fitch-Roy, 2017; Ydersbond, 2018). We therefore argue that it is valid to document coalitions based on shared beliefs.

Data and sample

The data for our analysis are the responses to two consultation processes carried out by DG Energy for the Clean Energy Package in 2015-2016. The consultation 'New Energy Market Design' collected input to the revision of the Electricity Market Directive (EMD) and the electricity market regulation, whereas the consultation 'New Renewable Energy Directive for the period after 2020' concerned the revision of the Renewable Energy Directive (RED). Both consultations were general enough to touch upon many different aspects associated with the energy transition and both received a high number of submissions. In section 5, the abbreviations of these two directives specify to which consultation process the quotes belong.

The sample of influential interest organizations was identified through the reputational approach (French, 1969) by means of an expert group[6]. Table 2 lists the 34 actors in the final sample by actor types. For a detailed description of the data and sample selection for the cluster analysis, see appendix B.

Identifying policy beliefs

To analyze the policy core beliefs for the electricity policy sub-system, we created a coding scheme (Jenkins-Smith et al., 2014; Markard et al., 2016). This was an iterative process, which switched between theory and thorough assessment of the data available in

[5] Note that there were also negotiations around market regulation during the third energy package. However, the discussions in the CEP were more strongly linked to the transition and included issues like capacity mechanisms versus scarcity pricing and bidding zone configuration.

[6] The expert group comprised people with different roles (scientists, interest organizations, administration officials, consultants)

Table 4
Policy core beliefs – calibration of dimensions in coding of statements

Main dimensions	Coding values
1 - The role of the market	1 - 1 = Only market(s) can solve the problems ahead. Market-based solutions should always have priority. A proper market will fix most problems. 1 - 2 = Markets can deal with most problems but not with all. We should enhance market forces. 1 - 3 = The power of the market is limited. There are several issues that cannot be addressed by markets. 1 - 4 = Markets cannot solve the problems. Alternative ways of intervention are necessary.
2 - State intervention (regulatory policy)	2 - 1 = Policy measures and instruments are dysfunctional and harm the economy. 2 - 2 = Policy measures and instruments might be necessary in some cases or fields, but they should be kept at a low level. 2 - 3 = Policy measures and instruments can and have to address most of the problems but not all. There is room for alternatives. 2 - 4 = Policy measures and instruments are key. Current problems can only be solved by strong government intervention.
3 – Regionalization vs national state	3 - 1 = We need a harmonized energy policy and market. All MSs should adjust to EU rules and directives with little national leeway. 3 - 2 = We should aim for a rather harmonized energy policy 3 - 3 = National policies and differences are necessary to some extent 3 - 4 = MSs should still have the final word when it comes to their national energy policy.
4 - Climate Change	4 - 1 = Climate change is not that important, and hence not among our upper priorities. Economic development should come first. 4 - 2 = Climate change is an important issue alongside other targets. 4 - 3 = Climate change is an important issue that we need to prioritize. 4 - 4 = Climate change is of the highest priority and we should do everything feasible to mitigate it.

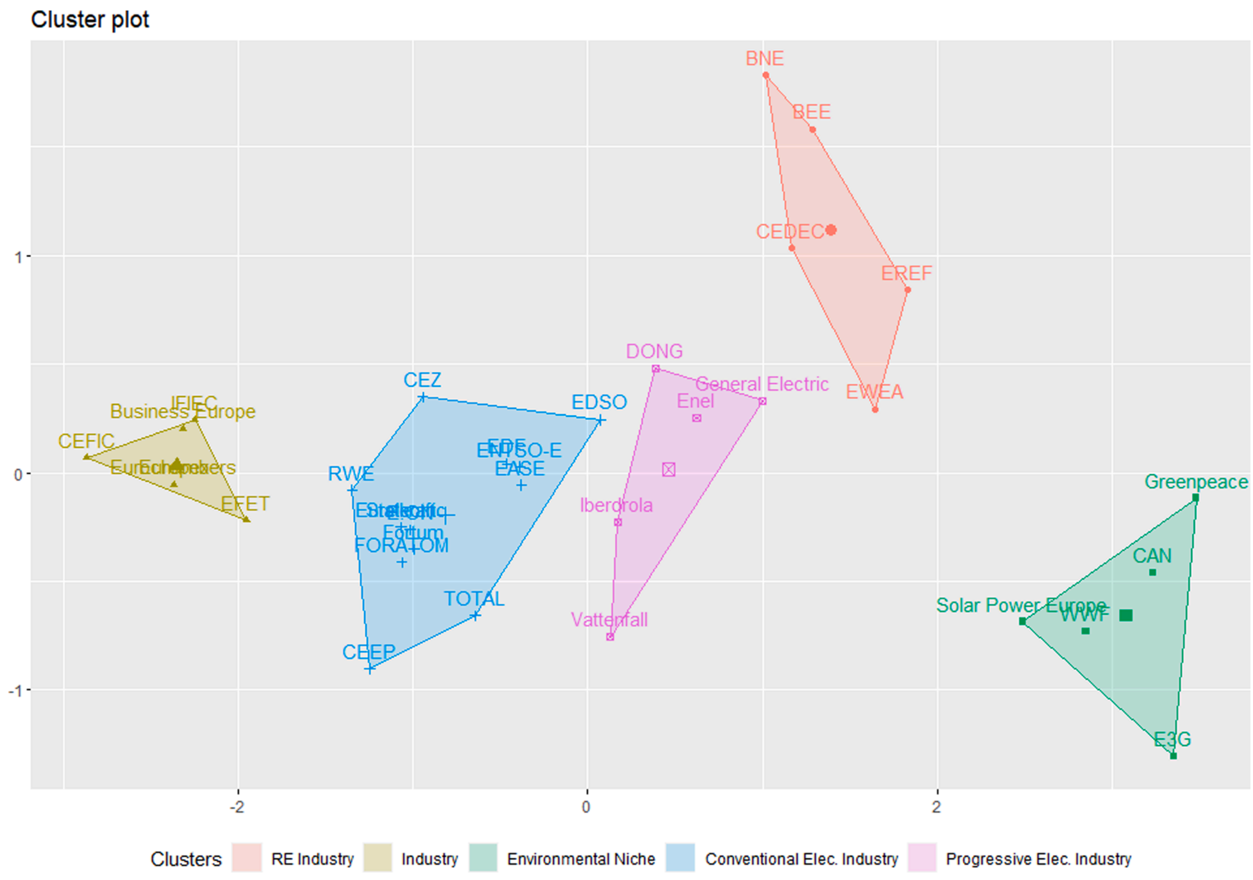

Fig. 1. The five advocacy coalitions

the consultations (Landry and Varone, 2005; Leifeld, 2013). The coding scheme was modified several times to capture the distinctions between the actors in the best way. After coding the documents for all selected actors, we arrived at four main policy core belief dimensions. Table 3 shows the policy core beliefs assessed in this paper and links them to the theoretical propositions for policy core beliefs within the ACF.

The first dimension concerns the belief actors have in the market and what they think the role of markets should be more generally. In the consultation responses, this is expressed as whether they are satisfied with current market designs and how they elaborate on concrete market design features for making markets work better. It also includes stressing the need for more and enhanced market forces, both in terms of the electricity market as such and the RE policies, i.e., that policies should be market-based (especially the ETS or auctions) to minimize costs and preferably not interfere with the electricity market.

Table 5
The members of the coalitions

	Coalitions labels and actor types	Coalition Members
1	RE Industry RE industry associations + new smart energy actors	BNE, CEDEC, EWEA, BEE, EREF
2	Industry Manufacturing industry associations + traders	EFET, Eurochambers, Europex, CEFIC, Business Europe, IFIEC
3	Environmental Niche E -NGOs + RE INDUSTRY (SP Europe)	CAN, Greenpeace, E3G, Solar Power Europe, WWF
4	Conventional Electricity Industry Utilities and electricity associations	EDF, E.on, TOTAL, CEEP, CEZ, RWE, EDSO, EASE, ENTSO-E, Fortum, FORATOM, Eurelectric, Statkraft
5	Progressive Electricity Industry Progressive utilities + tech providers (GE)	Iberdrola, Vattenfall, General Electric, DONG, Enel

Table 6
Summary of overall positions in the five coalitions[11]

Coalitions	Market	Policy	EU vs nation	Climate
Coalition 1: RE industry associations + new smart energy actors Label: RE INDUSTRY	Strengthen the internal market Elaborate in detail on market rules for RE Pro scarcity pricing – no capacity mechanisms	We need ambitious policies, targets and strong state intervention Enhanced market forces and strong policies are no contradiction	Harmonize market rules National policies are still necessary	Climate action is very important RE deployment is essential to meet climate targets
Coalition 2: Industry associations + traders Label: INDUSTRY	Free markets Eliminate distortions Important to ensure competitiveness of industry	Remove policies Policies destroy the market and hamper the competitiveness of EU industry	Harmonize market rules Harmonization of policy: The ETS should drive decarbonization No national support schemes	Climate action should not compromise competitiveness and jobs
Coalition 3: E -NGOs + SP Europe Label: ENVIRONM. NICHE	Strengthen the internal market But: several issues that the market cannot cope with, e.g. large overcapacity of existing conventional capacity	Strong state intervention is key We need policies for RE and for taking out conventional production	Harmonize market rules National policies are key	Climate action is our overall priority We should aim for 100% renewable energy production by 2050
Coalition 4: Utilities – conventional Label: CONVEN. UTILITIES	Strengthen the internal market Remove market distortions	In principle, policies that intervene in the market should be removed. Policies harm the functioning of the market	Harmonize market rules Harmonization of policies: EU-wide support scheme or no support post2020 ETS should drive decarbonization	Climate action is important
Coalition 5: Utilities – progressive + tech providers Label: PROG. UTILITIES	Strengthen the internal market Elaborate in detail on market rules for RE	We still need policies for RE Enhanced market forces and strong policies are no contradiction	Harmonize market rules Harmonization of national support schemes	Climate action is very important

The second dimension regards the need for state intervention in the form of specified renewable energy targets, technology-specific policies, and whether there should be certain exemptions – for example for smaller producers and priority dispatch (Kammermann and Ingold, 2019). Further, this dimension documents whether an actor perceives such policies to be detrimental to a well-functioning market and therefore believes they should be abandoned. To distinguish between the preferences for renewable energy, we also include statements that account for the relative strength of renewable energy policies.

We call the third dimension “EU harmonization versus national state” as it concerns whether the EU should have more authority within energy and electricity policy. This implies larger harmonization of renewable subsidy schemes to minimize national differences or attaining cooperation across the EU in terms of a European support scheme or strengthening the ETS. We also included preferences for more integrated electricity markets and harmonized market regulations versus the wish to strengthen national authority.

Finally, the fourth dimension refers to the climate beliefs of actors and the relative importance of mitigating climate change compared to other issues like economic growth and employment. This also includes the ambition level for GHG emissions reduction.

From the coded text documents, we compiled quantitative coding values that reflect the policy core beliefs of all actors for each coding dimension (Jenkins-Smith et al., 2017). The values vary between 1 and 4 (see Table 4). Since there are several – and sometimes contradictory – statements in the actors’ consultation documents, each relevant statement is coded with the appropriate value. For all actors, we calculated an average value for each dimension (Kammermann & Angst, 2021). Finally, we qualitatively analyzed the resulting values to determine whether they adequately represented the position of the respective actors. More information about the coding procedure and the values from the coding of actors can be found in appendix A and C.

Based on the values from the coding of consultation responses, we performed a cluster analysis to identify the relative closeness of actors (see Table A.4 in the appendix for coding values). For this purpose, we computed the Manhattan distance between all actors in the sample. The Manhattan distance calculates the distance between two points measured along perpendicular axes and prevents to some extent that outliers distort the cluster analysis. To compare the scores between the four dimensions, the absolute Manhattan distances for each dimension were standardized. The overall objective with this method is to identify clusters with the least differences within the clusters, and the greatest differences between clusters (Everitt et al., 2010).

We used three methods to identify the optimal number of clusters: the elbow method, the gap statistics method and the silhouette approach (Hennig et al., 2015). The elbow method calculates the average distance of each data point to the center (centroid) of the cluster (Everitt et al., 2011). The gap statistics method compares the change in within-cluster dispersion with that expected under a reference null distribution (Tibshirani et al., 2001). Both methods suggest that five is the most optimal number of clusters. The silhouette approach calculates the silhouette coefficient of each data point and measures how well it is positioned in each cluster (Hennig et al., 2015). It considers two clusters as the optimal number, but five clusters represent the second-best result. Moreover, the goodness of fit estimate for five clusters is slightly inferior compared to two clusters. The clusters were then visualized based on the Manhattan distances of their principal components; the two dimensions that explain the greatest variance between the actors. More information about the results from the best-fit assessment of clusters can be found in appendix D.

Results

The findings show that there are five distinct clusters of actors (see Fig. 1 and Table 5). We label the clusters: 'RE industry' (cluster 1), 'Industry' (cluster 2), 'Environmental Niche' (cluster 3), 'Conventional Electricity Industry' (cluster 4) and 'Progressive Electricity Industry' (cluster 5). Table 6 summarizes the main policy beliefs and policy positions of each coalition. We see that a detailed assessment of policy core beliefs that is "grounded in the data" (Corbin and Strauss, 2015) reveals important lines of distinction. This becomes increasingly important in a rapidly changing policy subsystem like the electricity policy system where actors of the same type pursue different strategies. As noted above, we consider the policy core beliefs and preferences of actors as indicators of these strategies.

The assessment identifies new and important lines of distinctions within the electricity industry and the green coalition. In our analysis, the electricity industry has split into a conventional and progressive coalition, while the green coalition is divided into a RE industry coalition and an environmental niche coalition. The industry coalition remains unchanged, but we find that electricity traders have similar beliefs as the industry associations. The traders are therefore part of this coalition as well.

The split within the electricity industry is above all due to differentiated policy core beliefs on the state intervention and climate dimensions. The 'conventional electricity industry' has slightly lower climate beliefs and prefers a phase-out of regulatory policies, a belief they share with the 'industry' coalition. The 'progressive electricity coalition' argues that we still need technology-specific policies for renewables but combine this with high market preferences. They take a middle position on the EU dimension and favor harmonization of national support schemes.

The members of the conventional electricity and industry coalitions want to limit or abandon technology-specific renewable energy subsidies, which they consider detrimental to a well-functioning market:

An active policy on the phase out of support systems is necessary in order to have a well-functioning electricity market. Renewables should be integrated into the market, rather than phasing out the target of developing a functioning market. (IFIEC, RED, p. 9)

Current renewables support schemes should be opened for cross-border participation at least at the regional level, and no new subsidy schemes should be implemented when the current subsidy schemes expire. (Fortum, RED, p. 11)

Moreover, they prefer targets and measures on the EU level. They strongly oppose market protection in the form of priority dispatch or exemptions from balancing responsibilities. Further, we observe that the 'conventional electricity industry' has considerably higher climate ambitions than the 'industry' coalition. The latter argues more vehemently against RE support and questions RE deployment as such. In their view, the expansion of RE is very expensive and potentially undermines EU competitiveness. Instead, they think the ETS should be the main policy for the transition. The main explanation for these preferences is economic interests. The industry coalition and coal producers prefer the ETS as the lesser evil out of a fear of stricter regulations, and lobby to make it as weak as possible (Meckling, 2011) while the conventional electricity industry (especially nuclear and existing hydro power) wants a strong ETS to ensure high and stable prices on the whole-sale electricity market (Lindberg, 2019).

Next, we consider the novel distinction within the 'old' niche coalition. Here, it should be mentioned that the RE industry coalition does not only consist of RE industry associations. We also find that some new actors are members of this coalition.

The 'RE industry' and the 'environmental niche', formerly considered as the broad green coalition, differ with respect to their market, regulatory policy and climate beliefs. In general, the environmental niche has stronger climate ambitions and regulatory policy beliefs than the RE industry. The members of the environmental niche doubt that the market will be able to provide sufficient incentives for the energy transition:

EU markets that allow investment in renewable energy to be driven by market signals alone remain a long way off. (WWF, 'Key recommendations' to EMD p. 6)

The European Union is today faced with a significant oversupply of generating capacity in most regions, which is the primary cause of the current financial instability in the sector. This jeopardises the needed investments in flexible and renewable resources and will not be solved by simply re-designing the electricity market. (CAN, RED, p. 12)

[1] Note that the positions of single actors in each coalition might deviate slightly from these core beliefs, as each actor holds individual positions.

This contrasts with the beliefs of members of the 'RE industry' coalition, which express a much stronger faith in markets. Moreover, these actors try to change the market rules in order to make markets 'fit for renewables'. They provide detailed accounts on how to change current electricity market regulation through the removal of market barriers for aggregators and new entrants, smaller minimum bid sizes and shorter time frames, amongst others. This is a position they share with actors in the 'progressive electricity industry' coalition:

BEE strongly supports the Commission in its view that scarcity pricing is a vital component of a future market design. The price quoted on the power exchange is the point where supply and demand intersect and therefore should be the main impetus for investments, competition and innovation. A market-driven investment environment is the best means to provide long-term price signals together with the necessary stability needed to trigger investment and lower the cost of capital, while meeting all system needs and increasing the share of renewable energy in the power mix. (BEE, EMD, p. 2)

It is going to become increasingly important that Europe leads in the areas of markets-fit-for-renewables and deployment of facilitating technologies such as demand flexibility if this number one position [EU's position as number one in renewables] is to be retained (DONG, RED p. 15)

The 'RE industry' and the 'progressive electricity industry' have converging beliefs on several dimensions. Most importantly, both combine strong market beliefs with strong preferences for regulatory policies. They want RE targets and targeted RE policies, but also highlight the need to 'make the market fit for renewables'. As such, their beliefs differ from previously dominant perceptions where markets were seen as contrary to regulatory policy interventions. This represents something qualitatively new in climate and energy policy. The 'RE industry' shows a stronger belief in the energy-only-market than some conventional utilities since the latter lobbied for the introduction of capacity mechanisms. Although both coalitions have high climate beliefs, 'RE industry' has slightly higher values than the 'progressive electricity industry'.

An important distinction between the two coalitions is that incumbents in the 'progressive electricity industry' favor more competition and less market shielding: they hold that harmonization of national policies is advantageous and want more market-based policies, including the ETS and auctions. The 'RE industry' has stronger regulatory policy beliefs, it supports continued market protection and prefers national support schemes. These preferences, too, might be explained by their respective economic interests. Large companies have better qualifications and resources to benefit from market-based schemes (Grashof, 2019). For companies that build RE plants with low or no subsidies, a high ETS price is important since these actors trade their electricity in the whole-sale market. As they often have mixed production portfolios, a higher ETS price helps not only their RE business, but also makes their existing gas, nuclear and hydro production more profitable compared to coal power (Lindberg, 2019; Vormedal et al., 2020).

Discussion

The analysis of advocacy coalitions based on policy core beliefs reveals that the ongoing energy transition has significantly changed the coalitions in the electricity policy system. We conceptualize this as the effect of technological change, which encompasses the following elements (and others): expanding shares of renewable energy in the electricity system (REN21, 2020), infrastructure deployment and reconfiguration (McMeekin et al., 2019), new procedures for system operation (Lindberg et al., 2019), new types of actors becoming electricity producers (i.e. prosumers) (Inderberg et al., 2018) and a shift in the asset composition of incumbents (Eckhouse et al., 2020). These changes affect the policy core beliefs of key actors, and the advocacy coalitions alter accordingly. Of course, there are other factors that influence beliefs as well and we acknowledge that we cannot isolate or quantify the effect of technological change. Still, we suggest that this is one main reason for changed beliefs. It should also be mentioned that these technological changes are partly a result of policies that were introduced at earlier stages of the transition. However, this causal link is not part of this study.

Our detailed assessment of the beliefs of a large number of actors reveals that technological change is jolting the previously stable policy subsystem. Compared to earlier coalitions, our findings suggest that the policy landscape is more heterogeneous, with less clear-cut distinctions. This finding pairs well with the empirical observation that shortly after the consultation process, several companies split or merged, while new companies have formed and others have changed their name. RWE segregated its renewable portfolio into a new company, Innogy, while E.on has created a new company, Uniper, to handle its coal and gas assets (Kungl and Geels, 2018). DONG Energy changed its name to Ørsted in 2017, while launching a strategy to become a 100% renewable energy company (Toft and Rüdiger, 2020). These developments are a few examples of an energy landscape undergoing rapid change.

Our study shows that the coalitions at the time of the public consultation processes (2015-2016) are different than those observed in earlier phases of the European energy transition. Although the assessment of coalitions' change is based on findings from studies that have not documented the same belief dimensions in the way we did, they are supported by several studies that documented the preferences of actors (Boasson and Wettestad, 2013; Gullberg, 2013; Toke, 2008; Ydersbond, 2016, 2018). Moreover, we argue that it is precisely in the acceleration phase that analyses are needed that document the policy beliefs of individual actors to show the distinctions that exist among certain types of actors. Ten years earlier the positions of different actor types were more prominently divided and within-group beliefs more harmonized. In such instances, assessments of individual actors might be less relevant.

We now turn to the discussion of our hypotheses. Our first hypothesis assumed that there will be one main coalition that represents the niche-level, which clearly contrasts with the advocacy coalition(s) of established industries and actors. Our findings show that in the acceleration phase, this is no longer the case. We find that the policy landscape is much more diverse, with several coalitions that can be associated with both conventional and new technology. This relates to the second hypothesis, which expected that incumbents that are ‘first to enter niche’ or ‘follow into niche’ have joined the niche coalition. Here, our findings point to several important insights:

The split of the electricity industry into two coalitions clearly reveals the various strategies of incumbents, where some are the first to enter into niche technologies, or to follow suit. Others have larger vested interests within conventional technologies and try to delay the transition. The analysis shows how these strategies are reflected in changing policy core beliefs in the acceleration phase of the transition.

Our study shows that incumbents that pursue a progressive strategy do not join the niche coalition. Instead, they form a new coalition where they cooperate closely with other coalitions and work actively to create the new regime. The progressive companies prefer policies that suit their economic interests and (altered) business models. Whereas niche coalitions in early phases of a transition will typically favor strong regulatory policies and market shielding, the incumbents that engage with the niche technologies in later stages instead favor less market shielding and more competition.

Despite their joint engagement with renewable energy, we observe a sustained distinction between progressive incumbents and new entrants. Most of these incumbents have diverse portfolios where renewables represent only a certain share of their business activities. Since the renewable strategies of incumbents differ from those of smaller actors and energy cooperatives, they also develop different beliefs. This is supported by other studies which found that commercial developers benefit from market-based policies like auctioning (Grashof, 2019) and green certificates (Jackson Inderberg et al., 2020). Lindberg et al. (2019) show that incumbents prefer centralized technology solutions, whereas the renewable energy industry and E-NGOs back enhanced decentralization. The latter involves continued direct subsidies and market exemptions for small-scale projects.

The third hypothesis expected increasing conflict among actors in the acceleration phase of sustainability transitions, manifesting as new distinctions within previously harmonized coalitions. This expectation pairs well with our findings of a split both within the utilities and within the former niche coalition. Also, we find that the former niche coalition is divided into two coalitions, where the ‘RE industry’ is closer to the progressive incumbents and tries to actively create the new regime. The ‘environmental niche’ houses the actors with the most ‘extreme’ beliefs in terms of higher renewable and climate ambitions and continued market shielding. However, we would like to point out that this finding does not necessarily mean more conflict, since there is also a large degree of collaboration across coalitions.

One concrete expression of this type of collaboration is the membership of utilities in energy associations and renewable energy associations. In our policy subsystem, all the utilities are members of Eurelectric[7], but many of them are also members of renewable energy associations. Interestingly, all utilities in the ‘progressive electricity industry’ are listed as market leaders on the web page of WindEurope 2020 (WindEurope, 2020). We can therefore assume that these utilities are highly influential within WindEurope, but that they also play a role within Eurelectric. However, Eurelectric had a different position in the negotiations than the progressive utilities and held different policy core beliefs.

This example of cross-coalition collaboration demonstrates that policy belief clusters do not tell the full story about coalitions in the EU. During policy negotiations, actors will gather in short-term coalitions with political parties and governments in order to achieve concrete policy change. By contrast, our study is well suited to demonstrating how different actors reorient in an electricity system which is undergoing rapid change.

Whereas earlier studies of advancing transitions have focused heavily on the strategies of incumbents in a transition (Geels, 2014; van Mossel et al., 2018), we provide important insights about the strategies of niche actors as niche-innovations are becoming more market mature. From primarily being occupied with pressing for their advantages in the market (i.e. niche protection and nurturing) in early phases of the transition, they now increase their efforts to change the regime configurations (i.e. market design and infrastructure). During the CEP negotiations, the wind industry advocated that their technology should have access to all types of markets and highlighted the need to adjust market rules to accommodate for the industry’s variable production (WindEurope, 2017). By contrast, the solar industry had a much larger focus on retaining market exemptions and advantages for small actors. This is partly a result of solar PVs’ deployment in Europe, where it has been largely the province of smaller actors, which again can be linked to its technological properties as a predominantly decentralized technology. It might also be related to the fact that the upscaling of solar PV deployment started approximately ten years after the wind industry and its market share in the EU is still considerably lower.

An example for the diverging positions of the solar PV and wind industry is the discussion about market advantages in the CEP. In its initial policy proposal, the European Commission wanted to remove several advantages for RE producers, including priority dispatch. The solar industry initiated the campaign “Small is beautiful” to retain these benefits for small-scale producers (SolarPower Europe, 2018, 2019)[8]. The wind industry was also a member of this campaign, but for them, it was not at the core of their negotiating claims.

The issue of exemptions for small-scale producers shows how the different properties of niche technologies resulted in slightly different negotiation positions. It implies that the niche technologies were more market mature in the form of large-scale projects at this stage of the energy transition, but for small-scale projects, this was not the case. This shows that market maturity varies with

[7] Eurelectric is the European association of all national electricity associations. Each member state has its own electricity association, and the utilities are members of these national associations in the countries where they operate.

[8] In particular, these advantages for RE producers have been crucial for the solar PV technologies, which have been adopted by many small-scale actors, especially households and firms. Removing these benefits would therefore hit this group of power producers harder than others.

project size and type of project developer.

The two positions correspond to slightly different transition pathways. Where the solar industry represents a strongly decentralized transition, the wind industry embodies a much larger degree of centralization. This concerns both the production and infrastructure components of the electricity system. The issue of priority dispatch shows how particular policy design elements can direct the transition in different directions. This is more important in the third acceleration phase when niche technologies become increasingly cost-competitive. The different interests of the emerging technologies indicate heightened disagreement about the direction of the ongoing transition and competing sustainability transition pathways (Lilliestam and Hanger, 2016; Lindberg et al., 2019).

Conclusion

This study analyzed the dynamics between niche and regime levels in an advanced transition phase, here referred to as the acceleration phase. By assessing advocacy coalitions in the European energy transition, we found that the niche level is no longer unified and parts of it evolved into an emerging regime. This is especially true for wind energy, which has reached high market shares and where cost competitiveness with conventional technologies is increasingly prevalent. It seems that in the acceleration phase, it is imprecise to use the categories 'niche' and 'regime'. Rather, we see how actors from both the niche and regime levels have converging policy beliefs and actively create the new regime. This finding illustrates the dynamics within the policy subsystem in the acceleration phase when "the elements of the old regime and novel elements are combined to form a new dominant regime" (Verbong and Loorbach, 2012).

The 'progressive utilities' coalition and 'RE industry' coalition represent an emerging regime, which challenges the existing regime. However, the new regime will probably co-exist with the old regime for some time before a shift is accomplished. This emerging regime currently consists of actors from the old regime (incumbent utilities), the old niche (RE industry associations) and new actors (new entrants and new types of actors like aggregators).

Our findings deviate from the few previous studies that analyze coalitions over time. These have conceptualized change with the categories "coalition decline and growth" (Schmid et al., 2019) or the "former minority coalition gaining influence" (Markard et al., 2016). Our study shows that the ongoing development is rather marked by the emergence of new coalitions and new alliances between them. It is no longer the question of being for or against the transition, but rather about the level of ambition, types of support policies, market design and the role of market mechanisms.

To further understand these dynamics, we need comprehensive and detailed assessments of actors' strategies in sustainability transitions worldwide. There are several fruitful avenues for future research. More knowledge is needed about the role of policies in the third acceleration phase of sustainability transitions. What types of policies are suited to ensure sustained climate action when renewable energy becomes cost competitive? How can these policies be designed to avoid negative interaction with markets? This could be achieved through further exploration of the emerging regime and in-depth assessments of policy preferences and beliefs. Such insights are important to ensure that scant resources are distributed efficiently and fairly.

Declaration of Competing Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author.

Signed by all authors as follows:

Marie Byskov Lindberg, June 8, 2021

Lorenz Kammermann, June 8, 2021

We have no conflicts of interest to disclose.

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Appendix A: The coding scales of policy core belief dimensions and the coding procedure

The coding of documents was done by two coders in several iterative steps (see Table A.1). After establishing a coding scheme based on ACF propositions, we coded approximately half of the documents. Then we double-checked the coding, made some adjustments in the coding scheme, and coded the rest of the documents.

The main task of the coding was to get the correct scaling which distinguishes the actors on each dimension. It was also important to have a clear scaling which means that positions do not level out each other.

The estimation of each value was done in the following way. First, all relevant statements in the consultation responses from the actor were coded with a specific value on the likert scale (1-4) in Nvivo. This is a qualitative assessment where the coders evaluate the text to decide whether a) it is relevant for the dimension and b) which scale it matches. To check for robustness and consistency of the coding, we regularly used Nvivo to display all the coded statements of one scale. Since each scale represented individual "nodes" in the software, we created reports for each node which would display all the coded statements from all actors to see whether coding was consistent.

Next, we used Nvivo to create a matrix coding, which produces a table with the total number of coded statements for each dimension. Then, we calculated the average value for each dimension for each actor. This average value is a result of all the statements from an actor. This approach would assume that all statements are equally important for the topic. However, as we recognize that some statements might be more important and represent the fundamental orientation of an actor, we carried out a final step of evaluation to ensure that this average value represented the expressed policy core belief of each actor. Here, we produced a coding report for each dimension for each actor and made a qualitative evaluation where we considered if some statements were more important and whether the average value was representative for the actors' position. If it was not, we selected the most relevant and representative statements and calculated a corrected value based on these statements only.

Finally, we also used other documents to cross-check the validity of our coding values. For example, we checked some of the annual reports of the companies and other publicly available documents. For the climate dimension, we also cross-checked our results with the specific preferences of actors for the European wide GHG emission reduction target that was adopted in 2014 (one year earlier).

Table A.1
Explanation of coding values

Dimension	Calibration	Examples of beliefs and associated policy preferences
1 - MARKET	1-1	Statements express the conviction that a well-functioning market will solve the issues like long-term investment signals, liquidity, balancing renewables. All technologies should be exposed to wholesale market price signals. Challenges can be overcome with concrete market design solutions.
	1-2	Statements that express the position that we need to enhance market forces and improve the market. It also includes statements that interventions that distort the market should be avoided and that the market can solve the problems.
	1-3	Statements display that there are many issues that markets cannot solve, either currently or in close future.
	1-4	A fundamental skepticism toward markets in general, doubting that market solutions can be fruitful for the energy transition.
2 - POLICY	2-1	A fundamental skepticism toward policy interventions. All policies should be phased out and there should be no exemptions for certain actors (i.e. small-scale producers)
	2-2	We should avoid policies for several reasons. Policies distort the market, lead to exaggerated costs. If policies are needed, they should be on the form of R&D.
	2-3	Currently, we still need some specific policies for renewables and preferably also specific RE targets. If the market, infrastructure, and other advantages for fossil energy are improved, we might be able to abandon these policies, but under current conditions this is not the case.
	2-4	Specific policies and targets for renewables are indispensable for the energy transition no matter what.
3 – EU - NATION	3-1	Renewable energy policy should be harmonized to the largest extent possible. This includes the position that all policies should be harmonized on the EU level, for instance through the ETS or a European-wide support scheme. National specific support should be abandoned.
	3-2	We should strive for greater harmonization in terms of EU-wide energy policies. Statements express a preference for gradual alignment of national support schemes through common EU rules or increasing regional cooperation.
	3-3	The national policies are still needed, but we should encourage enhanced consistency across national support schemes. They could be opened up for to renewable energy producers in other Member States.
	3-4	Prefer national level support schemes that are only open to national renewable energy producers. RE deployment should be tailored to national/local conditions. Actors express doubt that EU-wide schemes are practically feasible. Support policies should ensure that national renewable strategies and targets are achieved.
4 - CLIMATE	4-1	Climate policies and renewables are perceived as detrimental to industry, employment, and competitiveness. They explicitly stress the need to ensure coherent energy and climate policy reflecting the principles of sustainability, security of supply, and competitiveness. Renewable energy policies are perceived as extremely costly and hence a threat for their businesses.
	4-2	Climate policy is recognized as important, but actors are concerned about the costs of climate policy and advocate cost-efficient approaches. Statements also stress the need for a balanced approach of the energy policy, considering all dimensions (e.g. Security of Supply, affordability, decarbonization, energy efficiency and R&D/innovation), but express less concern with climate and renewables costs than statements coded 4-1.
	4-3	Statements that explicitly highlight the importance of having a climate vision, strategy, and target. Express the need to achieve the targets set. Some statements may elaborate on their own business strategy in this respect.
	4-4	Statements express that climate change is their upper priority. They perceive current targets as too weak and that it is our upper priority to have high targets and to reach these targets.

Appendix B: Establishing the actor sample

For our analysis of policy core beliefs of key EU policy actors, our first step was to identify influential interest organizations. The starting point for our sample of influential actors to EU electricity policy was the bulk of responses to the consultation processes associated with the revision of two main EU energy policy directives: The electricity market directive and the renewable energy directive. The first consultation is the 'New Energy Market Design' (open from July to October 2015), which received 320 responses. Our second source is the 2016 consultation is the 'New Renewable Energy Directive for the period after 2020' (open from November 2015 to February 2016), which received 614 submissions.

After making a pre-selection of the 60 well-known actors, we used an expert group consisting of eight experts to identify the most influential actors (see Table A.2). The expert group consisted of people that were selected due to their expertise on EU electricity policy. All researchers in the expert group were studying EU energy and/or electricity policy. One of them had until recently worked as a lobbyist in Brussels. The first author contacted the persons in the expert group per email and collected the data. Data from the expert group was collected in the period June 2016-March 2017.

To assess the perceived influence the experts were asked to rank the 50-60 most influential non-governmental actors in EU electricity policy on a scale from 1 to 4: From 'very influential' (1) to 'quite influential' (2), 'slightly influential' (3) and 'not influential' (4). The experts were also asked to add key actors that they thought were missing from the list and to rank these actors as well. The experts added 10 actors.

The primary condition to include an actor in our cluster analysis was that it was ranked '1' or '2' by at least two of the experts, or that it was added by one of the experts. An additional criterion was that the actors had submitted at least one response in one of the consultations that was of sufficient quality, meaning that it was possible to identify an actor's policy core beliefs within our four belief dimensions. Also, submissions in a different language than English were not included. After compiling the results of the expert group, we had a list of 48 actors, of which 14 were eventually excluded for different reasons (see Table A.3). In the work with the sample and coding, we also decided to take out three national transmission grids companies/associations since we did not include comparable actors from other member states. The cluster analysis had a final sample of 34 actors.

Table A.2
The composition of the expert group

Institution	Position	Location
Environmental NGO with an EU office in Brussels	Policy Officer	Germany
Consultancy for energy transitions	Director	Germany
ENTSO-E	Team Leader	Belgium
International tech company	Senior Policy Advisor	Belgium
University / research institution	Researcher	UK
University / research institution	Researcher	Norway
University / research institution	Researcher (previously working in Brussels as a lobbyist)	UK
University / research institution	Researcher	Belgium

Table A.3
Actors excluded from the sample

These actors were excluded:	Reason:
Alstom	Divested from energy business area
ERDF	We removed national transmission associations/companies from the cluster
Tennet	We removed national transmission associations/companies from the cluster
BDI	Consultation response not in English language
BDEW	Consultation response not in English language
Energy Networks Association	We removed national transmission associations/companies from the cluster
SEDC	Lack of data in consultation response
Euracoal	Lack of data in consultation response
Heat and Power Europe	Lack of data in consultation response
Siemens	No consultation response
ZVEI	No consultation response
T&D Europe	No consultation response
IEA	Lack of data in consultation response
ACER/CEER	We excluded EU governance bodies from the sample

Appendix C: The results of the coding of policy core beliefs

Table A.4
The coding values for actors in the cluster analysis

	Actors	Full name of actor	market	policies	EU - nation	climate
1	BEE	German Renewable Energy Federation	1,25	4,00	3,50	3,09
2	BNE	Association of Energy Market Innovators	1,22	3,17	4,00	3,00
3	Business Europe		1,11	1,00	1,50	1,80
4	CAN	Climate Action Network	3,00	4,00	3,50	4,00
5	CEDEC	Federation of local energy companies	2,00	3,20	3,75	2,58
6	CEEP	Central Europe Energy Partners	2,00	2,00	1,00	2,00
7	CEFIC	The European Chemical Industry Council	1,00	1,00	1,00	1,50
8	CEZ		1,50	2,33	2,00	2,00
9	DONG	Now: Ørsted	1,50	3,00	2,50	3,00
10	E.ON		1,50	2,44	1,25	2,33
11	E3G	Third Generation Environmentalism	3,50	4,00	3,00	4,00
12	EASE	European Association for Storage of Energy	1,50	2,00	2,00	3,00
13	EDF	Électricité de France	1,66	2,38	2,00	2,46
14	EDSO	European Distribution System Operators	1,80	1,50	3,00	3,00
15	EFET	European Federation of Energy Traders	1,25	1,69	1,00	2,00
16	Enel		1,75	3,10	2,50	3,00
17	ENTSO-E	European Network of Transmission System Operators for Electricity	1,43	2,08	2,00	3,00
18	EREF	European Renewable Energies Federation	2,00	4,00	3,50	3,08
19	Eurelectric		1,25	1,50	1,50	3,00
20	Eurochambers		1,00	1,25	1,00	2,00
21	Europex		1,00	1,25	1,00	2,00
22	EWEA	Now: WindEurope	2,00	3,60	3,00	3,45
23	FORATOM		1,38	1,33	1,50	3,00
24	Fortum		1,25	1,88	1,25	3,00
25	General Electric		2,00	3,00	3,00	3,00
26	Greenpeace		3,00	4,00	4,00	4,00
27	Iberdrola		2,25	2,79	2,25	2,28
28	IFIEC	International Federation of Industrial Energy Consumers	1,00	1,00	1,50	1,50
29	RWE		1,52	2,00	1,50	2,00
30	Solar Power Europe		3,00	3,75	3,00	3,50
31	Statkraft		1,25	1,50	1,50	3,00
32	TOTAL		1,64	2,67	1,00	2,70
33	Vattenfall		2,00	2,75	1,50	3,00
34	WWF	World Wildlife Foundation	3,00	3,50	3,25	4,00

Appendix D: Cluster analysis – Robustness of results

The following three figures show the results from the assessment of robustness of five clusters using the elbow (see Fig. A), gap statistic (see Fig. B) and silhouette approach (see Fig. C).

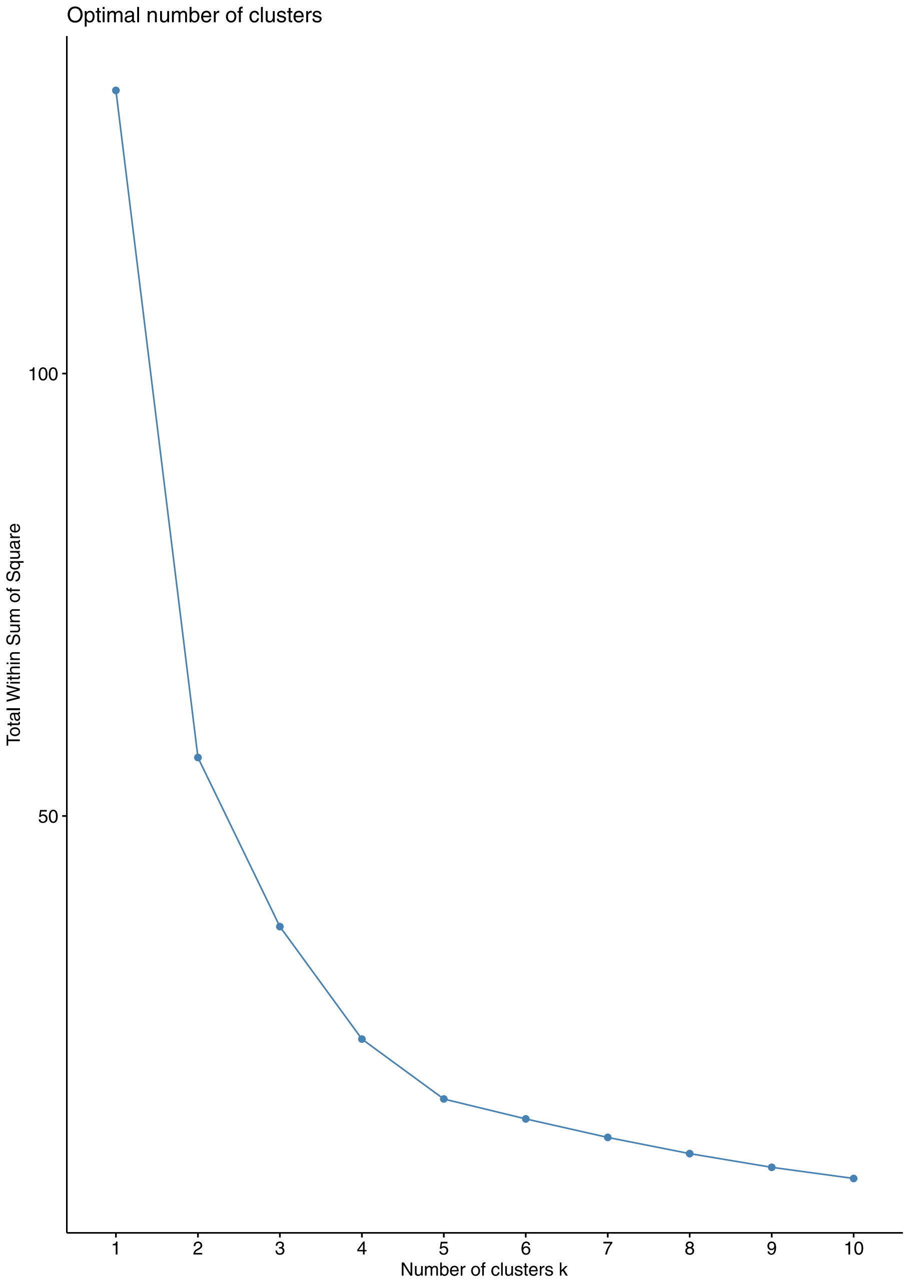

Fig. A. Optimal number of clusters with Elbow methods

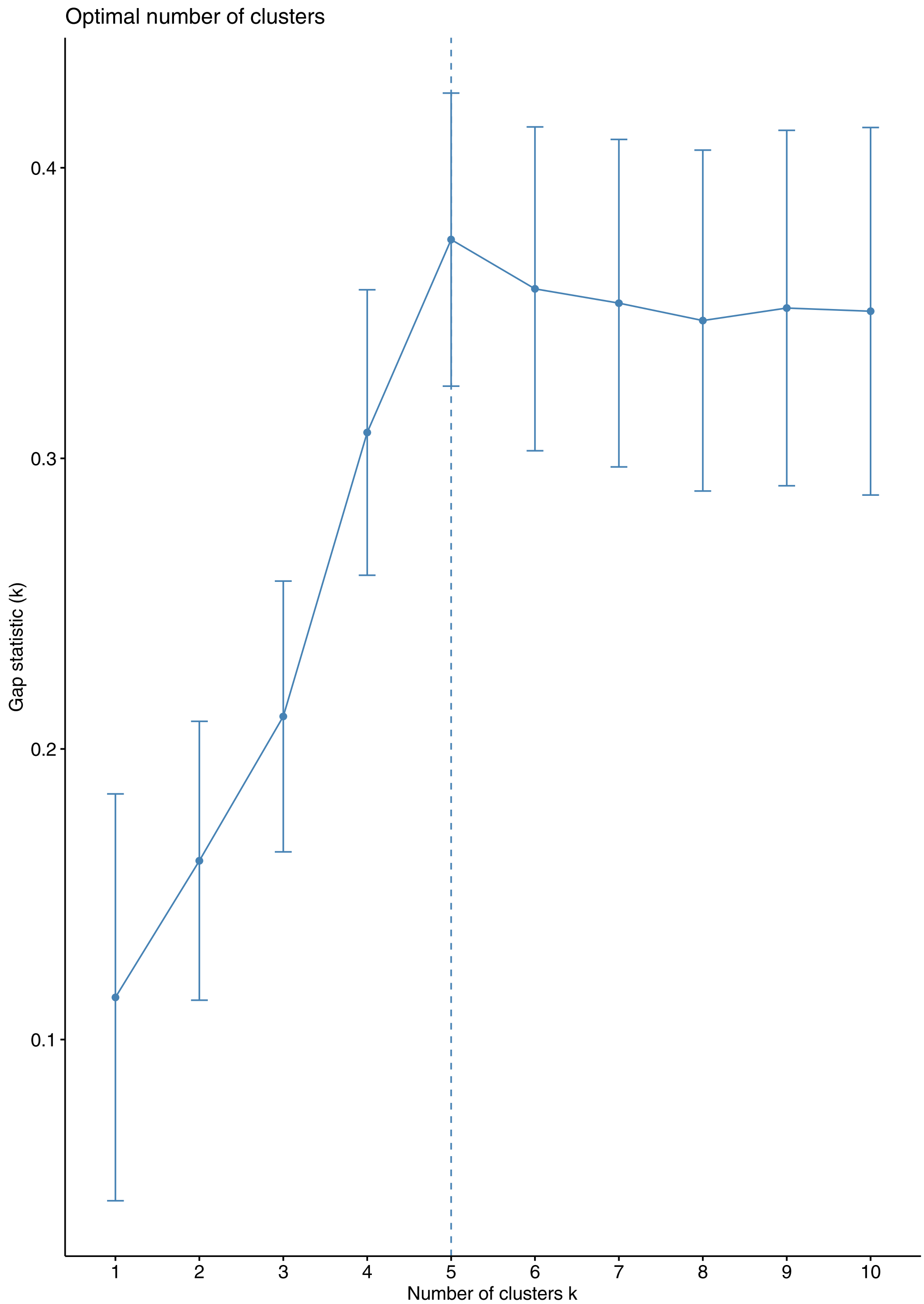

Fig. B. Optimal number of clusters with Gap Statistic approach

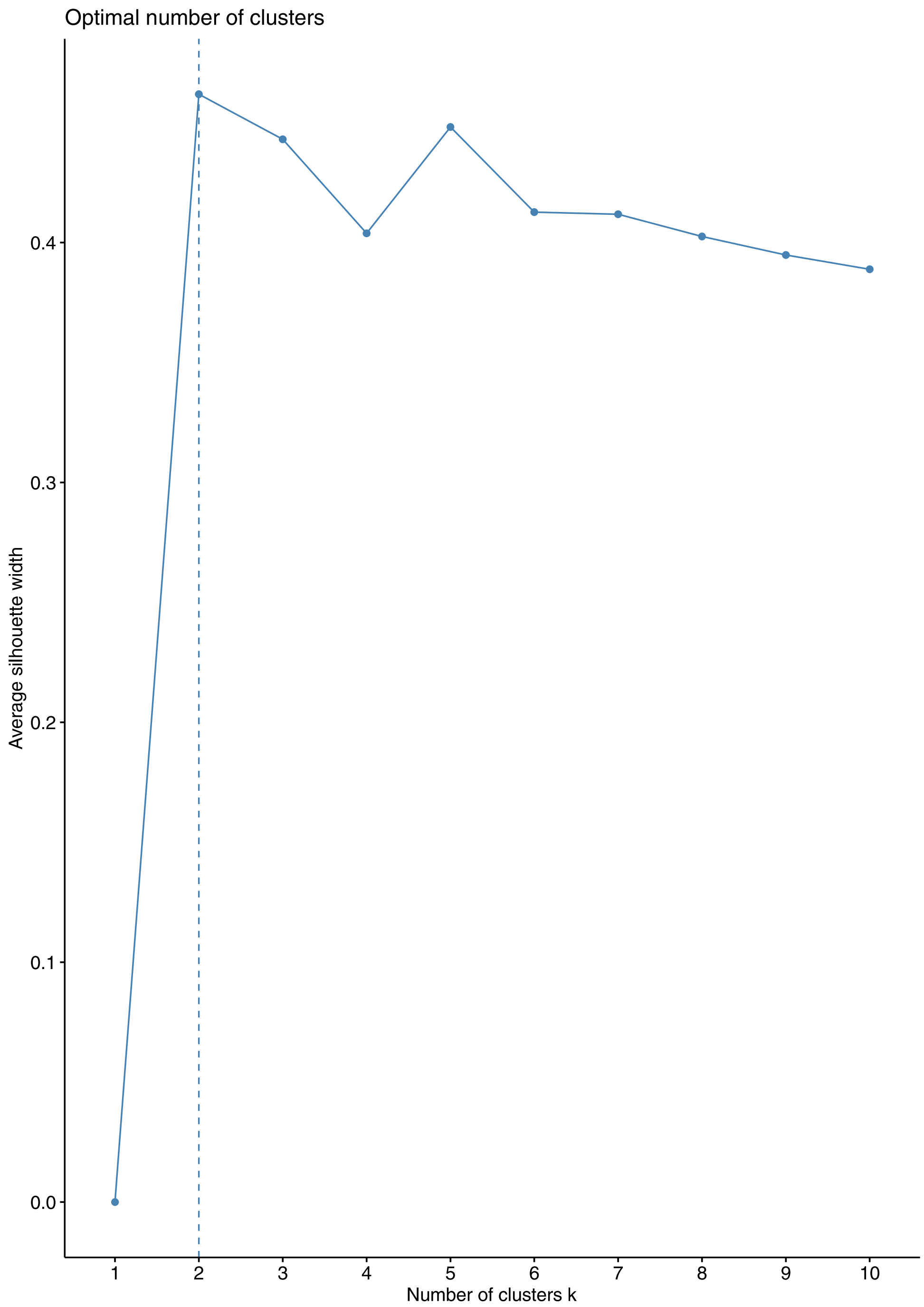

Fig. C. Optimal number of clusters with Average silhouette approach

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