Socio-technical transitions and policy change -

Advocacy coalitions in Swiss energy policy

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Abstract

Policies and politics are an integral part of socio-technical transitions. Policy processes and the conditions for policy change, however, have not received much attention in the transitions literature so far. We address this gap with a study on key actors in Swiss energy policy making. Drawing on the advocacy coalition framework we investigate how coalitions have changed and whether there are indications for major policy change. The study is based on the analysis of consultation documents of three major energy policy processes over a period of 12 years. Our results show that advocacy coalitions have largely remained stable. However, heterogeneity of beliefs has increased and in 2013, even a majority of actors expressed their support for the energy transition – an indication that major policy change might be ahead. We make suggestions how the advocacy coalition framework can inform analysis and theory building in the field of socio-technical transitions.

Keywords: Politics, policy change, advocacy coalition framework, energy transition, energy policy, Switzerland

1 Introduction

Politics and policy change are part and parcel of larger socio-technical transitions, in which established sectors such as energy supply, transport or agriculture undergo fundamental changes (Grin, 2010; Hess, 2014; Kern and Smith, 2008). Not only do changes in policies promote or hinder socio-technical change (e.g. in the form of deployment subsidies for renewable energies) but also do socio-technical transitions have consequences (e.g. redistribution of resources), which may again call for an adaptation of policies. Understanding the conditions for policy change is therefore a crucial ingredient for a comprehensive theoretical perspective on socio-technical transitions (Meadowcroft, 2011).

This holds even more for sustainability transitions, associated with long-term sectoral change towards more sustainable modes of production and consumption. Sustainability transitions are inherently value laden and political, which means that we can expect different interpretations and normative struggles over the pace and directions such transitions should take (Lawhon and Murphy, 2012; Smith and Stirling, 2010). Moreover, they are typically shaped by policies as in the case of the energy transition with renewable energy innovations

receiving public support (e.g. Hoppmann et al., 2013; Jacobsson and Lauber, 2006; van den Bergh, 2013).

Despite the crucial role of politics and policies, transition studies are just beginning to pay more attention to "the *political* circumstances that make the adoption of such policies likely" (Meadowcroft, 2011, p. 73). With this paper, we respond to recent calls to strengthen research on the 'politics of transitions' (Lawhon and Murphy, 2012; Shove and Walker, 2007; Smith et al., 2010), by exploring changes in advocacy coalitions as a precondition for major policy change directed at sectoral transformation. As we foreground different actors (political parties, associations, environmental NGOs, firms) and coalitions and their role in the policy process, we also contribute to the emerging line of research on actors and agency in transitions (Farla et al., 2012).

We draw on two strands of literature. First and foremost, we use policy process theories and the advocacy coalition framework (ACF), which maintains that actors with similar beliefs form alliances that affect the output of the policy process (Sabatier, 2007). According to the ACF, changes in the beliefs of key policy actors and subsequent reconfiguration of coalitions are regarded as a precondition for major policy change. Secondly, we position this study in the literature on (sustainability) transition studies (Markard et al., 2012), which is interested in the conditions for far-reaching changes in socio-technical systems (Grin et al., 2010). Policies are part of the institutional structures of socio-technical systems; so policy change is one of the drivers for socio-technical change.

The transition of the energy sector towards higher shares of renewable energies, increased energy efficiency and lower demand is an issue that has caught political attention in many countries, including Switzerland. In the aftermath of the Fukushima nuclear accident, the Swiss government has decided to phase-out nuclear energy (which currently accounts for up to 40% of the country's electricity generation) and to launch a fundamental reform of the energy sector. Such a far-reaching transformation requires political support from a broad range of actors over a long period of time. As of today, actual law making and set up of specific policy instruments are still ongoing and subject to a struggle of interests. So the question arises, to what extent key actors in Swiss energy policy will support the energy transition.

In the following, we study which coalitions of actors characterize the Swiss energy policy subsystem, whether and how they have changed over time and whether there are indications for policy change. Our paper is based on the analysis of consultation documents of three major energy policy processes at different points in time (2001, 2007 and 2013). We identify relevant political actors and systematically analyze their policy beliefs.

Our findings show that policy core beliefs and advocacy coalitions have largely remained stable over the past 12 years. However, heterogeneity of beliefs has increased and in the 2013 consultation, even a majority of actors expressed their support for the energy transition, which is a clear indication that major policy change might lay ahead.

The paper is structured as follows. In the next section we elaborate on the theoretical background and discuss how the ACF can inform transition studies. Section 3 then introduces the empirical setting and briefly reviews prior work. Section 4 presents the methods and section 5 the results. In section 6 we discuss the findings in the light of the ongoing socio-technical changes in the energy sector. Section 7 concludes.

2 Theoretical background

2.1 Socio-technical transitions, policy change and politics

A socio-technical transition is commonly understood as a fundamental transformation of a socio-technical system (e.g. Geels and Schot, 2010). Such a transition is multi-dimensional, i.e. it encompasses technological as well as organizational, institutional and socio-cultural change. In the course of a transition, new products, services, business models, organizations, regulations, norms and user practices emerge, partly complementing but more often substituting existing ones. Historical examples of socio-technical transitions include the introduction of pipe based water supply (Geels, 2005a), the shift from cesspools to sewer systems (Geels, 2006) or from carriages to automobiles (Geels, 2005b). The energy sector has seen major transitions as well. With the beginning of the industrial revolution coal increasingly replaced wood as the primary energy carrier in many societies, and in the 20th century oil, natural gas and nuclear fuels appeared as additional energy sources for electricity and transport (Solomon and Krishna, 2011).

Socio-technical transitions have been analyzed with different theoretical frameworks (Markard et al., 2012). One of these is the multi-level perspective (Smith et al., 2010; Geels, 2011), which suggests that established socio-technical systems[1] are very resistant to change due to a high degree of structuration (both

[1] The transitions literature refers to these systems as socio-technical regimes. We will not use the term regime very much in the following because it is used differently in the political science literature. We understand a socio-technical system as an interdependent set of actors and institutional structures in a specific technological domain.

material and institutional), close relationships among incumbent actors and vested interests. Transitions are set in motion through a combination of external developments or shocks (e.g. nuclear accidents) at the so-called landscape level and novel technologies emerging in protected niches (Geels and Schot, 2007; Verbong et al., 2007). As novel technologies develop and diffuse, new socio-technical systems emerge with them. These emerging systems also include actors, networks and technology-specific institutional structures and have been referred to as technological innovation systems in the literature (Bergek, Jacobsson, Carlsson, et al., 2008; Markard and Truffer, 2008b).

Policy change is a key process in socio-technical transitions. It is about the implementation, adaptation and discontinuation of public policies. With policies we refer to the content dimension of policy making, including objectives, programs, regulations, laws and funding priorities. When using the term public policies we refer to policies issued by a governmental entity. Policies are often formalized and can be viewed as key elements of the institutional structures of socio-technical systems, next to social norms, expectations, technical standards etc.

Policy change affects socio-technical systems in various ways. Technology and innovation policies contribute to the generation and diffusion of knowledge, which is vital for new technologies to emerge, while standardization and deployment policies contribute to the formation of markets and an up-scaling of novel socio-technical systems. In the ongoing energy transition in Germany, for example, a range of policies have fostered the development and diffusion of renewable energy technologies such as wind or solar (Jacobsson and Lauber, 2006; Strunz, 2014). Conversely, policy change may also contribute to the decline of socio-technical systems, e.g. through a removal of earlier subsidies or even through technology bans as in the case of nuclear power in Germany, or the ban on incandescent light bulbs in the European Union.

Also *politics* is an essential process in socio-technical transitions (Meadowcroft, 2011). Politics refers to the procedural dimension of policy making, with a variety of actors negotiating and interacting to produce public policies (Knill and Tosun, 2012). If politics embrace the political process, policies (or policy change) are the result. Examples for politics in the case of energy include different groups of actors struggling to legitimize and delegitimize nuclear power (Garud et al., 2010; Geels and Verhees, 2011) and to influence nuclear policy making (Nohrstedt, 2010). Similar struggles have been reported for renewable energy policies with incumbent actors trying to prevent policy change and renewable energy proponents lobbying in favor of deployment policies (Hess, 2014; Sühlsen and Hisschemöller, 2014). Also the failure of the Dutch transition management

experiment has been depicted as a case in which politics, namely the strong influence of incumbent actors, played a crucial role (Kern and Smith, 2008).

These examples illustrate that politics and policy change are central for socio-technical transitions. In the case of sustainability transitions, the exposure to politics can be expected to be even more prominent (Lawhon and Murphy, 2012; Meadowcroft, 2011). Sustainability transitions have been conceptualized as an *intentional* endeavor of socio-technical transformation, guided by public policies (Kemp and Loorbach, 2006; Voß et al., 2006). Such a process is not just inherently value-laden but also affects a broad range of stakeholders, which win or lose depending on how the transition unfolds.

In the transitions literature, scholars have suggested to study power and power relations (Avelino and Rotmans, 2009; Grin, 2012), the ways in which resources are mobilized (Avelino and Rotmans, 2009), which language is used in political discourse (Lawhon and Murphy, 2012), or how alliances form and accumulate around specific transition paths (Grin, 2012; Lawhon and Murphy, 2012). With this article, we contribute to these emerging lines of research on actors and politics in transitions. Empirically, we concentrate on the identification of advocacy coalitions and changes in coalitions as an explanation for policy change. Joining forces with other actors and building coalitions is crucial as the power and resources of single actors are typically limited: through alliances they can hope to affect politics and policies more decisively.

Interestingly, the term 'advocacy coalitions' already appears quite frequently in studies on socio-technical transformation, referring to groups of actors with common interests that shape discourses (Ulmanen et al., 2009), influence political decision-making (Jacobsson and Lauber, 2006) or legitimize novel technologies (Bergek, Jacobsson and Sanden, 2008; Negro et al., 2008). However, the underlying idea that shared beliefs are the basis for collective action and that these beliefs are rather resistant to change (Sabatier and Jenkins-Smith, 1993), has not been mobilized yet in the aforementioned studies.

2.2 Policy change and the advocacy coalition framework

In policy analysis, and more specifically in policy process theories, different frameworks have been developed to study and explain policy change (Sabatier, 2007). These include, among others, institutional rational choice (Ostrom, 1990; Scharpf, 1997), the punctuated-equilibrium theory (Jones and Baumgartner, 1993; True et al., 2007) and the advocacy coalitions framework (Sabatier and Jenkins-Smith, 1993; Sabatier and Weible, 2007).

In the following we concentrate on the advocacy coalition framework (ACF), which has been applied to a wide range of policy issues and policy making systems,

including the US, Canada and European countries (Sabatier and Weible, 2007; p. 217 ff). Due to its focus on beliefs, the ACF seems to nicely resonate with the study of sustainability transitions, for which competing values, distinct views on problems and causalities, and interpretation of scientific findings are central (Lawhon and Murphy, 2012). Given its wide range of applications, we also expect the ACF to be sufficiently general to be applied for the study of socio-technical transitions.

The ACF has a strong focus on actors and explains policy change with changes in the beliefs held by these actors (Sabatier and Weible, 2007). Next, we briefly introduce the key conceptual elements of the ACF together with the assumptions on which the framework rests.

Policy participants, or actors, are "legislators, agency officials, and interest group leaders, but also researchers and journalists who specialize in [a specific] policy area … and judicial officials who regularly intervene in a policy subsystem." (Sabatier and Weible, 2007, p. 192). Participants are considered to be experts in a specific policy field. A *policy subsystem* is a set of policy participants that "have sought to influence public policy in [a specific] policy domain for an extended period" (ibid). Policy subsystems often exist for decades. Examples of how subsystems have been defined include air pollution control in the US, steel policy in the European Union, climate change policy in Canada or health policy in the UK (Weible et al., 2009).

Policy actors are assumed to hold normative and causal beliefs that are difficult to change and act as filters for how information is perceived. The ACF distinguishes three hierarchical levels of actor beliefs: *Deep core beliefs* refer to fundamental assumptions and worldviews and are very difficult to change. *Policy core beliefs* are about basic strategies and positions in a policy subsystem. As they are "applications of deep core beliefs that span an entire policy subsystem" (Sabatier and Weible, 2007, p. 194) they are almost equally difficult to change. At the third level are *secondary beliefs* (also: secondary aspects) about specific policies to be implemented or measures to be taken within a specific subsystem.

Advocacy coalitions are groups of policy actors that share similar belief systems and engage in a "non-trivial degree of coordination": they collaborate and coordinate actions to enhance the chance that their belief systems get translated into policy outputs and objectives (Henry, 2011; Sabatier and Weible, 2007, p. 196). It is assumed that a policy subsystem consists of 2-4 advocacy coalitions, of which one is dominant and has the most influence on policy output (Weible et al., 2009). It is also assumed that policy core beliefs are rather stable over time, which is why coalitions - and policies - typically do not change very much.

However, policy change does occur and the ACF proposes several reasons, or paths, for that: *Policy-oriented learning* is a process in which new information on the policy issue becomes available and participants of the dominant coalition change their policy core beliefs accordingly. *External shocks* (e.g. larger changes in socio-economic conditions, outputs from other policy subsystems, political regime changes) are another source for changes in coalitions as they disturb the resources to which actors have access. Further sources of change are *internal shocks* (disasters, accidents) and *negotiated agreements* among different coalitions. These different sources have one thing in common: they usually impact, as an intermediate condition, within- and across-coalition structures, power balances, and resource distribution.

2.3 Comparison of frameworks

The advocacy coalition framework and systems approaches to socio-technical change have some similarities but also differences, which we will briefly discuss below. We concentrate on the multi-level perspective (MLP). Both ACF and MLP take a systemic perspective and seek to explain major changes of configurations or structures that are typically very stable and resistant to change. Both assume that changes are long-term but the time horizon is different: major policy change is expected to take about a decade, while socio-technical transitions are assumed to take 50 years, or more. Moreover, both frameworks refer to (external) shocks as a major source of change but also highlight other processes such as learning or novelties emerging.

The phenomena they seek to explain may be interrelated: policy changes are a central element in socio-technical transitions and socio-technical change may trigger, or facilitate, policy change. However, socio-technical transitions are broader: they do not just include policy change but different kinds of institutional changes, including changes in societal norms, culture, practices, routines, business models, markets, technology standards etc.

The two frameworks also differ in their underlying explanatory mechanisms for change. The ACF has very much of a micro-foundation with its focus on actors and their beliefs (and resources and interests). The MLP has no such focus on actors but relies on technology variation and selection as core explanatory principles (Geels, 2010). This is linked to differences in the underlying systems concept. The ACF conceptualizes the policy subsystem as a network of actors without paying much attention to broader institutional structures (e.g. taken for granted assumptions, collective expectations, socio-technical paradigms) that characterize a policy subsystem, or affect coalition building (Sabatier and Weible, 2007). The MLP in contrast very much emphasizes institutional structures, especially at the regime level but pays little attention to actors, their strategies

and resources in processes of system change (Farla et al., 2012; Markard and Truffer, 2008b). Against this background, the ACF seems to be an interesting complement for transition studies, strengthening the somewhat neglected view on role of actors and politics in transitions (Lawhon and Murphy, 2012).

Table 1: Comparison of the advocacy coalition framework and the multi-level perspective

	Advocacy coalition framework (ACF)	Multi-level perspective (MLP)
Purpose	Explain major changes in policy subsystem	Explain major changes in socio-technical systems
Timespan	≈ 10 years	≈ 50 years
Key conceptual elements	Policy subsystem, Actors, Beliefs, Advocacy coalitions	Regime (socio-technical system), Niche, Landscape
Key mechanisms and assumptions	Policy core beliefs and coalitions tend to be stable; change occurs through learning, external shocks, internal shocks and negotiated agreements	Regimes tend to be stable; niches protect and nurture novelties (source of change); landscape as a source of external pressures or shocks
Theoretical roots	Institutional theory, cognition, social psychology	Evolutionary theory, social construction of technology
Potential overlap	Socio-technical change as a driver for policy change	Policy change as a driver for socio-technical change

2.4 Interaction of policy change and socio-technical change

Below, we introduce the contours of a framework that links policy change and socio-technical change. We conceptualize socio-technical systems and policy subsystems as overlapping systems that 'share' certain actors and that are linked through resource flows.

We assume that actors can pursue (at least) two kinds of activities: they can contribute to policy making, they can provide services tied to the socio-technical system (e.g. energy generation, distribution, energy service provision, energy technology manufacturing) or they can do both. Examples for the latter are firms that develop or apply specific technologies *and* lobby for favorable regulation, or industry associations, which provide a variety of services for their members, including political representation of their interests. Such actors are involved in both systems.

The two systems are linked through resource flows. Actors of the socio-technical system provide resources such as finances or information for actors in the policy subsystem, including political parties, NGOs, associations, unions, public administration etc. In exchange, they receive political support, e.g. in the form of favorable regulation. At a systems level, we might say that a socio-technical system provides resources for the policy subsystem, while the policy subsystem

delivers favorable policies (which again secure resource flows into the socio-technical system).

In a stable situation (Figure 1a), actors of an established socio-technical system are well represented in the dominant advocacy coalition (directly or indirectly) and there are substantial resource flows from the socio-technical system to the policy subsystem. There is no or just incremental policy change, which means that the policy related institutional structures of the socio-technical system remain stable. Positions and resource endowments of actors as well as actor networks (business alliances and advocacy coalitions) do not change much. There might be competing coalitions and competing technologies but these are minor.

External developments such as new policy issues (e.g. climate change), accidents (e.g. Fukushima), crises (e.g. oil price crisis), megatrends (e.g. market liberalization) or technological advances in other sectors (e.g. ICT) may exert pressure on the existing systems. A similar effect can be assigned to internal developments (e.g. policy learning, negotiation, new technologies in the focal sector). In response, actors may explore technological alternatives and there may be early policy support for these, e.g. in the form of R&D subsidies or pilot programs. Such support will lead to the creation of market niches and a novel socio-technical system emerging, which may subsequently grow with more and more actors joining. Advocates of the alternative technologies will also participate in the political process, providing resources and strengthening ties to political parties and intermediaries. As a consequence, a new coalition may grow and gain political influence (early destabilization, Figure 1b).

Major policy change will occur, if policy core beliefs of key actors change (e.g. due to an existing system losing legitimacy as in the case of nuclear) and a new, dominant coalition emerges, which supports the socio-technical alternative. At the same time, political support for the established socio-technical system will be reduced or withdrawn, which leads to a destabilization of the established institutional structures, a re-orientation or exit of actors and a decline of resource flows (Figure 1c).

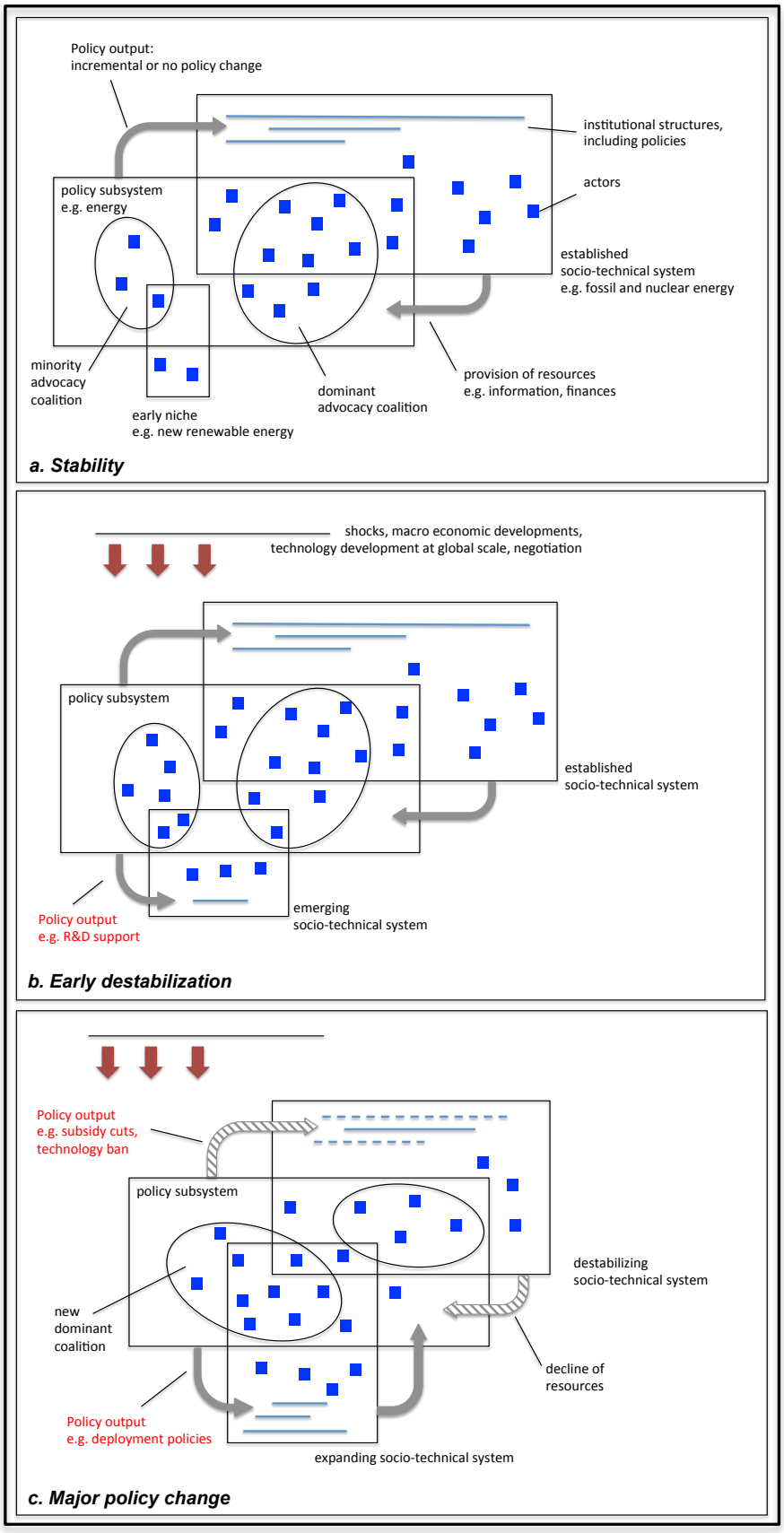

Figure 1: Interaction of policy subsystem and socio-technical systems

This framework highlights the role of actors, coalitions and resource flows. It is a simplified model to cover first ideas how policy change and socio-technical change are intertwined, i.e. how developments in one system feed back into the other. This does not imply that policy change is the only or primary driver for socio-technical change, or vice versa.[2] Also note that it does not account for the differences in timespan (cf. Table 1): there may be more major policy changes in a socio-technical transition. Moreover, the model seems to confine developments to national boundaries, which would neglect developments in other countries or regions that can be particularly important for the technological dimension.[3]

In the following empirical analysis, we can just look into one part of this framework, namely the changes in advocacy coalitions.

3 Energy transition and the Swiss energy policy subsystem

The energy transition is about fundamental socio-technical, organizational and institutional changes in the energy sector of a particular country or region. In many industrialized countries, the energy sector has witnessed transitions in the past 200 years (Solomon and Krishna, 2011). These were characterized by a massive growth of energy demand and major shifts in the use of energy carriers: from wood to coal, from coal to oil, from oil to nuclear energy and natural gas. These transitions included both, the exploitation of new primary energy sources and the development of novel energy conversion technologies (steam engine, internal combustion engine, steam turbine, nuclear reactor). Moreover, they also reached into related sectors such as industrial production, transportation, heating and electricity.

Currently, we see the beginning of another transition, in which fossil and nuclear fuels are substituted by new renewable energy technologies such as wind, solar or biomass. An important feature of the ongoing energy transition is that public policy has a strong influence on the pace and direction of the development. The German “Energiewende” with various public policies to strengthen renewable energies and energy efficiency and the political decision to phase out nuclear until 2022 is certainly a prominent example in this regard (Strunz, 2014).

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[2] There may be other influences at play such as changes in adjacent socio-technical systems or policy subsystems, larger policy changes etc.

[3] An example would be the impact of the German energy transition on both political and socio-technical developments in Switzerland.

3.1 Energy transition policy in Switzerland

In Switzerland, there is a host of energy policies that range from rules for market liberalization to programs for energy conservation, subsidies for renewables and regulations for CO_2 reduction. Here, we concentrate on the policy proposal of the "Energiestrategie 2050" currently under debate (EnG, 2012). In May 2011, in the aftermath of the Fukushima nuclear accident, the Swiss government and parliament decided to phase-out nuclear and to launch a fundamental reform of the energy sector. As a consequence, the government developed the 'Energy Strategy 2050', a policy proposal that was presented for stakeholder consultation in September 2012.

The proposal sets long-term targets (for 2035 and 2050) for the reduction of energy consumption (54% reduction until 2050) and the expansion of renewable electricity generation and combined generation of power and heat. It includes a variety of measures, including grid access and feed-in regulations, changes in spatial planning, subsidies and auctions for renewable energies etc. In a first phase until 2020, there is a focus on subsidies to stimulate new power generation and energy efficiency in the building sector, the service sector and industry. In a later stage, these support programs shall be replaced by an energy tax.

Compared to many other European countries, the Swiss energy market is rather small with an annual energy consumption of 245 TWh, of which 24% are accounted for by electricity, 34% by transport, 28% by heating, and 14% by other purposes (SFOE, 2012). Energy demand has continuously increased from 1979 to 2012 with an average of 0.85% per year, despite several measures to increase energy efficiency.

A particularity of the Swiss energy system is that the electricity sector is almost 'CO_2-free' as power production is primarily from hydropower (57% on average) and nuclear (38% on average). New renewable energies still play a minor role for electricity generation with solar, wind and biomass contributing to 1.7% of the electricity production in 2013 (SFOE, 2013). Over the past 14 years, there were no major changes in Swiss electricity generation. However, new renewables (especially solar) have seen some growth in the last five years, although they are still at very low levels compared to most other European countries.

Box 1: Key figures of the Swiss energy sector

Currently the Energy Strategy 2050 is revised by the Swiss Ministry of the Environment, Transport, Energy and Communication to integrate the inputs

from the consultation process and the Swiss government. It is expected that an adapted proposal will be sent into parliamentary debate again in Fall 2014.

Energy generation and consumption have not changed much in Switzerland in the past 10 to 20 years (see box). There have been various attempts to increase the share of new renewable energies and to reduce greenhouse gas emissions (primarily transport and heating) but both renewables policies and taxation of CO_2 have remained very moderate. The electricity sector has seen major regulatory change with a gradual market liberalization that started in 2009, allowing very large customers to choose their supplier. Full market access for all customers was originally foreseen for 2014 but has been postponed due to nuclear phase-out and the new energy transition policy.

3.2 Prior studies on advocacy coalitions in Swiss energy policy

Coalitions in Swiss energy and climate policy have already been analyzed in prior studies. A study of three policy fields (nuclear energy, energy efficiency, and electricity market liberalization) revealed two stable coalitions, a pro-growth and a pro-ecology coalition in Swiss energy policy from 1987 to 2000 (Jegen, 2003). Polarization between these two coalitions was most pronounced in nuclear policy. For more recent policy issues such as market liberalization, belief differences among members of the two coalitions were more moderate and cross-coalition collaboration could be observed.

Almost one decade later, Ingold (2011) and Sutter (2011) analyzed Swiss climate policy between 1995 and 2010. They also identified two major coalitions, a pro-economy, and a pro-ecology coalition. And again they found coalitions to be very stable with not much exchange across coalition boundaries. For some political issues such as energy efficiency or adaptation to climate change, however, cross-coalition cooperation and thus a potential adaptation of otherwise contrasting policy beliefs seemed to be possible (Sutter, 2011). Some actors like cantonal representatives, moderate parties or federal agencies might act as so-called policy brokers (Ingold and Varone, 2012; Kriesi and Jegen, 2001) and thus facilitate policy compromise or even policy change.

In summary, existing studies point to rather stable and polarized coalitions in the Swiss energy policy subsystem but also highlight that – depending on the actual policy issue – some actors work across coalition boundaries and may thus contribute to policy agreements.

4 Methods

Our analysis consisted of four steps including i) definition of scope and selection of key actors, ii) development of a belief coding scheme, iii) coding of three consultation processes and categorization of actors and iv) identification of coalitions based on actors' belief systems. For our study we used public consultation documents. In a consultation process, the administration invites all interested actors to submit written statements on a particular policy proposal. In some cases, stakeholders are even asked specific questions (cf. List 1). Submissions vary in length: some just cover a few pages, while others contain 40 to 80 pages of argumentation. The Energy Strategy 2050 proposal received almost 460 submissions, which points to the relevance of the topic and the potentially large size of the policy subsystem.[4]

In order to identify changes in coalitions, we compared findings from the Energy Strategy 2050 with two earlier energy policy proposals on market liberalization, the Electricity Market Directive (EMD) of 2001 and the Revision of the Power Supply and Energy Directive (PSED) of 2007. There is some overlap in policy content as both also cover the issue of support for renewable energies.

Scope of analysis and selection of key actors

Defining the scope of a policy subsystem and selecting key actors ("policy participants") is a crucial step in the application of the ACF (Sabatier and Weible, 2007). We started with a broad definition: The Swiss energy policy subsystem includes all actors involved in energy policy decision-making in Switzerland. This was narrowed down subsequently. Here the focus was on those actors that participate in the pre-parliamentary phase (consultation procedure).

To narrow down the number of actors, we first compiled a list of 70 organizations, which we assumed to have a high interest in the proposal. To prepare this list, we talked to experts in Swiss energy and climate policy and consulted earlier studies in the field (e.g. Ingold, 2011; Kriesi and Jegen, 2001; Sutter, 2011). Different types of organizations were covered, including political parties, industry associations, energy associations, environmental NGOs, utility companies, commissions and universities.

Next, a shortlist was prepared following the reputational approach (French, 1969), in which actors are included based on their perceived relevance. We contacted seven experts in the field (scientists, administration officials,

[4] Earlier proposals in the field of energy and climate policy from 2000 to 2008 received 170 to 255 submissions and the 2010 revision of unemployment insurance regulation received 73 submissions.

consultants) and asked them to rank each of the 70 organizations in terms of relevance[6] for energy policy making in Switzerland. Experts could also add additional actors. As a result, we yielded a sample of 23 organizations that – on average – were ranked relevant or highly relevant (cf. Table 4). Following the positional approach (Knoke, 1993), in which actors are selected because they hold formal decisional power or competences in the issue, we included additional actors from the housing sector, industry, commerce and transportation. Our final sample covered 41 actors divided into seven different groups (cf. Table 4).

Development of coding scheme

According to Sabatier (1993), a qualitative content analysis of publications of interest groups is a very suitable method to empirically examine policy core beliefs. To ensure a systematic and reproducible analysis we developed a category system that reflects both the applied framework and the data available. We briefly substantiate our categories below. This seems important, as several earlier publications in this area did not explain the set-up of the categorical framework used (e.g. Elliott and Schlaepfer, 2001; Lubell, 2003; Heintz, 1988).

We started with a list on policy core beliefs from the literature (Sabatier, 1998). That list was Sabatier's attempt to illustrate policy core beliefs in a concrete but general way. Besides subsystem-specific and institutional aspects, we also included the three dimensions of sustainability (environmental protection, social justice and economic efficiency). Next we tested our initial scheme with a selection of consultation documents and refined it. In particular, we split the initial categories of policy core beliefs into sub-dimensions. This bottom-up approach helped us to classify actor statements more precisely. We ended up with a list of 5 dimensions, and 18 sub-dimensions to identify policy core beliefs (cf. Table 5).

Secondary beliefs (cf. List 1) were derived from four questions out of the questionnaire that was part of the consultation. These questions are about specific policy goals and instruments.

Coding of beliefs and categorization of actors

To facilitate coding, we defined exemplary statements for each sub-dimension and used a four-stage ordinal scale to classify the text phrases found in the actors' consultation answers for Energy Strategy 2050 (cf. Table 6). In a pre-test, three submissions were coded independently by two researchers. Results were compared, coding guidelines adapted and specified. To better handle the large text quantities, we worked with MAXQDA, a software for qualitative data analysis.

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[6] Responds could choose between "highly relevant", "relevant" and "rather not relevant".

As the two other policy proposals had a somewhat different focus, not the exact same coding scheme could be applied. For instance, the dimension of social justice had to be removed because it did not yield a sufficient number of statements.

Also note that not all actors made submissions to all three proposals, some submissions were insufficient for solid belief identification, new actors appeared and some actors changed names. As a result we could only analyze statements of 24 actors for the EMD, 29 actors for the PSED and 31 actors for the Energy Strategy 2050 (out of the 41 preselected organizations).

Identification of coalitions

To identify coalitions, we pursued the following steps. First a matrix was created with one row for each actor and one column for all 18 core and four secondary beliefs. Each cell was then filled with a number between 1 and 4 (Table 6) indicating varying levels of agreement with the respective belief dimension. Second, a Manhattan Distance Analysis was conducted to transform this "actor vs. belief" matrix into an "actor vs. actor" matrix, where every cell indicates the distance in belief attribution between two actors. Third, clustering of actors was carried out with the Tabu Search Clustering approach. To assess the optimal number of clusters, Tabu Search Clustering provides a relative goodness of fit (Hanneman and Riddle 2005). In our case, the most robust results were produced by a split of the subsystem into two clusters, i.e. two coalitions. By using multidimensional scaling the distances of all actors can finally be illustrated graphically in two-dimensional maps (cf. section 5).

5 Results

In this section we first present our results from the Energy Strategy 2050 consultation, in terms of both policy core beliefs and secondary beliefs. In a second step, we compare the current actor base, policy core beliefs and coalitions with those of the two earlier policy processes.

5.1 Energy Strategy 2050

Analysis of policy core beliefs

Our analysis shows that the policy core beliefs of the key actors in the Swiss energy policy subsystem of 2013 are distributed heterogeneously (cf. Figure 2). There are two coalitions emerging from the cluster analysis. A larger group of actors (1) encircled on the bottom-right part of the graph, and a smaller one on the left side (2).

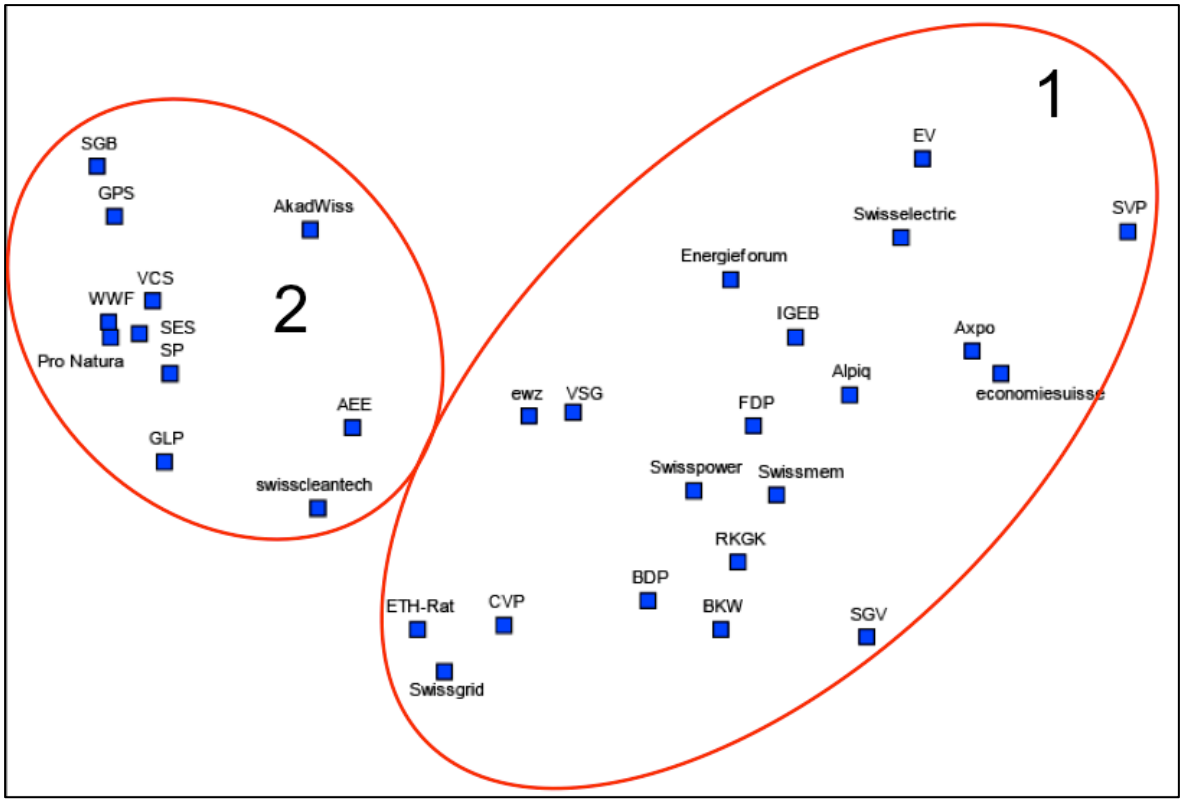

Figure 2: EnStrat 2013 – Relative distances of actors in terms of policy core beliefs

Group 1 encompasses mid- and right-wing parties, 'classical' industry associations such as Economiesuisse, energy associations and the large Swiss utility companies (cf. Table 2). Group 2 consists of three green and left-wing parties, the Swiss Federation of Trade Unions (SGB), a clean-technology industry association (Swisscleantech), the major environmental NGOs and two renewable energy associations. In the following, we will refer to the first group as "pro-economy" coalition and to the second as "pro ecology" coalition.[9]

Although there are belief differences within each coalition, we could identify some common threads in each of the five dimensions of our category system (cf. Table 3). While pro-ecology actors regard the energy transition as a chance and attach great importance to renewable energies, pro-economy actors see no need to change the established energy system. Moreover, pro-ecology actors, in contrast, call for policy intervention and regulatory change to get the energy transition off the ground. Pro-economy actors, in contrast, reject regulatory

[9] These labels are proxies for the dominant beliefs in the two coalitions and chosen in accordance with earlier studies (e.g. Ingold 2011). It has to be noted though that the labels are somewhat misleading as actors of the first coalition also highlight environmental concerns (but to a lesser extent) and actors of the second group also highlight economic motivations.

intervention and some even show a general mistrust of the state. The following statement by a leading industry association may serve as an illustration here:

> „[At stake here is] the basic public policy question, which role the state should play in energy policy. The proposal is strongly marked by state control, influence and re-education in wide areas of life- and work organization. … We regard the entire political mix of regulation, subsidies, intervention in planning and bureaucracy as not productive. … The [energy] strategy at hand would lead Switzerland into an economic dead end." Economiesuisse 2013

Table 2: Key actors in the two coalitions

	"pro ecology" coalition (2)	"pro economy" coalition (1)
Political parties	GLP, GPS, SP	BDP, CVP, FDP, SVP
Trade associations	SGB, Swisscleantech	Economiesuisse, EV, SGV, Swissmem
Environmental protection and consumer organizations	Pro Natura, VCS, WWF	
Energy supply companies		Alpiq, Axpo, BKW, EWZ, Swissgrid, Swisspower
Energy associations	AEE Suisse, SES	Energieforum, IGEB, Swisselectric, VSE
Scientific organizations	AkadWiss	ETH-Rat
Others		RKGK

Both groups of actors refer to environmental, economic and social concerns but they set quite different priorities. Pro-ecology actors assign a high priority to environmental protection and climate change and they mobilize pro-environment arguments much more frequently than pro-economy actors. An inverse relationship applies for economic priorities. Pro-economy actors repeatedly emphasize that low energy prices and competitiveness of the Swiss industry are very important. However, also actors in the pro-ecology coalition mobilize economic arguments. They highlight that the energy transition creates jobs and reduces dependence on energy imports, as expressed in the following statement by the Social Democratic Party.

> „Until 2030, 50% of the energy consumption in Switzerland must be covered by renewable energies. … the required targets lead to a massive expansion of renewable energies and an increase of energy efficiency, which create jobs and added value in Switzerland. [This] represents an opportunity for the economy and reduces foreign dependence on fossil energies." SP 2013

In terms of social impacts, pro-ecology actors claim that energy must be affordable for everyone (with the households in mind), while pro-economy actors are more occupied with broad public legitimation for energy policy.

Table 3: Typical policy core beliefs of actors in the two coalitions

Policy Core Beliefs	"pro ecology" coalition (2)	"pro economy" coalition (1)
Seriousness of the problem	Expansion of renewable energies is important; energy transition is an opportunity	No need to change the existing energy supply system
Role of the state	Public policies are necessary for energy policy	State interventionism has negative effects on the economy in general
Environment	Climate change and environmental protection are important issues for energy g	[low degree of mobilization]
Economy	Expansion of renewable energies creates jobs and reduces import dependency	Low energy prices are important to maintain industry competitiveness
Society	Energy must be affordable for everyone, including households	Energy transition must be ultimately approved by public vote

While the general differences are remarkable, belief distances between specific pro-ecology and pro-economy actors are in some cases much smaller. The Electric Utility of Zurich (ewz) and the Swiss Association of the Gas Industry (VSG), for example, are close to the positions of the Association for Renewable Energies and Energy Efficiency (AEE) and Swisscleantech (Figure 2). These actors are located at the common boundary of coalitions, which means that their distance to actors of the other coalition is even smaller than to some members of their own coalition. They same holds for the Swiss Federal Institute of Technology (ETH), the Christian Democratic People's Party (CVP) or Swissgrid, the Swiss transmission grid operator. These actors hold comparably moderate policy core beliefs, which makes it easier for them to potentially engage in cross-coalition collaboration. The following illustrates that the CVP highlights the benefits of the energy transition, despite being classified as a pro-economy actor.

> „The CVP considers the phase-out of nuclear energy and the related expansion of energy generation from renewable, domestic energy sources an opportunity for Switzerland. With [this kind of] energy generation the regional economy can be strengthened and jobs can be created." CVP 2013

Analysis of secondary beliefs

With regard to secondary aspects we compared whether the actors are in favor of nuclear phase-out and support targets for renewables, energy efficiency and energy demand (cf. List 1). Here the picture is very much different compared to what we saw for policy core beliefs (Figure 3).[10]

[10] Note that we do not refer to coalitions in this part of the analysis because this term is exclusively used for differentiation on the basis of policy core beliefs.

We find that most organizations support the new policy objectives. Interestingly, even actors that – in terms of policy core beliefs – are part of the pro-economy show various levels of consent. This includes electricity sector players such as EWZ, Swisspower and BKW as well as CVP, the Swiss association of small and medium enterprises (SGV), ETH and the Swiss mountain cantons. The statement of BKW, one of the Swiss nuclear power plant operators, illustrates how cautiously nuclear proponents argued in 2013.

> "After the events in Japan, it is clear for BKW that the substitution of … Swiss nuclear power plants cannot take place with nuclear power plants of present-day technology. BKW can therefore understand the political will to ban the construction of new nuclear power plants. … However, a legally consolidated technology ban for nuclear energy based solutions has to be rejected." BKW 2013

The analysis also shows that the positions of those in favor of the propositions are widespread, while most opponents express identical secondary beliefs. This might make it easier for the opponents to join forces against the proposal.

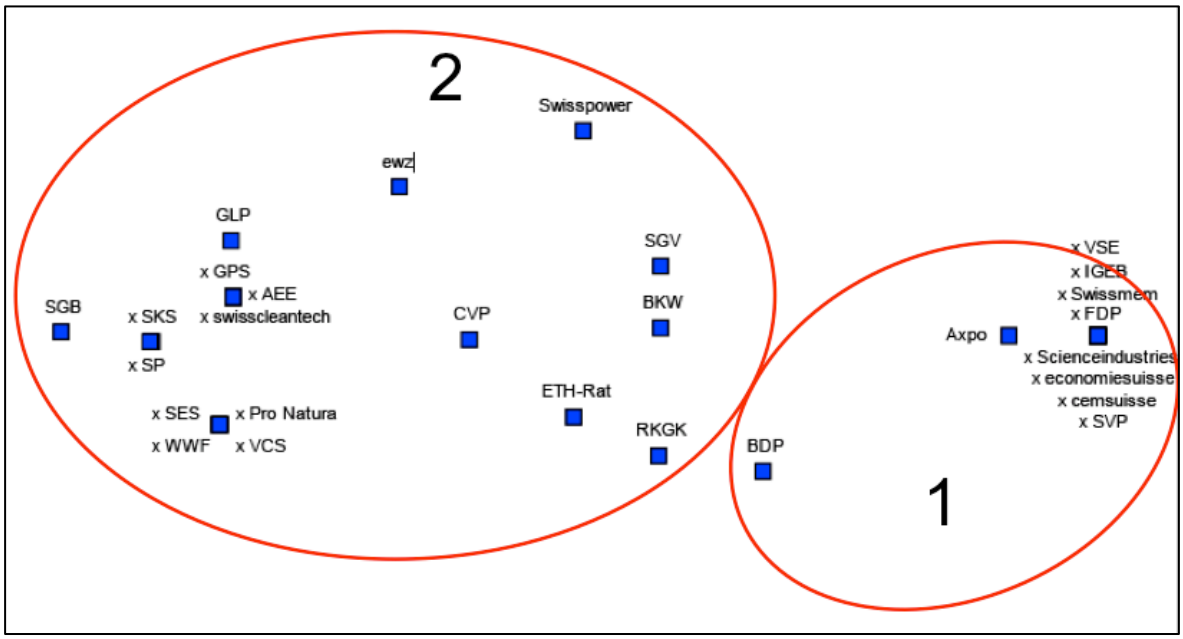

Figure 3: EnStrat 2013 - Relative distances of actors in terms of secondary beliefs

5.2 Changes in advocacy coalitions

We distinguish two types of change, changes in the actor base and changes in beliefs and coalition configurations.

Changes in the actor base

Within our observation period, we find a series of changes in the set of key actors. Among others, two new political parties emerged. The Green Liberal Party (GLP) was founded in 2004 in the Canton of Zurich as a split-off of the Green Party and has become active at the national level from 2007 onwards. The Civic

Democratic Party (BDP) was founded in 2008 as a separation from the right-wing Swiss People's Party (SVP). In our data, both newcomers show up ony in the 2013 consultation process.

In the electricity sector, there was a merger of two large electricity producers in 2009, which resulted in a new firm named Alpiq.[11] Furthermore, two novel associations emerged. Swisselectric was founded in 2002 by the four largest utility companies in Switzerland to strengthen technological and political collaboration. Swisscleantech was founded in 2009 to supports the interests of 'clean-technology' firms, many of which are SMEs that offer 'green' products or services. In 2013, Swisscleantech had close to 300 members.

Some of these changes (foundation of new parties) were largely independent of the developments in the energy sector, while others were not. Market liberalization has led to mergers, new alliances and a diversion of interests in the electricity sector. For utilities with a focus on distribution, the energy transition seems to represent less of a threat than for power producers (esp. those invested in nuclear energy). The foundation of Swisscleantech is related to an even broader phenomenon, the rise and increasing impact of eco-oriented products and services.[12] These are often related to energy but also go beyond it.

Changes in coalitions

In all three policy consultations, the pro-economy coalition (1) was the dominant one. In 2001, it held almost three times as many actors as the pro-ecology coalition (Figure 4) and in 2007 it comprised still twice as many (Figure 5), similar to what we found for 2013 (Figure 3).[13]

The three cases also vary in terms of belief distances. In 2001 the distance between the two coalitions was very prominent, while in 2007 actor beliefs were more heterogeneous and the two coalitions less far apart. In fact, from 2001 to 2013 there is increasing belief heterogeneity among pro-economy actors while the average belief distance in the pro-ecology coalition remains largely the same.[14]

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[11] For the consultations of 2001 and 2007 we took the statements of both predecessors (Atel and EOS) and compiled their aggregated beliefs to improve comparability. The differences of the positions of the two companies were rather marginal.

[12] In March 2013, the Swiss government has launched a set of instruments to foster green consumption and a circular flow economy ("action plan green economy").

[13] Note that the size of a coalition is not a sufficient indicator to determine its actual influence on the policy process. See also related comment on resources in section 6.2.

[14] It has to be noted though that a direct comparison of actor positions and average distances over time is somewhat limited because the overall number of actors we

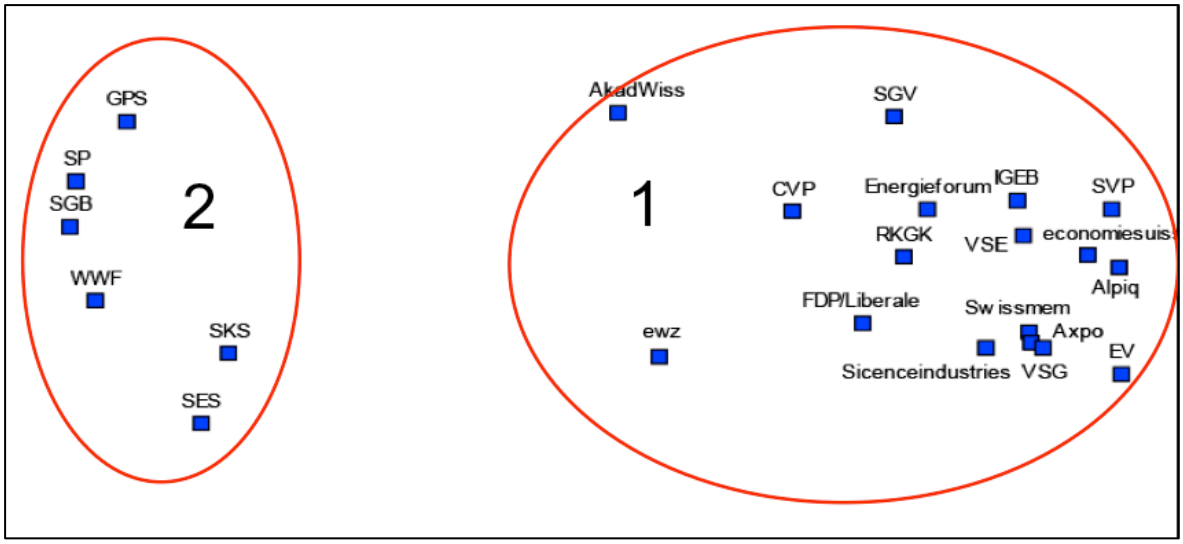

Figure 4: EMD 2001 - Relative distances of actors in terms of policy core beliefs

We also found that three pro-economy actors, the Swiss Academy of Sciences (AkadWiss), the municipal utility of Zurich (EWZ) and the Christian Democratic People's Party (CVP) were comparatively close to the other coalition in 2001 and in 2007. This also applies for 2013 with the exception that AkadWiss was then even part of the pro-ecology coalition. Also pro-ecology had such 'boundary-spanning actors'. These are AEE, Swisscleantech and Swissolar.

Finally, the comparison shows that two new actors, the Green Liberal Party (GLP) and Swisscleantech 'joined' the pro-ecology coalition, while another two newcomers, Swisselectric and the Civic Democratic Party (BDP), were found the pro-economy coalition.

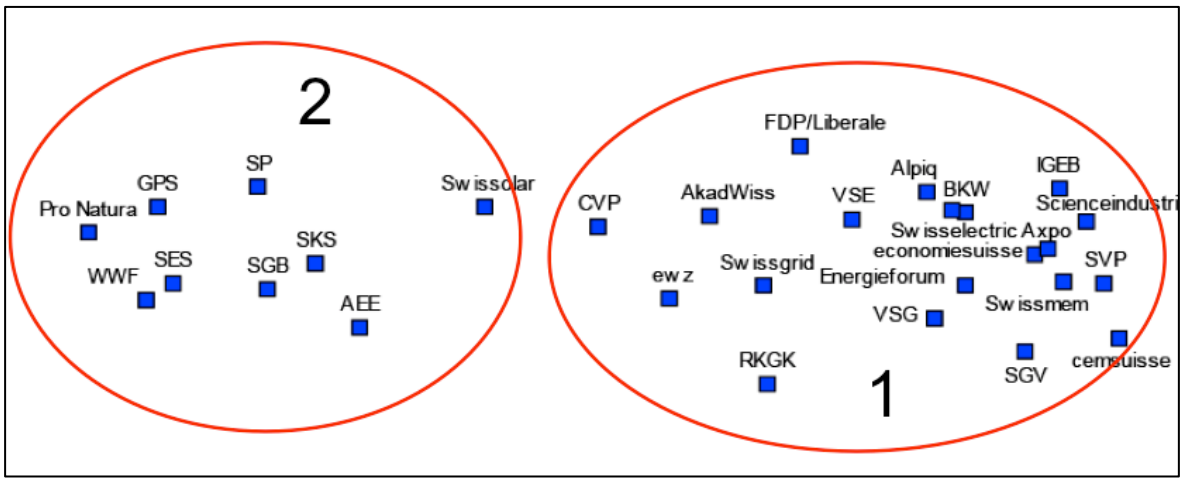

Figure 5: PSED 2007 – Relative distances of actors in terms of policy core beliefs

could include in our analysis varied. This is due to data availability and changes in the actor base.

5.3 Summary of findings

The Swiss energy policy subsystem is characterized by two coalitions: A larger group of key actors ("pro-economy") tend to give priority to low energy prices and rather oppose regulatory intervention, while a smaller group of actors ("pro-ecology") highlight the importance of environmental and climate protection and the necessity of public policies towards these goals. Over a period of 13 years, the two coalitions have remained very stable and policy core beliefs of the key actors have not changed very much.

However, the spectrum of policy core beliefs has increased: Positions back in 2001 were much more polarized compared to 2013. Especially actors in the mid-right political spectrum today exhibit a greater variety of beliefs than in earlier years. Moreover, we found quite some support for the energy transition policy proposal at the level of secondary beliefs – despite otherwise stable coalitions. Several pro-economy actors support the current policy proposal, although they display otherwise conservative policy core beliefs.

Finally, our study revealed that there is a comparatively high political interest in the energy transition. The current policy proposal received a record-breaking 460 submissions, while earlier bills got 2 to 3 times less. The proposal has touched upon the interests of a wide range of organizations and industries, including transportation, building, cement industry, machinery industry etc. Many of these are not 'the usual suspects' in energy policy, which points to the variety of issues at stake and the fundamental nature of an energy transition.

6 Discussion

6.1 Discussion of results

Our findings that two coalitions characterize Swiss energy policy making and that these have largely been stable in the past are supported by earlier studies. Jegen (2003) found a dominant "pro-growth" and a minor "pro-ecology" coalition competing from 1987 to 2000 and also Ingold (2011) and Sutter (2011) found very similar coalitions and very little change for the case of climate policy in Switzerland. Jegen (2003) also reported that the pro-growth coalition was very dominant in earlier years, while towards the late 1990s, power and size of the two coalitions became more equilibrated (Kriesi and Jegen, 2001). The latter is not supported by our data. We found a clear majority of key actors in the pro-economy coalition - in 2001 and also later until 2013.

Furthermore, the dominant coalition included *incumbent actors* of the energy sector and their representatives. This is in line with studies from other countries

that found energy incumbents rather lobbying against major policy changes (Kern and Smith, 2008; Stenzel and Frenzel, 2008). However, we also saw that the incumbents are not a united force. Three players (EWZ, BKW and Swisspower) were in favor of many of the proposed policy changes in 2013. EWZ is the largest municipal utility and Swisspower is a joint venture of 23 municipal utilities. So it seems that these incumbents rather see opportunities than risks in the energy transition.

Given the observed stability of Swiss energy policy coalitions, it comes as a surprise that *secondary beliefs* are pro change and many key actors are currently in favor of nuclear phase-out and an expansion of renewables by means of regulation. This is all the more interesting as nuclear has been one of the most contested energy policy issues in Switzerland in the past, with very polarized views and a strong advocacy coalition in favor of its continued use (Jegen, 2003). However, views on nuclear and renewables are obviously changing. Even actors, which are essentially conservative, meanwhile express doubts on nuclear and see economic potential in alternatives (see earlier statement of CVP).

The energy transition is associated with arguments about job creation, regional value creation and independence of energy imports. Such arguments fit very nicely to conservative policy core beliefs but are also mobilized by pro-ecology actors. This means that the policy issue (energy transition) does not match the 'classical' lines of conflict between environmental and economic values any more.[15] In fact, the *policy issue has shifted* over time as renewables became more mature and economically viable and nuclear has lost some of its earlier legitimacy.

Our study also showed that in 2013 the pro-ecology coalition included three major industry associations (AEE, Swissolar and Swisscleantech). This coalition, in other words, is not just constituted by left-wing parties and environmentalists but also accommodates for a new type of industry actors. There is a range of industries such as clean-tech, energy efficiency, energy services, solar, wind etc. whose members expect to benefit from the ongoing energy transition, which is why they are in favor of stringent transition policies. We interpret this as an indication that the underlying *actor basis shifts* as socio-technical change unfolds. Again, the energy transition is not just a struggle of environmental and economic interests but of emerging vs. established industries, and who will win or lose.

Finally, we also saw that actors hold *different positions*, with some being close to the opposite coalition. Actors that display moderate beliefs and engage in cross-

[15] This also questions the labels we used for the two coalitions.

coalition collaboration and coordination can play a crucial role for policy change (Beyers and Braun 2013; Kriesi and Jegen 2001). As brokers they seem particularly relevant in Swiss decision-making, which is generally characterized by compromise seeking. Our study has shown that EWZ, VSG, CVP, Swisscleantech, AEE and Swissolar are potential candidates for such a role. Further investigation would be need though on whether they actually use this potential.

6.2 Methodological challenges

One motivation for our study was to explore how established methods for analyzing coalitions in policy subsystems can inform transition studies. The systematic identification of key actors, their policy core beliefs and relative positions has helped us to make major lines of political conflict transparent (Table 3), to detect typical arguments, to discover potential boundary-spanning actors and to draw conclusions on further developments in the field. Such an actor oriented approach seems to be all the more interesting as innovation and transition studies have just started to take a more explicit view on actors, resources, strategies and interests (Farla et al., 2012; Markard and Truffer, 2008a). In our analysis, however, we encountered some methodological and conceptual challenges that deserve consideration in further research.

Study of cooperation and resource flows

In this study we identified coalitions on the basis of belief similarity. We did not venture into examining *actual collaboration* among actors. Although previous work (cf. Sabatier and Weible, 2007) has shown that policy core beliefs typically exhibit a strong overlap with collaboration (e.g. information exchange, joining forces, alignment of positions), we could not demonstrate this for the case at hand. Further research may want to explore alternative measures on both the existence of coalitions and the collaboration of actors within advocacy coalitions and other types of alliances such as innovation networks (Musiolik and Markard, 2011). It is especially the building of networks and the exchange of resources within alliances we expect to deliver further insights into the actual influence of coalitions on policy making.

Actual influence on policy process

While we could point to the numbers of key actors in each coalition this tells us little about what influence these actors and coalitions really have on the policy process (Stokman and van den Bos, 1992). Further research will therefore benefit from systematic analyses of power (Avelino and Rotmans, 2009) and of the resources actors control (Sabatier and Weible, 2007). The latter include formal decision-making power, access to political venues, financial resources, social

ties, legitimacy etc. In the case of political parties, for example, one could use seats in parliament or voting shares as proxies for political influence. Another possibility is to look into the financial resources different coalitions have available (cf. Hess, 2014) or direct relations they maintain with formal decision-makers (Beyers and Braun 2013).

Incomplete data & belief mobilization

With position papers from many different actors available, the approach of identifying policy core beliefs on the basis of written accounts is both promising and feasible. However, even with an essentially nice stock of data it might not always be possible to accurately map the core beliefs of every actor. We came across many instances in which submissions were not long or detailed enough to extract policy core beliefs. In addition, we encountered a systematic challenge as several pro-economy actors made no or just very few statements on environmental or social issues. If an actor does not mobilize a specific belief dimension (e.g. environment) we can only assume that it is not important. An alternative approach is therefore to approach policy actors with questionnaires that explicitly try to reveal different dimensions of policy core beliefs (Ingold, 2011).

7 Conclusions

Socio-technical transitions such as the current transformation of the energy sector are of fundamental societal, economic and environmental importance and inherently political. Scholars in the field of innovation and transition studies have therefore repeatedly called for paying more attention to the underlying policy processes (Markard et al., 2012; Meadowcroft, 2011; Shove and Walker, 2007; Smith et al., 2010). With this paper, we have addressed this gap and analyzed changes in advocacy coalitions as a precondition for major policy change.

For energy policy in Switzerland we found that coalitions have remained very stable over the last 12 years. This is not just line with the findings of earlier studies on the Swiss energy policy subsystem but also supports one of the ACF's basic assumptions that policy core beliefs are rather resistant to change. Our analysis also showed that incumbent actors of the energy system are well represented in the dominant advocacy coalition that opposes policy change.

Nonetheless, there are indications for change: Policy core beliefs of actors in the dominant, conservative coalition have become more heterogeneous. In terms of secondary beliefs a majority of key actors even supports the energy transition, including some energy incumbents. It seems that even actors who are essentially (but moderately) conservative see opportunities in the energy transition. Finally,

there are emerging industry actors (clean-tech, solar, energy efficiency) that expect to benefit from the transition and are thus well represented in the pro-ecology coalition. These changes might translate into policy support for a major re-orientation in the Swiss energy sector.

In conceptual terms, these observations can be interpreted as three interrelated processes: (beginning) changes in policy core beliefs, changes in the actor base (e.g. new industry actors emerging) and changes in the policy issue. These are very likely related to a maturation of the alternative socio-technical system: Renewable energies meanwhile can be perceived as economic opportunities and are associated with conservative values such as job creation and energy independence. The emergence of new industry actors further supports the economic importance of alternative technologies. At the same time, nuclear energy has lost some of its former legitimacy and became increasingly expensive, which also provides grounds for re-valuation.

This has implications for theory: In the case of socio-technical transitions, it seems that policy change is not just a matter of changes in policy core beliefs. Instead, change of the policy issue (e.g. technology performance characteristics) and changes in the actor base (e.g. new industries emerging) also play a role. This essentially points to the interdependence of policy change and socio-technical change as suggested by our framework.

In conclusion, we think that the ACF represents a fruitful framework to analyze innovation and transition policy processes. It is therefore a valuable complement to the socio-technical systems approaches that are usually applied when studying socio-technical change. More specifically, it seems to be a useful tool to follow the actors, i.e. to identify beliefs and belief changes over time. It also has the potential to further integrate analyses of the resource endowments of both actors and advocacy coalitions. However, we also have to acknowledge that the ACF focuses on a particular type of actors, the policy elite, with experts, political parties, corporate actors and associations in the foreground. It might therefore overlook how struggles over values unfold elsewhere, e.g. within organizations (firms, parties, associations) or in the broader population (social media, public discourse). Overall, the ACF still seems to fit nicely into the broader research agenda of sustainability transition studies, addressing the issue of politics (Lawhon and Murphy, 2012; Smith and Stirling, 2010) and paying more attention to the strategies and interests of actors (Farla et al., 2012).

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Appendix

Table 4: Most relevant actors in the Swiss energy policy subsystem

Category	**Actor name**
Political parties	Civic Democratic Party (BDP)
	Christian Democratic People's Party (CVP)
	Liberal Democratic Party (FDP)
	Green Liberal Party (GLP)
	Green Party (GPS)
	Social Democrat Party (SP)
	Swiss People's Party (SVP)
Trade associations	Association of Swiss automobile importers (Auto Schweiz)
	Association of Swiss cement industry (CemSuisse)
	Swiss business federation (EconomieSuisse)
	Oil association (EV)
	Federation of home owners (HEV)
	Tenants association (MV)
	Scienceindustries
	Swiss federation of trade unions (SGB)
	Swiss federation of small and medium enterprises (SGV)
	Swiss Cleantech
	Swiss association of machinery, electro and metal industry (Swissmem)
	Swiss Touring Club (TCS)
Environmental protection and consumer organizations	Pro Natura
	Foundation for consumer protection (SKS)
	Swiss Traffic Club (VCS)
	WWF Switzerland (WWF)
Electric utility companies	Alpiq Holding AG (Alpiq)
	Axpo Holding AG (Axpo)
	BKW Energy AG (BKW)
	Municipal utility of Zurich (EWZ)
	Swissgrid [transmission system operator]
	Swisspower [energy service joint venture of Swiss municipal utilities]
Energy associations	Association for renewable energies and energy efficiency (AEE)
	Energyforum
	Alliance of energy intensive industries (IGEB)
	Swiss energy foundation (SES)
	Swisselectric [Association of the major power producers]
	Swiss association for solar energy (Swissolar)
	Federation of Swiss electric utilities (VSE)
	Federation of the Swiss gas industry (VSG)
Scientific organizations	Swiss academy of sciences (AkadWiss)
	ETH-Rat
Others	Swiss electricity commission (ElCom)
	Intergovernmental conference of mountain cantons (RKGK)

List 1: Questions in the consultation along which we distinguished secondary beliefs

- Do you agree with a step-wise phase-out of nuclear energy? Yes/No.
- Do you agree that new nuclear power plants cannot be approved any more? Yes/No.
- Do you agree with expansion targets for electricity from renewable energies and with targets for energy demand? Yes/No.
- Do you agree that electricity suppliers have to fulfill targets for a steady improvement of energy efficiency (with the use of white certificates)? Yes/No.

Table 5: Coding scheme

Policy Core Beliefs			Sub-dimensions
1) Subsystem-specific aspects	Seriousness of the problem	Relevance of the energy transition	Increase in renewable energies and improvement of energy efficiency
			Importance of taking actions
			Risks of nuclear energy
2) Institutional aspects	Market - State	Responsibilities between market and state	Reliance on market forces
			General position with regard to policy instruments
	Centralized - decentralized	Responsibilities between different levels of government	Restriction of federalism
			Orientation towards the principle of subsidiarity
Sustainability dimensions	3) Ecological aspects	Protection of climate, environment and resources	Comprehension of climate goals
			Protection of landscape vs. expansion of renewable energies
			Greater involvement of mobility sector
			Other aspects
	4) Social justice	Involvement in decision-making processes	Democratic legitimization and objection rights
		Price for Energy	Affordable energy supply
	5) Economic efficiency	Supply security	Energy independence
			Legal certainty and clear framework conditions
			Priority of supply security
		Costs of energy	Effects on employment
			Importance of energy prices for economy
			Criterion for choice of technology
		Competitiveness	Importance of competitiveness

Table 6: Example of code assignment

Policy Core Belief			Sub-dimension	Ordinal Scale
2) Institutional aspects	Market - State	Responsibilities between market and state	Fundamental position on policy instruments	The actor generally opposes any further regulation and policy intervention
				1 = Yes
				2 = Rather yes.
				3 = Rather no.
				4 = No. State interventions help to achieve pre-set goals.