




Going beyond technocratic and democratic principles: stakeholder acceptance of instruments in Swiss energy policy

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Abstract

This paper is about stakeholders' acceptance regarding regulatory instruments in energy policy. We expect that today's introduced instruments not only correspond most to technocratic principles and what elected officials prefer, but that they correlate with the preferences of a wider number of public and private actors in policymaking. We therefore compare the already introduced policy instruments to instrument preferences of the public administration, elected officials, but also NGOs and utilities. In doing so, we contribute to the question of whether or not the instruments already introduced today correspond to technocratic or democratic principles, or to the preferences of the larger governance arrangement involving other public and private actors. We compare three cantons in Switzerland and gather data through a systematic literature review, expert interviews, and surveys. The comparison of the data suggest that the currently selected policy instruments correspond to technocratic principles, but that they also and often correspond to the preferences of public and private actors. More concretely, whereas in one canton, NGO preferences align with the introduced instruments, in another canton, this is the case for utilities. In the third canton, all different actor types display similar preferences very much in accordance with the currently employed instrument mix. We thus conclude that depending on the region, different principles and preferences are reflected in the current policy mix.

Keywords Policy design · Acceptance · Technocracy · Democracy · Governance · Renewable energy policy

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Introduction

The selection of policy instruments is a core task of political decision making and a key element in policy studies. Policy instruments are the ‘public’ tools available to steer and govern, with the aim of changing a target groups’ behavior and to reach political goals (Howlett 2009; Landry and Varone 2005). Traditionally, the selection of policy instruments was in the hands of either technocrats/the public administration, elected officials, or both. Today’s research shows that a broad array of actors can be involved in policy instrument selection (Howlett and Lejano 2012). Thus, when interested in what ideologies are reflected in today’s policies, the study of a variety of stakeholders as well as the values and world-views they have seems crucial (Weible 2005). New institutional arrangements emerge, such as collaborative or governance networks, in which policymaking is characterized through self-organization and collective cooperation (Berardo and Scholz 2010; Bodin and Crona 2009). There is actually an ancient debate as to whether technocratic or democratic principles should dominate policy design (see also Gilley 2017). We try to go beyond this debate and ask if the policy instruments introduced today reflect technocratic or democratic principles, or if they correspond to the preferences of a wider set of actors involved in the larger governance arrangement. (e.g., technocrats/public administration; elected officials, but also NGOs or utilities).

This question is important because if we find evidence that today’s instruments do not correspond anymore to the preferences of a large number of politically involved actors, policy may change in the future and current instruments be abolished or suffer correct implementation. And differently, if many stakeholders prefer instruments that are not yet introduced, then new measure might have a real chance to get into the future mix.

The present paper explores the nexus between criteria of technocratic policy design (e.g., resource intensiveness) (Bressers and O’Toole 1998; Dahl and Lindblom 1992; Henstra 2016; Landry and Varone 2005; Metz 2017; Sovacool 2009; Varone and Aebischer 2001), of democracy (i.e., the acceptance of elected officials), and collaborative governance including stakeholder’ instrument acceptance (Ansell and Gash 2007; Feiock and Scholz 2010; Nohrstedt 2010). In this context and in line with Peters (2002, 563), we test whether currently introduced policies correspond most to technocratic criteria for policy design and whether they are also legitimized by other stakeholders’ acceptance.

Empirically, we study instrument mixes for the promotion of renewable energies in three Swiss cantons (i.e., sub-national states). We take a comparative approach because depending on the regional context (e.g., how disputed renewables are, their impact on landscape or the local economy, or best practice examples), there might be important differences in stakeholders’ acceptance of policy instruments (typically green NGOs or utilities) and how much they correspond to the acceptance of the administration and elected officials. A comparison of cases furthermore allows a more thorough assessment of potential policy implications.

The Swiss case is ideal because the Fukushima crisis in 2011 constitutes a landmark in Swiss energy-related policymaking: It marked a radical shift away from nuclear power and toward plans for substantially greater amounts of renewables (RE) (Swiss Federal Department of the Environment, Transport, Energy and Communications DETEC 2017). To achieve this target, new policy instruments for the promotion of RE are introduced or removed from the policy mix that aims to achieve the energy transition. Other studies about the energy transition mostly cover the impact of policies on the *outcome*, e.g., the production of renewable electricity or the decrease in carbon emissions (Yi and Feiock 2014), or

they investigate why specific renewable energy projects succeed or fail (Martin and Rice 2015). We know much less about *policy instruments*, i.e., the *policy output* in such transformational settings and about the pathway toward the future policy mix. In this context, going beyond the ‘technocrats versus democrats’ question is particularly interesting: On the one hand, RE strategies are often realized through local projects (e.g., wind farms). The realization of those projects tends to rely heavily upon the acceptance of neighboring communities and the local population, which implies that knowing the preferences of representatives of civil society and the local economy seems a key for successful implementation of policy instruments (Wolsink 2012). On the other hand, if the energy sector is of strategic importance to the state, authorities such as the administration or elected officials might not want to give policy design out of their hands. However, we cannot make inference about what principle (technocratic versus democratic) or stakeholder groups impact today’s policy mix or future instrument selection most. However, we can evaluate to what principles and stakeholder preferences today’s instruments correspond most. This gives us then the chance to speculate about what instruments might have more or less support in the future.

Methodologically, we implement an innovative combination of approaches. First, we determine the currently implemented policy mix. Second, using three selected technocratic criteria, we evaluate policy instruments that the three Swiss cantons could use for the promotion of RE based on a literature review and expert interviews. To obtain a ranking, we employ multi-criteria methods (i.e., ELECTRE TRI) (Roy 1991, 2016). The use of multi-criteria methods (MCA) in policy design has been repeatedly suggested in recent years in order to provide scholars and decision makers with more reliable empirical analyses (Howlett 2004; Schneider 2012). Third, to assess the stakeholders’ acceptance of policy instruments (preferences of technocrats and elected officials, but also NGOs and utilities), we collected extensive original survey data. The survey comprises of questions aiming to collect information about actors’ preferences regarding current and potential future instruments that would enable a renewable energy transition.

Policy mixes and policy design

The range of measures available to overcome politically identified problems is vast, and, generally, policy instruments can be used interchangeably (‘toolbox’ approach) (Landry and Varone 2005). However, in recent years, scholars of policy design increasingly acknowledged the complexity of policy selection and shifted their focus from single instruments to multi-tool policy mixes (Gunningham 2005; Henstra 2016). Howlett and Rayner (2013) and for example, state that policy instruments are rarely introduced on a ‘clean slate,’ i.e., new policy instruments depend on older instruments that were previously implemented. Howlett et al. (2014) analyze policy design for multifaceted instrument mixes and call for a better evaluation of policy instruments in such intricate situations.

Technocratic and democratic principles in policy design

Policy design evolved during the last decades and now includes several criteria for instrument evaluation, assessment, or selection (for an overview, see, e.g., Metz 2017). One can distinguish three different generations of instrument analysis based on different criteria:

The first generation of policy scholars strongly emphasized coercion as the main criterion regarding the evaluation of policy instruments (Lowi 1972). This focus emerged from the ongoing debate between economists and political scientists regarding the interrelation between the state and the market and how much state intervention versus market freedom was needed. This primarily economic approach centered on the resolution of specific market failures and searched for single policy instruments that were designed to solve one specific problem (Dahl and Lindblom 1992). Furthermore, first generation political scientists tended to focus on what the state should have done, rather than what states actually did, thereby missing the empirical aspect of policy (Howlett 2004, p. 3). The selection and design of policy instruments is, however, not a simple process in which a problem and its solution, as shaped by a policy instrument, have to be identified and implemented by a few decision makers.

Second generation scholars put a more distinct emphasis on the ‘policy’ context, i.e., the broader portfolio of instruments that are already introduced and in what new instruments are embedded in (Bressers and O’Toole 1998). The new focus on context illuminated the realization that the introduction or implementation of new policy instruments always depends on the preexisting policy mix, which begs the question of whether ‘optimal’ policy mixes can ever be developed in the first place (Grabosky 1994).

A third and most recent generation of scholars further considered the ‘political’ context, i.e., politics and the procedural elements in policy design (Howlett and Rayner 2007; Metz 2017). Varone and Aebischer (2001, p. 618) mainly suggest four criteria by which political actors can choose and evaluate policy instruments: (1) Ideological constraints refer to the limitations placed on instrument selection due to existing political ideologies and most importantly to ideological majorities in parliament. Technocrats will therefore try to opt for instruments that do not encounter ideological constraints and fit ideological majorities in order to effectively pass the political decision-making process (Henstra 2016). (2) Resource intensiveness, which refers to the intensity of the costs required to operate an instrument—administrative personnel, monitoring, enforcement, infrastructure, etc. (3) Targeting precision, which refers to how precisely an instrument is aimed at its targets. Well-targeted policy instruments are able to reach the identified target group (Metz 2017; Schneider and Ingram 1993) and induce ‘real’ behavioral change within this target group. (4) Political risk, which is about how visible the instrument and its potential failure are. Decision makers will avoid the risk of being identified as a supporter of instruments that are unpopular or as the actor that introduced an instrument that failed publicly (Henstra 2016). The four criteria of Varone and Aebischer (2001) are considered to be universally relevant and very much in line with other typologies, independent from the specific policy field they are applied to (Bressers and O’Toole 2005; Henstra 2016; Howlett 2015). While the first three criteria are most important to technocrats and concern their tasks in instrument design, implementation and evaluation, the last criterion of political risk is in line with the perspective elected officials adopt then selecting and advocating for instruments.

Toward a governance perspective in policy design

Different scholars (see for example Howlett and Mukherjee 2017; or Cheng and Yi 2017) argue that the evaluation of policy instruments strongly depends on the actors that are involved during the policy process. This claim can be seen from a technocratic, a democratic, or a governance perspective:

From a technocratic understanding, policy design is restricted to the public administration. In this view, the administration decisively shapes policies by drafting proposals and reformulating outlines (eventually with input from the government and parliament) (Sager and Rosser 2009).

From a democratic understanding, elected officials represent the citizens and are thus the actor type to focus on when interested in policy design. If policies can be voted upon at the ballot, the mere design of public policies is mostly in the hands of collective actors having the resources (e.g., personnel, money, knowledge, access to information) to actively participate in that game. One exception is elected officials who have their party and sometimes their staff that helps them translate their ideologies into actual policy proposals.

Finally, from a governance perspective, policy design is in the hands of a broader network of actors interested in the same goal of addressing a societal problem (Kenis and Schneider 1991). These actors represent different levels of decision making and of implementation processes what contributes to the institutional complexity of modern governance (Hooghe and Marks 2002; Lubell 2013; Lubell and Edelenbos 2013). One way to bridge fragmented systems is through collaborative arrangements where public and private stakeholders are brought together to engage in consensus-oriented decision making (Ansell and Gash 2007). In that regard, recent studies emphasize the criterion of stakeholder acceptance, in which the policy preferences of not just elected officials, but also of stakeholders, public, and private actors, are crucial (Dermont et al. 2017; Wüstenhagen et al. 2007). Research on policy acceptance focuses on the idea that policy instruments are more effectively introduced and later implemented when they are accepted, or even supported, by actors representing different groups, values, and worldviews in a community (Ingold et al. 2018).

Research design

In this study, we compare different instrument mixes for RE promotion in three Swiss cantons: First, we determine the currently introduced instrument mix in each canton. Second, we determine a policy mix based on the three technocratic criteria of policy selection as outlined in the section just above. Third, we identify the preferred instrument mixes of distinct actor groups (technocrats and elected officials, but also NGOs and utilities) relevant in the domain of RE policy. Before, we outline methods used to analyze the data for those two approaches; we introduce the three case study regions.

Selection of case study regions

The case of energy policy in federalist Switzerland is interesting for several reasons: First, after the Fukushima incident in 2011, the Swiss government decided to phase out the use of nuclear energy. This move arguably boosted the renewable energy market and required the introduction of new policy instruments to support it. Second, as part of a federalist country, the sub-national entities, the cantons, are the strength behind implementing an energy transition and face significant challenges in reaching targets developed at the national level (Sager 2017). It is also within the cantons, as well as at the local level, where RE projects will finally be implemented. The success of the projects, however, strongly depends on their acceptance by the private sector and local communities.

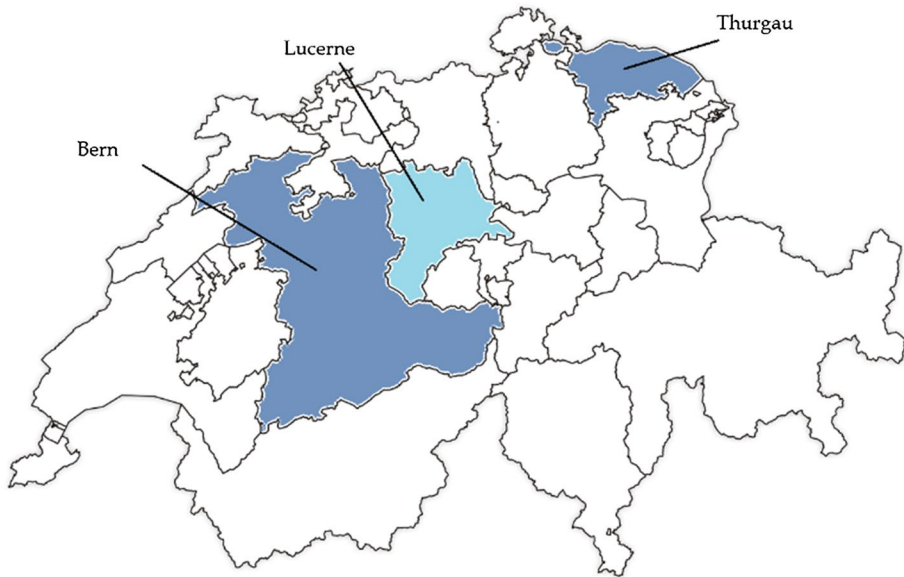


Fig. 1 Geographic location of cantons. *Source:* own illustration

The paper specifically analyzes energy policy in the cantons of Bern, Lucerne, and Thurgau. Those cantons display interesting socioeconomic and political differences that have an impact on how different public and private actor groups are involved in policy design. Bern is the biggest and most heterogeneous canton in terms of culture (German- and French-speaking parts) as well as in regard to the mix of mountains, lowlands, and urban areas. It is a canton with a long tradition of hydropower. Regarding its size, the strength of the left-wing parties (40% in parliament), and its experience with renewables, we expect to find a true ‘governance setting,’ where NGOs and the private sector are well organized. This then also means that the policy mix we observe today might be in line with all four actor group preferences (see below for details). Lucerne and Thurgau are more homogenous, smaller cantons, fully German-speaking. In Lucerne, there is some potential for wind energy and also some entrepreneurship promoting this. But all in all, the private sector is less well organized than in Bern and not locally anchored anymore (the main utility being a multi-regional). Thurgau is the wealthiest canton of all three, but also the most conservative with only 15% of left-wing seats in parliament. Different than in Bern, for instance, there are not many landscape protection issues that mobilize green NGOs against renewable installations. So we expect differences in how the different actor groups align in their preferences with the currently introduced policy mix (Fig. 1).

The identification of relevant policy instruments within the RE promotion mix

The breadth of policy instruments available to decision makers on the cantonal level is vast. In order to produce congruent results, the most relevant instruments for promoting renewable electricity need to be identified. This paper takes a twofold approach to the preselection of instruments: First, we compiled a large list of instruments available to

Table 1 Instruments for the promotion of renewable electricity

Instruments	Description
<i>Non-financial support (voluntary)</i>	
Information and education	Providing information to the general public and further education courses to an interested specialized audience by the canton
Demonstration	Prototypical function of the canton, e.g., cantons build their own buildings according to the highest energy standards and thus take a leading role
<i>Non-financial support (coercive)</i>	
Minimal investment ratio	Implementation of a minimal investment ratio for utilities
Partial self-supply (new buildings)	Newly constructed building are obliged to produce a certain amount of the used electricity (e.g., based on usable floor area)
<i>Financial support (subsidies)</i>	
Research	Financial support of energy research for public and private institutions
Pilot and demonstration projects	Financial support of private or public projects to facilitate market introduction after successful research
Subsidy construction	Financial support for construction of renewable electricity projects
Subsidy grid access	Financial support for the construction of a grid access
Public announcements	Cantonal call for tenders
<i>Financial support (tax reductions)</i>	
Reduction of capital cost	(Partial) cantonal coverage of interests for investment costs; this instrument would make the construction of new facilities cheaper and less risky
Tax reduction construction	The costs of construction of renewable electricity can be deducted from taxes
Tax reduction on selling RE	Tax exemption for the sale of renewable electricity up to 10'000kWh/a; this instrument would mainly target small private house owners that produce some of their electricity with (e.g.,) PV panels. The limited amount of kWh/a would not be relevant for larger utilities
No tax on selling RE	Total tax exemption for the sale of renewable electricity; because of the general exemption, this instrument would mainly target large utilities who produce extensive amounts of (mostly) hydropower
CO ₂ tax compensation	Compensation of CO ₂ tax for companies investing in renewables; this instrument would mainly target companies from energy intensive industries and the transportation sector that currently pay large amounts of CO ₂ taxes

policy makers based on an extensive literature review. Second, we had experts on the Swiss renewable electricity sector (three heads of cantonal energy departments, one representative of the Swiss Federal Office of Energy, as well as one representative each of an NGO and of a utility) evaluating the list in six interviews. During these interviews, the experts were able to select all instruments that they recognized as both technically and legally feasible. Instruments that the experts considered to be fully unrealistic (e.g., a complete ban on non-renewable energies) or not compatible with the Swiss electricity system were removed from the list. The instruments considered for the evaluation are listed in Table 1.

We categorize instruments based on a simple typology that distinguishes between instruments that provide financial incentives and instruments that do not. Instruments that provide financial aid are further separated in such that they actively offer subsidies for desired actions and allow tax reductions. We also distinguish instruments that work

with other mechanisms than financial incentives between voluntary and coercive measures (Sovacool 2009). This typology will allow a more structured and thorough discussion of results later on.

A feed-in tariff is obviously missing in the table; because Switzerland implemented a cost-covering feed-in tariff on the national level, none of the experts considered an additional cantonal feed-in tariff to be a realistic policy option due to jurisdictional constraints.

Operationalizing the technocratic criteria relevant for instrument selection

Deduced from the literature presented in Sect. 2 above, we can retain three technocratic principles: ideological constraints, resource intensiveness, and targeting precision (Henstra 2016; Varone and Aebischer 2001). We scored the instruments in a two-step procedure: First, we assigned values based on a literature review that takes different instrument characteristics into consideration (see, e.g., Henstra 2016). The evaluation of the policy instruments is based on a literature review of previously conducted assessments of mostly Swiss, but also international energy and climate policy. This is why this assessment does not consider the specific context (e.g., already introduced policy mix in or financial situation of the jurisdiction) in which the instrument will be introduced, but is a rather general assessment of the performance of each instrument. Ideological constraints are evaluated by judging the chance that their introduction might trigger conflict between the involved actors (Ingold 2008). For example, the introduction of information campaigns will not cause actors to seriously oppose a proposal. However, the potential refund of the CO₂-tax goes against some of the core ideologies of the green and left-wing parties and will therefore trigger major opposition during the policy process (Bygrave and Ellis 2003). We then evaluate the instruments' resource intensiveness by assessing the administrative and financial costs of implementation, monitoring, and operation. Again, an information campaign does not require large administrative engagement or incur major financial costs, whereas fully administering a new subsidy scheme could require both (Metz 2017; Stavins 1997). Targeting precision captures the selectivity of an instrument in regard to its impacts on potential target populations. Further education of practitioners, for example, is a highly precise instrument because only people working in the domain of renewable energy are targeted (Henstra 2016). On the other hand, the obligation to partially self-supply new buildings targets a much broader group, from private house owners to companies to public organizations (Ingold 2008; Kellenberger 2004).

In a second step, we discussed the scores with the same experts that already corroborated the list of instruments. The experts largely agreed with the previously determined scoring of the instruments. In the few occasions experts disagreed with an evaluation, we prioritized their assessment over the literature review. We assigned a score of 1 for a 'low,' 3 for a 'medium,' and 5 for a 'high' performance on each of the three criteria. Scores of 2 and 4 are also possible in the case that an instrument does not directly fit into the low-medium-high scale. We consider a low performance to be 'good' for two criteria: ideological constraints and resource intensiveness. For targeting precision, we consider a high performance to be 'good.' We take this reversed directionality into account when ranking the instruments.

The ranking of the instruments is done based on ELECTRE TRI (Elimination and Choice Expressing Reality) which belongs to the so-called outranking methods of multi-criteria analysis (Figueira et al. 2016; Roy 1991, 2016). The method has already found some use in renewable energy policy and has been applied in domains such as operations

research and energy planning in multiple studies (Beccali et al. 2003), or for the evaluation of policy instruments promoting the use of electric vehicles (Taefi et al. 2016). A particular advantage of this method is its flexibility regarding the inclusion of multiple qualitative criteria that are crucial for the assessment of the policy instruments presented in this paper.

ELECTRE TRI evaluates different options with a given set of at least three criteria (in this case different instruments are evaluated based on three selection criteria) and orders them according to their performance. The data used for the analysis are set on an ordinal or a weak interval scale. Every score of every instrument is then pair-wise compared to the scores of other instruments for the same criterion so that the different alternatives can be ranked (Figueira et al. 2016). In order to understand the approach of ranking options, two main concepts need to be discussed briefly: thresholds and outranking. Generally, policy option A is better than option B when A scores higher on a specific criterion. However, it also matters how *much* better A is compared to B because minimal differences may not be relevant to political actors (e.g., it does not matter to decision makers whether the implementation of a new subsidy required an expenditure of \$1 million or \$1.01 million). ELECTRE TRI therefore uses the so-called *indifference threshold* that renders small differences in one criterion between two options as insignificant. On the other hand, ELECTRE TRI also employs a *preference threshold* that qualifies an option as strictly better than another when surpassed. A third threshold particular to ELECTRE TRI is the *veto threshold* that implies the opposite consideration as the indifference threshold. When an instrument scores significantly higher by one criterion than another instrument, it can be assumed to then veto the worse of the two options. All three thresholds need to be set according to the research interest and may vary across different criteria (Buchanan et al. 1998). Based on these three thresholds, ELECTRE TRI compares every instrument with every other instrument (pair-wise comparison) and determines whether one is ‘at least as good’ or ‘not worse’ than the second another, i.e., whether it outranks the second instrument regarding one specific criterion. Those scores are then cumulated and transformed into a ranked list of options.

Operationalizing policy instrument acceptance

We evaluate the degree to which each instrument is accepted by different actor types (e.g., administrative entities, elected officials, but also NGOs and utilities). Again in line with the literature presented in Sect. 2, we contrast the above evaluation with the actual preferences of the public administration. And following rules of representative democracy, we are interested in how elected officials assess the policy instruments and to what extent their preferences align with the current mix. And finally, and from a governance perspective, we also assess preferences of NGOs and utilities. We selected those two actor types because both have a special interest in renewables and their regulation. They were furthermore detected as the two most important actor groups following the reputational approach as outlined below. Even though most green NGOs are in favor of alternative energy, there is an increased conflict arising when it comes to landscape protection potentially being hampered or softened through renewable installations. This is not a trivial issue in Switzerland, where over 80% of the landscape is protected. And utilities in contrast are most often the ones who invest in those installations and have an economic interest in the issue. Data to assess the preferences of all those actor types were gathered through standardized surveys. As a first step, we identified the collective actors and organizations involved in RE policy design. Actors were selected according to the positional and decisional approaches for the

Table 2 Actors initially included in survey by actor group and response rate

Canton	Political parties	Admin. entities	Assoc. (public entities)	Assoc. (energy)	Assoc. (business)	Utilities	NGOs	Response rate (%)
Bern	8	4	5	4	9	6	4	78
Lucerne	7	3	3	7	10	3	4	68
Thurgau	9	5	1	6	8	5	3	65

identification of stakeholders and later confirmed with the reputational approach (see, e.g., Magill and Clark 1975). In the first wave of contact (September 2016), all actors received a survey questionnaire by postal mail. Second and third attempts to reach actors (late October and December 2016) were then executed by email in which actors had to complete an editable pdf-file. We sent the survey out to all political parties represented in the cantonal parliament (i.e., elected officials), to the administrative offices involved in renewable energy policy (i.e., energy, environment, water, special planning and agriculture), as well as to relevant NGOs, utilities, business associations, as well as trade unions and other associations. The paper puts its focus on political parties in parliament for the assessment of elected officials and not on the cantonal governments because all cantonal governments operate under a consensual principle. The consensual character makes government solutions improbable that clearly reflect a specific parties priorities (Vatter 2016).

Table 2 shows how many actors per actor group were included in the survey. Response rates varied between 78% in Bern, 68% in Lucerne, and 65% in Thurgau, whereas the response rates may coincidentally differ and because of the small sample, we can attribute the varying response rates to different factors. Bern is by far the largest among the three cantons, and its political actors are thus more professionalized and more resourceful than the ones in Lucerne and Thurgau.

In order to determine the most important actors and actor groups, the survey respondents were asked to indicate which actors they considered the most important in the domain of RE policymaking. The respondents were able to make a selection based on the complete list of actors that we include in the survey and had the option to add additional actors they considered relevant. There was no limit on the number of actors that could be selected. This question serves two purposes: First, it functions as a fail-safe in case important actors were missed during the initial identification process. Second, the question also determines the most important actors and actor groups within the policy process. The so-called reputation of an actor is considered to be a proxy for their total resources and hence for their influence in the process. For each actor, the amount of times they were mentioned as 'very important' in the process is counted and then divided by the total possible number of possible mentions (i.e., total number of returned survey questionnaires). Actors that receive a value of 1 are considered to be important by everyone, versus a value of 0.5, which infers that an actor is considered to be important by at least half of all responding actors. We used this question as a proxy for our actor selection; i.e., to select other actor groups besides elected officials and the public administration. We did restrain from including all actor types and only focused on those perceived as important, as some degree of power and resources is needed to decisively impact policy design (Carpenter 2010; Carpenter and Krause 2012). The reputational analysis returned four crucial actor groups: the public administration, the elected officials, environmental NGOs, and utilities. Other actor groups included in the survey received lower reputational levels (i.e., economic associations, trade unions, and

renewable energy businesses) or did not return any questionnaires (i.e., science and administrative entities in Lucerne) and are therefore not considered in the following analysis.

In order to assess the stakeholders' instrument acceptance, survey participants were asked to choose their preferred policy mix to support the expansion of renewable electricity production from the list of instruments presented above.¹ This question takes into consideration the fact that instruments are hardly ever implemented in an isolated way and makes sure that stakeholders answering the question are able to choose their preferred instruments in a policy mix setting (and not one by one in an isolated manner). In the actual survey, none of the actors chose an 'unrealistic' number of instruments. In other words, all respondents acknowledged that state resources are limited and that not all instruments could be implemented at the same time.

Actors were able to select the primary instruments they would like to employ (assigned value of 1) or, alternatively, in their preferred policy mix (assigned value of 0.5). Instruments they did not choose at all received the value of 0. We selected the thresholds that indicate whether an instrument should belong to the primary instrument mix based on this coding. This implies that instruments whose score is close to 1 (here ≥ 0.7) should make part of the primary instrument mix. Instruments that receive a score close to 0 (here ≤ 0.3) should not be implemented. Instruments with scores in between the two thresholds (thus close to 0.5) should be given secondary priority. Furthermore, actors were able to add instruments to the list that they considered were feasible options for achieving the overarching target of increased renewable electricity production. However, this option returned no further relevant insights.

The preferences of the four actor groups are then aggregated. We weight the preferences of administration, elected officials, NGOs, and utilities according to their reputation, and the mean value was utilized as the acceptance indicator. In some cantons, the number of actors involved in renewable energy policy is very low, especially with regard to NGOs and utilities. For these cantons and actor groups, sometimes one single actor had to be taken as a reference.

Analysis

The current instrument mixes

In a first step, instruments that are currently implemented in the three cantons were identified and are depicted in Table 4. The canton of Lucerne has the most parsimonious instrument mix, which consists solely of two instruments: information and education and the canton's prototypical function, i.e., voluntary non-financial support. In the canton of Bern, the current policy mix in the domain of RE promotion consists of information campaigns and advice from the canton to potential builders, opportunities for further education, financial support for research, pilot, and demonstration projects, tax reductions for the installation of renewable electricity production, as well as the canton's prototypical function in

¹ The exact wording of the question is as follows (translated from German): 'In the following you will find a selection of potential or already implemented measures that support the expansion of renewable electricity production in the canton of XX. Which of the following measures should, from the position of your organization, be employed primarily or secondarily by the canton of XX? You may add further measures on the blank lines on the bottom of the list.'

Table 3 Technocratic criteria scores

Instruments	Ideological constraints	Resource intensiveness	Targeting precision
<i>Non-financial support (voluntary)</i>			
Information and education	1	1	5
Demonstration (prototypical function of the canton)	1	1	5
<i>Non-financial support (coercive)</i>			
Minimal investment ratio	5	5	1
Partial self-supply (new buildings)	4	4	1
<i>Financial support (subsidies)</i>			
Research	3	3	5
Pilot and demonstration projects	3	3	5
Subsidy construction	4	5	4
Subsidy grid access	4	5	4
Public announcements	3	4	4
<i>Financial support (tax reductions)</i>			
Reduction of capital cost	4	3	3
Tax reduction construction	3	3	5
Tax reduction on selling RE	3	4	3
No tax on selling RE	4	5	3
CO ₂ tax compensation	5	4	3
<i>MCA thresholds</i>			
Threshold of indifference	1	1	1
Threshold of preference	2	2	2
Veto threshold	4	4	4

Legend: scores refer to: 5 = high; 3 = medium; 1 = low; reading example: the instrument of information and education has few ideological constraints and a low resource intensiveness. On the other hand, its targeting precision is high

cooperation with the communes (lowest administrative level). This instrument mix thus adds instruments from the financial support through tax reduction category. The canton of Thurgau has the most all-encompassing policy mix regarding the expansion of renewables. Thurgau utilizes the same instruments as the canton of Bern, but, in addition, grants subsidies for the construction of projects such as larger PV systems exceeding 30kWp. Further, it is about to implement a partial self-supply standard for building which would force home owners and businesses to add renewable electricity production installations to their newly constructed buildings. Thurgau thus also adds instruments from the subsidy category.

Evaluation of policy mix with technocratic criteria

Each instrument could attain a score ranging from 1 (low performance) to 5 (high performance) for constraints, resource intensiveness, and targeting precision, respectively. The distributed scores that were then used for the instruments' pair-wise comparison are depicted in Table 3. In order to conduct the MCA-analysis, the thresholds were set as follows: First, the indifference threshold is set at 1 based on the assumption that elected officials and other actors are indifferent or not able to actively distinguish between instruments

that have very similar scores in one criterion. Furthermore, all instruments were evaluated qualitatively. An indifference threshold of 1 (compared a threshold of 0) prevents the model from assuming outranking relations between instruments that are purely based on coding decisions that might have gone one way or the other. Second, the preference threshold is set at 2, which corresponds to the increment from low to medium or from medium to high. This gap is large enough for actors to clearly distinguish the performance of two instruments without being so large that it would lead to continuous veto relations. Finally, the veto threshold is set at 4. After running the model, the ranking attained through ELECTRE is then converted to a scale of 0–1. Similar to the preference scores, scores of 0.7 or higher mean that an instrument should primarily be employed in the policy mix. We transform the final ranking (scale from 0 to 1) onto the same scale as the instrument preferences actors could express in the survey (1 for primary importance of instrument in policy mix; 0.5 for secondary importance; 0 for that instrument should not be part of the policy mix). It is thus easier to compare results. We set the threshold at 0.7 because when splitting the scale of 0–1 into three sections, 0.7 (rounded up from 0.67) is the cutoff for the top tier, whereas 0.3 (rounded down from 0.33) refers to the bottom tier. Table 4 (column 2) shows the ranking of the selected policy instruments following the MCA method.² The thereby identified technocratic mix is constituted primarily of the following instruments: persuasive measures such as information and education; the canton's prototypical function; support for research and pilot and demonstration projects; and tax reductions granted for the construction of renewable electricity systems.

The preferred instrument mixes

Based on the survey results we hereafter present the accepted instrument mixes in the respective canton (Table 4, columns 3–6). In the canton of Bern, the administration prefers an instrument mix that focusses on persuasive measures such as information and education, pilot projects as well as the canton's prototypical function, tax reductions for the construction of RE projects, and the coercive requirement to partially self-supply new buildings. Elected officials have similar instrument preferences, but do not support pilot and demonstration projects. The utilities support an instrument mix that additionally contains financial support for research as well as tax reductions for selling RE, which is of course their core business, and, similarly to all other actor groups, tax reductions for the construction of RE production installations. Environmental NGOs support the most extensive instrument mix, which, in addition to the previously stated instruments, includes financial support for pilot and demonstration projects, as well as a partial tax exemption for selling renewable electricity. All actor groups agree that information and education as well as demonstration should be employed and that the construction of installations to produce RE should be tax

² The MCA model is then evaluated for its robustness. The threshold of indifference is set at 1. Lowering the threshold to 0 would make the model more sensitive and in this way more vulnerable to small differences in the evaluation of the instruments that might be purely based on the qualitative assessment and coding. An indifference threshold set at 2 would, on the other hand, overstress the assumption that decision makers and other actors are somewhat indifferent about the differences between policy options that have similar attributes. The threshold of preference is set at 2 for all models. Lowering the threshold to 1 is not possible because it would overlap with the indifference threshold. Raising it to 3 is an option as long as the veto threshold is set at 4 or higher. When running, the model with a preference threshold of 3 does not return large differences to the original model. The order of the instruments does not change. The alternate threshold returns, however, a less distinct ranking.

Table 4 Current, technocratic, and preferred instrument mixes

Instruments	Technocratic principles		Admin ($n=2$)		Elected officials ($n=7$)		NGOs ($n=4$)		Utilities ($n=4$)		Current mix
	MCA		Pref.		Pref.		Pref.		Pref.		
<i>Non-financial support (voluntary)</i>											
Information and education	0.8		1.0		0.8		0.9		0.8		X
Demonstration (prototypical function)	0.9		1.0		0.8		1.0		1.0		X
<i>Non-financial support (coercive)</i>											
Minimal investment ratio	0.0		0.0		0.3		0.5		0.1		
Partial self-supply (new buildings)	0.0		1.0		0.8		0.9		0.4		
<i>Financial support (subsidies)</i>											
Research	0.7		0.3		0.5		0.5		1.0		X
Pilot and demonstration projects	0.7		0.7		0.5		0.7		0.9		X
Subsidy construction	0.1		0.5		0.4		0.6		0.4		
Subsidy grid access	0.1		0.3		0.3		0.5		0.4		
Public announcements	0.4		0.0		0.3		0.6		0.5		
<i>Financial support (tax reductions)</i>											
Reduction of capital cost	0.4		0.2		0.5		0.7		0.3		
Tax reduction construction	0.7		1.0		1.0		0.8		0.9		X
Tax reduction on selling RE	0.3		0.2		0.8		0.6		0.8		
No tax on selling RE	0.1		0.0		0.4		0.3		0.4		
CO ₂ tax compensation	0.3		0.0		0.5		0.5		0.5		
<i>Lucerne</i>											
Technocratic principles		Admin ($n=0$)		Elected officials ($n=6$)		NGOs ($n=3$)		Utilities ($n=1$)		Current mix	
MCA		Pref.		Pref.		Pref.		Pref.			
<i>Non-financial support (voluntary)</i>											
Information and education	0.8		NA		1.0		0.3		1.0		X
Demonstration (prototypical function)	0.9		NA		0.9		1.0		0.5		X

Table 4 (continued)

Lucerne Instruments	Technocratic principles		Admin ($n=0$)		Elected officials ($n=6$)		NGOs ($n=3$)		Utilities ($n=1$)		Current mix
	MCA	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.		
<i>Non-financial support (coercive)</i>											
Minimal investment ratio	0.0	NA	NA	0.5	0.5	0.6	0.0	0.0	0.0		
Partial self-supply (new buildings)	0.0	NA	NA	0.5	0.5	1.0	0.0	0.0	0.0		
<i>Financial support (subsidies)</i>											
Research	0.7	NA	NA	0.7	0.7	0.6	0.0	0.0	0.0		
Pilot and demonstration projects	0.7	NA	NA	0.6	0.6	0.9	0.5	0.5	0.5		
Subsidy construction	0.1	NA	NA	0.6	0.6	1.0	0.5	0.5	0.5		
Subsidy grid access	0.1	NA	NA	0.4	0.4	0.8	0.0	0.0	0.0		
Public announcements	0.4	NA	NA	0.8	0.8	0.6	0.5	0.5	0.5		
<i>Financial support (tax reductions)</i>											
Reduction of capital cost	0.4	NA	NA	0.5	0.5	0.6	0.5	0.5	0.5		
Tax reduction construction	0.7	NA	NA	0.9	0.9	0.6	0.5	0.5	0.5		
Tax reduction on selling RE	0.3	NA	NA	0.6	0.6	0.4	0.0	0.0	0.0		
No tax on selling RE	0.1	NA	NA	0.3	0.3	0.0	0.0	0.0	0.0		
CO ₂ tax compensation	0.3	NA	NA	0.4	0.4	0.3	0.0	0.0	0.0		
<i>Thurgau</i>											
Technocratic principles		Admin ($n=2$)		Elected officials ($n=7$)		NGOs ($n=1$)		Utilities ($n=1$)		Current mix	
MCA		Pref.		Pref.		Pref.		Pref.		Pref.	
<i>Non-financial support (voluntary)</i>											
Information and education	0.8	0.9	0.9	0.9	0.9	1.0	0.5	0.5	0.5		X
Demonstration (prototypical function)	0.9	1.0	1.0	0.6	0.6	1.0	1.0	1.0	1.0		X

Table 4 (continued)

Instruments	Technocratic principles		Admin (<i>n</i> =2)		Elected officials (<i>n</i> =7)		NGOs (<i>n</i> =1)		Utilities (<i>n</i> =1)		Current mix
	MCA	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.	Pref.		
<i>Non-financial support (coercive)</i>											
Minimal investment ratio	0.0	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5		
Partial self-supply (new buildings)	0.0	0.9	0.7	1.0	1.0	1.0	1.0	1.0	1.0		
<i>Financial support (subsidies)</i>											
Research	0.7	0.6	0.5	0.6	0.5	0.0	0.0	0.0	0.0		X
Pilot and demonstration projects	0.7	1.0	0.9	1.0	0.9	1.0	1.0	1.0	0.5		X
Subsidy construction	0.1	1.0	0.8	1.0	0.8	1.0	1.0	1.0	0.5		X
Subsidy grid access	0.1	0.1	0.8	0.1	0.8	1.0	1.0	1.0	0.0		
Public announcements	0.4	0.1	0.3	0.1	0.3	0.5	0.5	0.5	0.5		
<i>Financial support (tax reductions)</i>											
Reduction of capital cost	0.4	0.9	0.1	0.9	0.1	0.5	0.5	0.5	0.5		
Tax reduction construction	0.7	0.1	0.6	0.1	0.6	1.0	1.0	1.0	1.0		X
Tax reduction on selling RE	0.3	0.9	0.2	0.9	0.2	0.5	0.5	0.5	0.5		
No tax on selling RE	0.1	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.0		
CO ₂ tax compensation	0.3	0.1	0.4	0.1	0.4	0.0	0.0	0.0	0.0		

Legend: italicized instrument scores show scores ≥ 0.7 and indicate instruments primarily relevant for the policy mix. Reading example: In the canton of Bern, all actor groups would select the instrument of information and education for their preferred policy mix. Furthermore, also the evaluation by technocratic criteria selects information and education for a potential policy mix

deductible. In the canton of Lucerne, elected officials prefer a similar instrument mix as in Bern. However, they add public announcements to the mix, with a relatively high score of 0.8, but drop the obligation for partial self-supply. On the other hand, utilities are somewhat restrictive—they want the canton to solely inform and educate the interested public. The NGOs again support a rather comprehensive instrument mix that covers financial incentives for research and pilot and demonstration projects as well as the mandate that all newly built buildings produce a certain amount of their required electricity on their own. The canton where actors generally support the most extensive instrument mix is Thurgau: The public administration prefers a very comprehensive mix consisting of multiple persuasive and financial instruments as well as the requirement for the partial self-supply of new buildings. Elected officials are more reluctant to reductions of capital costs and taxes. Utilities, however, are more constrained and focus on the building sector with partial self-supply and on subsidies for the construction of such installations. NGOs mostly agree with this mix and, in addition, support subsidies for the construction of the grid access.³

Discussion

The paper asks if the currently selected instruments in the three cantons correspond to the instruments performing best following three technocratic criteria. We furthermore investigate whether preferences of four actor types, the administration (i.e., technocrats), elected officials, NGOs, and utilities align with the current and observable mix.

In all three cantons, the current mix corresponds to instruments that score highly when considering technocratic principles. In Bern and Thurgau, the mix includes the support of research that has a score of 0.7 what is only slightly above the threshold we consider necessary for high performance from a technocratic perspective. The only considerable exception consists in subsidies for the construction of renewables; this instrument makes part of the mix in Thurgau, but receives with 0.1 a very low score following the three technocratic principles. It has a considerable targeting precision, but comes with high constraints and is very resource intensive.

One intuitive expectation is that the actor group of the public administration might align the most with the instruments performing best following technocratic principles. It is true that most of the instruments preferred by the administration in Bern and Thurgau also score high in regard to technocratic criteria. But this is not always the case (e.g., in Bern the administration supports partial self-supply and in Thurgau capital cost reductions, both not scoring high from a technocratic perspective), and also other actor groups have the general tendency to prefer instruments with high technocratic performance.

When comparing actors' preferences related to the already introduced mix across the three case studies, interesting insights can be gained: In Bern, the preferences of all three actor groups are very homogenous and align with the introduced mix. This might be the result of the fact that negotiations about renewables have a long tradition in this canton, and that civil society and business are both well organized and integrated in the larger governance arrangement responsible for public policymaking (see, e.g., Gerlak et al. 2016). Thus, actors have the tendency to interact with each other and to seek policy compromise.

³ Both in Lucerne and Thurgau, the number of actors being part of the utility or NGO groups and being active in RE policy is very limited. We thus only have very few responses in the respective groups.

In other words, the understanding of the situation and what is needed in the canton regarding renewables and their regulation is similar across the different actor groups.

This is much less the case in the other two cantons. In Lucerne and with the exception of one instrument, NGOs prefer instruments that are not included in the current mix, whereas in Thurgau, NGOs align much more in their preferences with the current mix than utilities. It is interesting to see that all actor groups find some of their preferred instruments in the current mix. There is no group that aligns systematically with what is introduced.

In what follows, we back up the results with some more knowledge about the different cases and regional contexts. One interesting insight we gained from our analysis is that experience with an instrument seems to play a crucial role for the alignment of stakeholders' preference and introduced instruments: In the canton of Lucerne, for example, elected officials show major support for public announcements (0.9). Lucerne used to employ this instrument, but phased it out due to budgetary restrictions. But in the other two cantons (that do not yet use this instrument), approval is very low (0.2 each). In our case, it can therefore be assumed that decision makers are especially open to instruments they are already familiar with and employ in their canton (Metz and Ingold 2017). Generally, it can be further observed that elected officials prefer an instrument mix that consists of slightly less than the currently implemented instruments. Furthermore, the canton of Lucerne demonstrated the largest discrepancy between what is currently introduced and what elected officials preferred. This can partially be explained by the tense financial situation in the canton, as well as by a failed total revision of the energy act that led to the absence of most instruments.

The NGOs are the actor group that showed the highest preferences for an instrument mix that is more coercive and broader than the mixes favored by the other two actor groups. This finding can mainly be ascribed to their core policy beliefs, which correspond with the idea that NGOs put a much stronger emphasis on issues such as environmental protection and climate change and are generally more favorable toward state intervention than the other two groups (Metz 2017). This can be directly linked to their stronger support for market-based measures such as tax reductions in exchange for selling renewable electricity or direct subsidies provided by the canton. However, none of the NGOs were in favor of the strongest measure (the complete repeal of taxes on renewable electricity). The hesitation to support this instrument can be attributed to two factors. First, dropping all the taxes on selling renewable electricity would lead to a boom in the planning and construction of power plants (especially dams and wind turbines) in regions that do currently not have any significant infrastructure. NGOs are naturally reluctant to prioritize renewable electricity production over landscape protection. Hence, they also oppose large surges in the construction of power plants, especially in sensitive environmental areas such as near pristine rivers and undeveloped terrain. Second, the electricity industry is a major tax contributor especially on the cantonal, but also on the nation level. These taxes are partially used for climate adaptation measures such as flood prevention or for environmental restoration projects. NGOs therefore also have an interest in not shrinking these taxes.

Whereas the NGOs prefer a more all-encompassing instrument mix, utilities prefer less instruments overall. This finding is also not surprising because most instruments presented in this paper actually support ordinary citizens should they decide to build their own renewable electricity producing system, like rooftop solar. This additional power generation is able to help soften the peak electricity consumption times, which occur at noon. However, these new generation systems serve as a form of competition for the utilities, because they start to carve away at the utilities' historical monopoly on electricity production and distribution. Nevertheless, rooftop solar is not yet a fundamental threat to the monopoly

maintained by utilities because most private homes that produce renewable electricity are not entirely self-sufficient and are still reliant on the power produced by large-scale power plants. However, this private production of electricity still results in a loss of revenue for the utilities, especially with regard to the current electricity prices and the major investments utilities need in their infrastructure. Furthermore, utilities are obliged by federal law to buy excess electricity and feed it into the grid, which again increases their administrative expenses.

Conclusion

This paper assesses whether previously selected instrument mixes correspond to technocratic criteria in policy design or to preferences of central stakeholders in the policy process. To answer this question, we compare the introduced policy mix to policy mixes derived from technocratic principles and survey data. In doing so, we try assess whether the currently introduced policy instruments correspond mostly to technocratic or democratic principles, or if they align most with the preferences of public and private actors integrated in the larger governance arrangement. We argue that this question is highly relevant, especially in the fields of energy policy and transition. Within these fields, the acceptance of new options not only depends upon the state's strategies, but also on the perceived legitimacy of the instruments, the broader political context, and preferences of a wide array of concerned actors (Ingold et al. 2018). If the preferences of central actors do not mirror the currently implemented policy mix, they might challenge it in the future. By doing so, unsatisfied actors might destabilize current regulation and push to either introduce new instruments or remove old ones from the mix (Kivimaa and Kern 2016).

We empirically investigate policy instruments introduced in Swiss energy policy and focus on three sub-national entities called cantons. We identify technocratic policy mixes by conducting a multi-criteria analysis (ELECTRE TRI) and assess actors' preferences as acquired through an elite survey in the cantons of Bern, Lucerne, and Thurgau. Generally, the instruments introduced score highly when it comes to their technocratic performance. But the picture is more complex than that. The general conclusion we can draw is that regional contexts matter. In the canton of Bern with the longest experience of renewable energy promotion, the different actor types including NGOs and utilities have all coherent and comparable preferences in how to regulate renewable energies in the canton. And those preferences largely align with the introduced mix. This is different in the two smaller cantons, with less experience and more conservative parliaments. In Lucerne, for instance, preferences of NGOs and utilities are almost not reflected at all in the current mix. These actors might thus push for the introduction of their preferred instruments such as extensive subsidies in the case of NGOs. In Thurgau, preferences of all actor types only partially match what is introduced. Here, we could speculate that the coercive instrument of mandatory partial self-supply in new buildings might be introduced because all actor groups (public administration, elected officials, NGOs and utilities) accept the instrument already. A fact that might hinder its introduction is the instrument's low scores regarding technocratic principles.

Our result is thus very much in line with current research about the performance of so-called collaborative governance arrangements. Collaborative governance follows the assumption—and some existing empirical evidence—that the participation of affected, concerned, and responsible actors enhances the acceptance of decisions, which consequently

supports implementation and therefore improves the quality of outcomes (Macnaghten and Jacobs 1997). Mainly in environmental policy studies, scholars show some evidence that deliberative, bottom-up ways of problem solving can improve outcomes (Berkes et al. 2002; Christensen et al. 2012; Newig 2012). Our research is not going thus far, but shows some tendency that more homogenous preferences among different actor types can exist in settings with a longer, collaborative tradition in policy design. And such ‘negotiated agreements’ (as it might be possible, for example, in the case of Thurgau with its self-supply regulation) might then also have an impact on the quality in implementation and finally the policy outcome.

The study has its inherent limitations. The elephant in the room is the missing direct causal link between the currently introduced policy mix and the constructed technocratic and preferred instrument mixes. The paper does not assume that its analysis can be used to find direct causal connections between the three mixes. However, what the paper is able to do is compare the three cantons and offer insights about what policy instruments have a high potential of being introduced in the future or removed from the policy mix (if already introduced but with low acceptance scores by key stakeholders).

Another important limitation of the study is that there are other factors which enable or restrict choices around policy instruments that have not been discussed in detail. These factors include, for example, path dependency and therefore the instruments that are already in place, budgetary limitations, etc. (see, e.g., Öberg et al. 2015). This paper is also an attempt to integrate MCA into policy design on a theoretical level. There are many sophisticated decision tools and therefore more criteria that impact decision making than this study analyses (see, e.g., Henggeler Autunes and Oliveira Henriques 2016). However, the more theoretical design criteria have rarely been applied in the way that this paper does.

In sum, this paper shows that policy design criteria as well as actors’ preferences are a valuable element of analyzing policy design and understanding current policy mixes. It seems most relevant for the adoption of future policy mixes which aim to foster the deployment of renewable electricity to focus on instruments that score well with all three, technocratic, democratic, and governance principles. This is especially true for decision makers, as they are the primary actor groups in charge of instrument selection and need to be aware of the factors that are often crucial for other actor groups. Elected officials need to consider the acceptance of other stakeholder or actor groups when making a final choice. This paper gives insights to elected officials, as well as to other actors, into how they might structure and justify their instrument selection in highly complex policy mix situations.

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