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**Of Technocrats and Believers –
Factors Driving Instrument Selection in Transitional Settings**

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Of Technocrats and Believers – Factors Driving Instrument Selection in Renewable Energy Policy

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Abstract

This paper is about the selection of policy instruments in the domain of renewable electricity policy in Switzerland. The article analyzes different factors for instrument selection – technocratic principles of instrument design and preferences of political actors – and assesses their relevance in a specific context. Three different instrument mixes are compared: the current policy mix implemented in a canton, the technocratic mix determined by employing multi-criteria analyses MCA and the preferred instrument mix of three actor groups assessed through elite survey data. The comparison suggests that the selected policy instruments largely reflect the preferences of the decision makers but not necessarily the ones of the environmental NGOs or utilities. Furthermore, the analysis shows that the technocratic instrument mix largely corresponds to the decision makers preferred instruments.

1. Introduction

The transition towards more sustainable energy generation is considered as one of today's main challenges in environmental and climate mitigation politics (Edenhofer, Pichs Madruga, & Sokona, 2012). In order to achieve ambitious goals such as 50% of greenhouse gas emission reduction or a considerable increase in renewable energy, nation states need to adopt policy measures that are able to effectively help accomplish these targets within a certain period. For policy makers the selection of adequate measures is often a complicated process with a multitude of potential selection criteria and many different interests from various political actors that have to be considered in a general state of uncertainty of how the energy sector will develop in the future (Gunningham, Grabosky, & Sinclair, 1998; Howlett, 2011; Howlett, Tan, Migone, Wellstead, & Evans, 2015; Linder & Peters, 1988, 1989; van Buuren, Driessen, Teisman, & van Rijswijk, 2014). Recent studies about renewable energy transitions mostly cover the impact of policies on the *outcome*, e.g., the production of renewable electricity or the decrease in carbon emissions (Yi & Feiock, 2014) or why specific renewable energy projects succeed or fail (Martin & Rice, 2015). We know much less about what criteria drive the *selection of policy instruments*, i.e., the policy *output* in such transformational settings. Hence, the step of instrument selection and what criteria are relevant therein needs to be studied more systematically and empirically (Cheng & Yi, 2017; Colebatch, 2017; Howlett & Lejano, 2012; Schneider & Sidney, 2009).

To focus on policy instruments is generally considered as relevant in policy studies and political sciences, as they are defined as the tools decision-makers can rely on to reach defined goals and

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targets(Howlett, 2005). Studying policy instruments in energy politics seems particularly relevant as the energy sector is prone to market failures such as natural monopolies or the tragedy of the commons (Howlett, 2009) as well as time inconsistency, and commitment problems (Lodge & Wegrich, 2012). All this makes state intervention an important condition to overcome current threats such as natural resource degradation, energy shortages, or climate change through fossil fuel generation. However, “[t]he design process [of policy instruments] is complex, often internally orchestrated between bureaucrats and target groups, and usually much less accessible to public scrutiny than many other kinds of policy deliberations” (Howlett, 2009, p. 84). On the one hand, and from a technocratic point of view, efficiency and effectiveness might seem the core selection criteria in order to insure the achievement of politically defined goals. On the other hand, today’s policymaking is characterized by the participation of a wide array of actors: the selection and implementation success of policy instruments strongly depends upon their acceptance by citizens, target groups and other stakeholder groups (Dermont, Ingold, Kammermann, & Stadelmann-Steffen, 2017; Stadelmann-Steffen, 2011; Thalmann, 2004). In this context, we ask *what criteria drive current policy instrument selection?*

To answer this question, the present paper explores the nexus between criteria of technocratic policy design (e.g., effectiveness or efficiency) (Bressers & O’Toole, 1998; Dahl & Lindblom, 1992; Henstra, 2016; Kingdon, 1984; Landry & Varone, 2005; Metz, 2017; Peters, 2002; Sovacool, 2009; Varone & Aebischer, 2001) and political actors’ and stakeholders’ preferences (Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014; Nohrstedt, 2010; Sabatier, 1988). In this context, and in line with Peters (2002, 563), we argue that policy mixes should not only score high with the technocratic criteria of policy design but that they are also legitimized by the broader acceptance of politically involved actors and stakeholders. This balance should ensure that instruments are politically feasible (e.g. target group acceptance enhancing ease in implementation; see also Landry and Varone 2005), legitimized through a larger representation of citizens and the population, and finally addressing the problems and challenges on the political agenda by reaching the defined targets.

Empirically, we study instrument mixes for the promotion of renewable energies in three Swiss cantons (i.e. subnational states). First, and to evaluate these instruments via technocratic policy design criteria, the paper draws from three generations of instrument selection theory. Second, and derived from survey data in the three study regions, the preferred instruments and instrument mixes of politically involved actors (decision-makers, NGOs and electricity industry) are assessed. Finally, the currently introduced instrument mix is compared to the mixes found through the technocratic, and the stakeholder assessment.

For ordering the instruments based on their technocratic performance, the paper employs multi-criteria methods (i.e., ELECTRE TRI) (Roy, 1985, 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 (Gamper & Turcanu, 2015; Howlett, 2004; Schneider, 2012; Taeihagh, 2017). The present paper therefore presents an approach for integrating MCA as a tool in policy design studies. Furthermore, extensive original survey data was collected among the political

stakeholder in the subnational states that cover their preferences regarding current and potential future instruments enabling a renewable energy transition as well as their ideological beliefs (Kammermann & Ingold, 2017).

The remainder of the paper is structured as follows: section 2 discusses the relevant policy design criteria for instrument selection in renewable energy policy as well as the preferences of political actors. Section 3 presents the research design including the cases, data and MCA method (ELECTRE TRI) as well as the operationalization. Section 4 reports the results of the analysis. The paper concludes with a discussion of the most relevant findings in section 5 and some final remarks in section 6.

2. Policy mixes and policy design

The range of measures that can be used to overcome politically identified problems is vast and generally policy instruments can be used interchangeably ('tool-box' approach) (Landry & 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, Mukherjee, & Woo, 2015). Howlett and Rayner (2013), for example, state that policy instruments are rarely introduced on a 'clean slate', i.e., new policy instruments depend on older instruments that are already implemented. Howlett, Mukherjee, and Rayner (2014) proceed further and analyze policy design for multifaceted instrument mixes, and call for a better evaluation of policy instruments in such intricate situations. Furthermore, Howlett and Mukherjee (2017) as well as Enzensberger, Wietschel, and Rentz (2002) and Cheng and Yi (2017) argue that the evaluation of policy instruments also depends on the actors that are involved during the selection process. The current paper investigates whether observable policy mixes are the product of a technocratic assessment or if stakeholders' preferences drove instrument selection.

2.1. Technocratic design criteria and instrument selection

Criteria for the evaluation of policy instruments in policy mix situations are an important element for decision makers to structure the decision procedure and to choose among potential options (Henstra, 2016; Howlett, 2004). During the last couple of decades, three different generations of policy design research have emerged. In the first period, economists and political scientist mainly focused on the interrelations between government and market actors and considered most instruments as economically inefficient because they restrained free market development. This primarily economic approach heavily centered on the resolution of specific market failures and searched for single policy instruments that were designed to solve one specific problem (Dahl & Lindblom, 1992). Dahl and Lindblom (1992) present for example continua for the evaluation of policy instruments. Lowi (1972), on the other hand, centers his attention on the degree of coerciveness. Furthermore, first generation political scientists normatively focused on what the state should do and missed the empirical aspect of policy design by neglecting what states did in reality (Howlett, 2004, p. 3). The selection and design of

policy instruments is, however, not a simple process where a problem and a policy instrument as a potential solution have to be identified and implemented by a few decision makers.

Second generation scholars put already a more distinct emphasis on the context in which instrument were implemented and in what combinations they occurred (Bressers & O'Toole, 1998; Salamon & Lund, 1989). Salamon and Lund (1989), for example, describe that policy instruments can be designed according to their *effectiveness, economic efficiency, legitimacy, equity* and *partisan support*. However, depending on a specific situation some criteria might be more relevant than others (e.g., efficiency is more important with tight budgets than when financial resources are more freely available). The new focus on context included the realization that the introduction of new policy instruments always depends on the already existing policy mix what lead to the question whether 'optimal' policy mixes can be developed in the first place (Grabosky, 1994). Scholars also started to reject the idea that government intervention per se is ineffective. Gunningham et al. (1998) argue for example for an approach that involved 'selective' state intervention and pushed for the involvement public and private orderings and some market based solutions.

A third and most recent generation of scholars further considers procedural elements such as the affectedness of target groups to be relevant for instrument selection and intensifies the focus on the interrelation of single instruments in policy mixes (Howlett & Rayner, 2007; Ingold, 2008; Metz, 2017). This latest generation of scholars introduced further design criteria that are relevant for instrument selection. Varone and Aebischer (2001, p. 618) mainly suggest four criteria by which political actors can choose and evaluate policy instruments: (1) *Ideological and financial constraints* refer to the limitations impeded on instrument selection due to the political ideologies present in parliament and to budgetary restrictions. Decision makers will therefore try to opt for instruments that are not confined by too many limitations in order to get them passed (Henstra, 2016). (2) *Resource intensiveness* denotes how high the expenditures for the operation of an instrument are in terms of the costs for administrative personnel, monitoring, enforcement, etc. Due to budget limitations, policy makers will generally try to refrain from implementing new instruments that use too many state resources. (3) *Targeting precision* refers to how precisely an instrument is aimed at its targets. Generally, it can be assumed that decision makers opt for instruments that have a high targeting precision. This is because decision makers try to avoid targeting their own voter base with restrictive policy instruments in order not to lose votes in the next election. They therefore construct specific target groups and opt primarily for instruments that are precise in the target population they address (Pierce et al., 2014; Schneider & Ingram, 1993). A similar argument can be presented for (4) *political risk*, i.e., how visible the instrument and its potential failure is. Decision makers will avoid the risk of being identified as the cause of instruments that are unpopular or as the actor that introduced an instrument that publicly failed (Henstra, 2016). The four criteria of Varone and Aebischer (2001) are considered to be universally relevant, independent from the specific policy field they are applied in.

2.2. Actors' preferences and instrument selection

Seldom, the most efficient and effective policy instrument is introduced in reality. Second best options are often the product of ideologically conflictive and long-lasting negotiations among a wide array of actors involved in today's policy design and implementation (Jenkins-Smith et al. 2014; Varone 1998). Justifying instrument choice not only via technocratic criteria, but also by considering actors' preferences is not only a normative question (Peters 2002). Mainly in the energy sector, a wide array of research exists, emphasizing the active role of citizens in the application and implementation of policy instruments (Schweizer-Ries et al. 2010; Zoellner et al. 2008). In this context, new forms of state intervention such as feed-in tariff systems that turn the citizen also into a co-producer of energy supply (see Wolsink 2012), can only be successfully designed and implemented when preferred by at least some parts of the population. And this holds also true in participative or direct-democratic settings, where citizens become de facto decision-makers, and where their acceptance of (new) policy instruments is thus key for policy choice (Ingold et al. 2017). Generally speaking, the larger context (e.g. timing, i.e. after a focusing event, see Birkland 2005) and legitimacy setting (Markard et al. 2016) are important pre-conditions to create acceptance for certain policy instruments over others. Moreover, if most actors involved in policymaking are not formal decision-makers, at least legitimacy and acceptance, and thus stakeholders' policy preferences, are seen as crucial for the successful operation of implementation procedures (O'Toole 2000).

3. Research design

The research design is separated in two parts. The first sections cover the instruments' technocratic evaluation and the determination of the technocratic instrument mix. The second part covers the documentation of the relevant actors' preferences and the identification of their preferred instrument mixes.

3.1. The Swiss cantons, their policy instruments and relevant actors

The case of federalist Switzerland is interesting for several reasons: first, Switzerland knows a strong climate mitigation policy since the beginning of the 20th century. This might create an overall favorable context for the promotion of a low-carbon energy supply (Ingold, 2008). Second, after the Fukushima incident in 2011, the Swiss government decided the nuclear phasing out. This move might give renewable energy supply an additional boost. Third and most importantly, being a federalist country, the cantons are the strong implementing force behind the energy transition and face significant challenges in reaching the targets set on the national level (Sager, 2014). The paper specifically analyzes the cantons of Berne, Lucerne, and Thurgau. The cantons were selected based on the distinct policy mixes in the field of renewable electricity and the different preconditions for renewable electricity production, Bern focusing on hydropower, Thurgau on PV and Lucerne on wind energy. Furthermore, the three cantons are also an adequate representation of Switzerland regarding their size and socio-demographic conditions.

The dependent variable in this study are the policy instruments used for the promotion of renewable electricity in the Swiss cantons. The range of policy instruments available to decision makers on the cantonal level is vast. In order to produce congruent results, the most relevant instruments for the sector of renewable electricity promotion need to be identified. The paper takes a two-fold approach to this pre-selection of instruments: in a first step, based on an extensive literature review a large list of instruments available to policy makers was compiled. In a second step this list was evaluated in six interviews where experts of 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) were able to select all instruments where they saw the technical and legal possibility of the instruments being implemented. 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. Prominently missing in the list is a feed-in tariff. Switzerland implemented a cost-covering feed-in tariff on the national level and none of the experts considered an additional cantonal feed-in tariff to be a realistic policy option due to jurisdictional constraints.

Table 1: Instruments for the promotion of renewable electricity

Instruments	Description
Information & education	Provision by the canton of information to the general public and further education courses to an interested specialized audiences
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)
Research	Financial support of research for public and private institutions
Pilot & demonstration projects	Financial support of projects between research and market introduction
Subsidy construction	Financial support of the construction of renewable electricity projects
Subsidy grid access	Financial support for the
Public announcements	Cantonal call for tenders
Reduction of capital cost	(Partial) cantonal coverage of interests for investment costs
Tax reduction construction	The construction of renewable electricity can be deducted from taxes
Tax reduction on selling RE	Tax exemption of the sale of renewable electricity up to 10'000kWh/a
No tax on selling RE	Total tax exemption of the sale of renewable electricity
CO2 tax compensation	Compensation of CO2 tax for companies investing in renewables
Demonstration	Prototypical function of the canton

The identification of the most important actors was conducted through a written and online elite survey among the stakeholders in the domain of renewable energy policy on the cantonal level. Actors were selected according to the positional and decisional approaches for the identification of stakeholders and later confirmed with the reputational approach (see e.g., Magill & Clark, 1975). In a first wave (September 2016) all actors received a survey questionnaire by postal mail. A second and third attempt to reach actors (late October and December 2016) were then executed by email where actors had to

complete an editable pdf-file. Response rates vary between 78% in Bern, 88% in Lucerne and 85% in 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 ones for policy making in the domain of renewable electricity. The respondents were able to make a selection based on the complete actors list and had the option to add further actors they considered relevant.⁷ There was no limit set for actors that could be selected. The question has 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. This so-called reputation of an actor is considered to be a proxy for its total resources and hence for its influence on the process. For each actor the amount of mentions to be 'very important' in the process is counted and then divided by the total possible number of mentions (i.e., total number of returned survey questionnaires). Actors that receive a value of 1 are considered to be important by everyone a value of 0.5 infers that an actor is considered to be important by at least half of all participating actors. Because the results of this question are relevant for the following parts of the research design, its results are briefly discussed here, before the actual analysis: The question did not provide any actors that were missed during the initial identification process. The reputational analysis returned three crucial actor groups: the political parties, environmental NGOs and utilities. Other actor groups included in the survey received lower reputational levels (i.e., economic associations, trade unions & 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.

3.2. Operationalization and method for the technocratic instrument mix

The operationalization process starts with the evaluation of the policy instruments selected in section 3.1 according to the four design criteria previously discussed (targeting precision, ideological constraints, resource intensiveness, and political risk). The instruments are then scored according to the elaborations of Henstra (2016) as well as the discussion of design criteria presented in section 2.1. The instruments were assigned a score of 1 for a low performance, a 3 for a medium performance and a 5 for a high performance. Scores of 2 and 4 are also possible in case an instrument does not directly fit onto the low-medium-high scale.

The method used for the determination of the technocratic instruments is ELECTRE TRI (*EL*imination and *Choice* *Expressing* *Reality*) which belongs to the so-called outranking methods of multi-criteria analysis (Figueira, Greco, Roy, & Słowiński, 2013; Figueira, Mousseau, & Roy, 2016; Roy, 1985, 1991, 2016). The method has already found some use in renewable energy policy and has been applied in multiple studies in domains such as operations research and energy planning (Beccali, Cellura, &

⁷ The wording of the question is as follows (translated from German): "In the canton of XX multiple actors influence the expansion of renewable electricity production. You can find an as complete as possible list of actors below. Please check all actors that are very important in the process of policy making in the domain of renewable electricity production. Should important actors be missing on the list, please add on one of the empty lines."

Mistretta, 2003) or for the evaluation of policy instruments promoting the use of electric vehicles (Taefi, Kreutzfeldt, Held, & Fink, 2016). A particular advantage of the method is its flexibility regarding the inclusion of multiple qualitative criteria that is 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 six selection criteria) and orders them according to their performance. The data used for the analysis is set on an ordinal or a weak interval scale. So that the different alternatives can be ranked, every score of every instrument is then pair-wise compared to the scores of other instruments for the same criterion (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 needs a budget 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. If an instrument scores much better on a criterion than another then it can be assumed that it vetoes the worse option. All three thresholds need to be set according to the research interest and may vary across different criteria (Buchanan, Henig, & Henig, 1998). Based on these three threshold ELECTRE TRI then compares every instrument with every other instrument (pair-wise comparison) and determines whether it is 'at least as good' or 'not worse' than the second one, 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 (Figueira et al., 2013). Furthermore, ELECTRE TRI also allows weighting the different criteria that is often relevant due to contextual factors.

3.3. Identification and operationalization of the preferred instrument mixes

Actors' preferences were collected through the elite survey conducted in the cantons of Bern, Lucerne and Thurgau. In order to assess the stakeholders' preferences regarding instrument selection, the actors involved in cantonal renewable energy policy were asked to choose their preferred policy mix to support the expansion of renewable electricity production from the list of instruments presented above.⁸ This question takes into consideration the fact that instruments are hardly ever implemented in an isolated way and makes sure that the answering stakeholders are able to choose their preferred policy mix in such a setting. All actors questioned in the survey are collective actors familiar with the political

⁸ The exact wording of the question is as follows (translated from German): "In the following you'll 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."

system and process. We can therefore assume that their choice of instruments reflects the fact that state resources are not unlimited and that not all of the proposed instruments can be implemented at the same time. In the actual survey, none of the actors chose an 'excessive' amount of instruments. Actors were able to select instruments they would like to employ primarily (assigned value of 2) or secondarily in their preferred policy mix (assigned value of 1). Instruments they did not choose receive the value of 0. Furthermore, actors were able to add instruments they considered feasible for the achievement of the overarching target of an increased renewable electricity production, however, this option returned no further relevant insights.

The preferences of the three actor groups are then aggregated: NGOs' and utilities' preferences were weighted equally and the mean value was utilized as the preference indicator. In some cantons, only one major utility or NGO participated in the survey or is generally involved in renewable energy policy. For these cantons and actor groups, the one single actor had to be taken as a reference. The actor group of the decision makers is operationalized with the parties in the cantonal parliaments because they are the relevant actors for the implementation of every instrument. The paper puts its focus on the political parties and not on the cantonal governments because all cantonal governments operate under a consensual principle. The consensual character of the governments makes solutions improbable that clearly reflect a specific parties priorities (Vatter, 2016). In order to accurately represent the strengths of the different factions, parties are weighted according to the share of seats in parliament they control in January 2016. The preferences of each actor group are then also placed on a scale from zero to two.

3.4. Determination of policy mixes and comparison

The last step of the analysis focusses on determining what instruments reach the highest scores on the preference and MCA scales. In accordance with the survey question, instruments reaching a score of ≥ 1.4 should 'primarily' be employed in a cantonal policy mix for the expansion of renewable electricity production. The instruments that reach such a high level of acceptance are considered part of the desired policy mix for each actor group. The same holds true for the MCA scores. Instruments with scores from ≥ 0.7 to < 1.4 are considered to be of secondary relevance and scores from 0 to ≤ 0.7 express that an instrument is not desired at all in the policy mix. The three different mixes are then compared and set in relation with each other. For validation, the instrument mixes were then discussed with the same pool of experts that already evaluated the general list of policy instruments.

4. Analysis

4.1. The current instrument mixes

In a first step, instruments that are currently implemented in the three cantons were identified and are depicted in Table 2. In the canton of Bern, the current policy mix in the domain of renewable electricity promotion consists of information campaigns & the canton offering advice for potential builders and offers for further education, the financial support of research and pilot & demonstration projects, tax

reductions granted for the installation of systems producing renewable electricity producing, as well as the canton's prototypical function in cooperation with the communes (lowest administrative level). The canton of Lucerne has the most parsimonious instrument mix that consists solely of two instruments: information & education and the canton's prototypical function as well as a recently discontinued program for public announcements ($\approx$ tender system). The canton of Thurgau has the most encompassing policy mix regarding the expansion of renewables. Thurgau utilizes the same instruments as the canton of Bern but further grants subsidies for the construction of projects such as larger PV systems exceeding 30kWp and is about to implement a partial self-supply standard for building which would force home-owners and businesses to add renewable electricity producing installations to their newly constructed buildings.

Table 2: The current instrument mixes

	Bern	Lucerne	Thurgau
Information & education	X	X	X
Minimal investment ratio			
Partial self-supply (new buildings)			X*
Research	X		X
Pilot & demonstration projects	X		X
Subsidy construction			X
Subsidy grid access			
Public announcements		X**	
Reduction of capital cost			
Tax reduction construction	X		X
Tax reduction selling of RE			
No tax on selling RE			
CO2 tax compensation			
Demonstration	X	X	X

Legend: * = instrument is about to be introduced; ** = instrument currently on hiatus due to budget restrictions

4.2. The technocratic instrument mix

Instruments were evaluated based on the four criteria suggested by Varone and Aebischer (2001) and Henstra (2016). Scores that could be attained by each instrument reach from 1 (low performance in a specific criterion) to 5 (high performance). The distributed scores that are then used for the instruments' pairwise 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 decision makers and other actors are basically indifferent or not able to actively distinguish between instruments that have very similar scores in one criterion. Furthermore, all instruments were evaluated qualitatively and an indifference threshold of 1 (compared a threshold of 0) also 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 what 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 too extensive what would lead to a veto relation. Finally, the veto threshold is set at 4. After running the model, the ranking that is attained through ELECTRE is then converted to a scale of 0 to 2. Scores of 1.4 or higher mean that an instrument should primarily be employed in the

Table 3: ELECTRE matrix

Instruments	Targeting precision	Ideological constraints	Resource intensiveness	Political risk
Information & education	5	1	1	1
Minimal investment ratio	1	5	5	5
Partial self-supply (new buildings)	1	4	4	3
Research	5	3	3	1
Pilot & demonstration projects	5	3	3	1
Subsidy construction	4	4	5	3
Subsidy grid access	4	4	5	3
Public announcements	4	3	4	2
Reduction of capital cost	3	4	3	2
Tax reduction construction	5	3	3	2
Tax reduction on selling RE	3	3	4	2
No tax on selling RE	3	4	5	3
CO2 tax compensation	3	4	4	4
Demonstration (prototypical function)	5	1	1	1
Threshold of indifference	1	1	1	1
Threshold of preference	2	2	2	2
Veto threshold	4	4	4	4

Legend: scores refer to: 5 = high; 3 = medium; 1 = low

instrument mix. The thereby identified technocratic mix constitutes of persuasive measures such as information & education as well as the canton's prototypical function; the support of research and pilot & demonstration projects; and granting tax reductions for the construction of renewable electricity systems (see Table 4).

The MCA model is then shortly 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 little differences in the evaluation of the instruments that might be purely based on the qualitative assessment and coding. A threshold of indifference set at 2 would, on the other hand, overstress the assumption that decision makers and other actors are somewhat indifferent between policy options when they show similar attributes. The threshold of preference is set at 2 for all models. Lowering the threshold to 1 is not possible because it would collude with the indifference threshold. Raising it to 3 is an option that could be utilized 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.

4.3. The preferred instrument mixes

In the canton of Bern, decision makers prefer an instrument mix that focusses largely on persuasive measures such as information & education as well as the cantons prototypical function. The utilities support a very similar instrument mix that further contains the financial support of research projects by the canton. The environmental NGOs finally support the most extensive instrument mix that further contains the financial support of pilot and demonstration projects as well as a partial tax exemption for selling renewable electricity. All actor groups agree that information & education and demonstration should be employed and that the construction of RE producing installations should be deductible from

Table 4: The technocratic instrument mix

	Evaluation score
Information & education	1.6
Minimal investment ratio	0.0
Partial self-supply (new buildings)	0.3
Research	1.4
Pilot & demonstration projects	1.4
Subsidy construction	0.7
Subsidy grid access	0.7
Public announcements	1.2
Reduction of capital cost	1.2
Tax reduction construction	1.4
Tax reduction selling of RE	0.9
No tax on selling RE	0.9
CO2 tax compensation	0.5
Demonstration	1.8

Legend: highlighted instruments show scores higher than 1.4 and are considered as primarily relevant for the instrument mix

the taxes. In the canton of Lucerne, decision makers prefer the same instrument mix as in Bern, however, they add public announcements with a rather high score of 1.8 to the mix. On the other hand, utilities are rather restrictive and 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 obligation for newly built buildings to produce a certain amount of the necessary electricity on their own. The canton where actors generally support the most extensive instrument mix is Thurgau: The decision makers prefer a very comprehensive mix consisting of multiple persuasive and financial instruments as well as the obligation for the partial self-supply of new buildings. The NGOs mostly agree with this mix and further add subsidies for the construction of the grid access. The utilities are a bit more constrained and focus on the building sector with partial self-supply and on subsidies for the construction of such installations. All instrument mixes are depicted in Table 5.

5. Discussion

The paper identifies the current, technocratic and preferred instrument mixes with regard to the three actor groups in the cantons of Bern, Lucerne and Thurgau. In the following section the paper's two central question is discussed based on these results. The paper asks if the currently selected instruments correspond to the actors' preferences (preferred instrument mix) or to the technocratic selection criteria (technocratic instrument mix).

The decision makers show large support for the current policy mix in each canton. Deviations are usually a result of preference scores being slightly lower than the necessary 1.4 threshold that needs to be passed in order to belong to the preferred policy mix. An interesting factor that can be derived from this observation is the crucial role experience seems to play for actors' preference and also for instrument choice: In the canton of Lucerne for example, the decision makers show major support for public announcements (1.8), however, in the other two cantons (that do not yet use this instrument) approval is very low (0.4 each). It can therefore be assumed that decision makers are especially open to

Table 5: The preferred instrument mixes

Bern	Decision makers (n=7)	NGOs (n=4)	Utilities (n=4)
Information & education	1.5	1.8	1.3
Minimal investment ratio	0.5	0.8	0.5
Partial self-supply (new buildings)	1.2	0.8	0.5
Research	1.2	1.5	1.8
Pilot & demonstration projects	0.9	1.8	1.3
Subsidy construction	0.6	1.0	0.8
Subsidy grid access	0.5	0.8	1.0
Public announcements	0.4	1.3	1.3
Reduction of capital cost	0.6	1.3	1.0
Tax reduction construction	1.7	1.5	1.5
Tax reduction selling of RE	1.0	1.5	1.0
No tax on selling RE	0.5	0.5	0.8
CO2 tax compensation	0.9	0.8	1.0
Demonstration	1.4	1.9	2.0

Lucerne	Decision makers (n=6)	NGOs (n=3)	Utilities (n=1)
Information & education	2.0	1.3	2.0
Minimal investment ratio	0.7	1.3	0
Partial self-supply (new buildings)	0.7	2.0	0
Research	1.2	1.3	0
Pilot & demonstration projects	0.9	1.7	1.0
Subsidy construction	1.0	2.0	1.0
Subsidy grid access	0.7	1.3	0
Public announcements	1.8	1.3	1.0
Reduction of capital cost	0.7	1.3	1.0
Tax reduction construction	1.7	1.3	1.0
Tax reduction selling of RE	1.2	0.7	0
No tax on selling RE	0.6	0	0
CO2 tax compensation	0.5	1.0	0
Demonstration	1.5	2.0	1.0

Thurgau	Decision makers (n=7)	NGOs (n=1)	Utilities (n=1)
Information & education	1.8	2.0	1.0
Minimal investment ratio	0.8	1.0	1.0
Partial self-supply (new buildings)	1.4	2.0	2.0
Research	1.1	0	0
Pilot & demonstration projects	1.8	2.0	1.0
Subsidy construction	1.4	2.0	1.0
Subsidy grid access	0.6	2.0	0
Public announcements	0.4	1.0	1.0
Reduction of capital cost	0.4	1.0	1.0
Tax reduction construction	1.4	2.0	2.0
Tax reduction selling of RE	0.2	1.0	1.0
No tax on selling RE	0.3	0	0
CO2 tax compensation	0.9	0	0
Demonstration	1.8	2.0	2.0

Legend: highlighted instrument show scores higher than 1.4 and are considered as primarily relevant for the instrument mix

instruments they already know and use in their canton. With regard to the public announcements in Lucerne, that are currently on hiatus due to budgetary constraints, it can be assumed that based on the very high approval rates they have a high chance of being reintroduced should there be an open window. Generally, it can be observed that the decision makers prefer an instrument mix that consists of slightly less instruments that are currently implemented. In the cantons of Bern and Lucerne for example the parliaments consider the support of research and pilot & demonstration projects to be of (high) secondary importance.

The NGOs are the actor group that shows the highest preferences for an instrument mix that is more coercive and generally larger than the ones of the other two actor groups. This finding can mainly be ascribed to their policy core beliefs that show that NGOs put a much stronger emphasis on issues such as environmental protection and climate change and consider state intervention as more desirable than the other two groups. This can be directly linked to their stronger support of more coercive measures such as tax reductions for the selling of renewable electricity or direct subsidies provided by the canton. However, none of the NGOs is in favor of the strongest measure (the complete repeal of taxes on renewable electricity) even though the instrument belongs to their technocratic policy mix. 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 the landscape protection. Hence, they also oppose a too strong surge for the construction of power plants, especially in sensitive areas such as 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 nature restoration projects. NGOs therefore also have an interest not to cut back on these taxes.

Whereas the NGOs prefer a more encompassing instrument mix, utilities prefer less instruments. In addition, their technocratic policy mix is entailed with less coercing instruments than currently present in the cantons. 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 such as PV on the roof. This additionally generated power is able to help break the peaks of electricity consumption that occur at noon, however, these new producers stand in competition with the utilities because they start to break the utilities' long-lasting monopoly in the domain of electricity production. This monopoly is not fundamentally threatened in the near future because most private homes that produce renewable electricity are not entirely self-sufficient and rely on the power produced by larger power plants. However, this still results in a loss of revenue, especially with regard to the current electricity prices and in the need for major investments in the electric grid in order to cope issues such as grid stability and the large increase in network connections. Furthermore, utilities are obliged by federal law to buy excess electricity and feed it into the grid what again leads to administrative expenses.

These findings are especially interesting with regard to the primary question presented in this paper that asked what factors actually drive instrument selection for the promotion of renewable electricity production. The first and most obvious conclusion that can be derived is not 'what' factors but 'who' is relevant. The study shows that in all three cantons the preferences of the decision makers almost exactly represent the current policy mix. The support of the relevant parties in parliament is therefore crucial for the success of an instrument. In the Swiss context it is even more relevant because the cantonal parliaments show very high stability over time and majorities mostly stay the same over decades

(Vatter, 2016). Short time fluctuations in the implemented instruments that often occur in majoritarian democracies are therefore not to be expected. The decision makers' preferences can therefore be identified as a crucial factor for the selection of instruments. The relevance of the extensively discussed policy design criteria should, however, not be neglected. Similarly to their preferences, the technocratic policy mix corresponds well to the current cantonal policy mixes. However, and in contrary to the preferences, design criteria cannot be linked directly to the choice of instrument. They have much more to be taken as an indicator whether policy makers actually choose instruments that 'represent their interest' or if they choose their instruments based on more ideological factors.

6. Conclusion

This paper investigated what factors drive instrument selection in the context of transitional settings and did so by comparing the current, the technocratic and the preferred instrument mixes in the domain of Swiss renewable energy policy from the view of three actor groups: the decision makers, the utilities and NGOs. The technocratic policy mixes were identified by conducting a multi-criteria analysis (ELECTRE TRI). The actors' preferences were determined with an elite survey in the cantons of Bern, Lucerne and Thurgau. Generally, the currently implemented instrument mix corresponds best to the technocratic and decision makers' preferred policy mix. NGOs opt for a policy mix that encompasses a larger number of instruments that are also more coercive than the current ones. The utilities are in favor of the exact opposite: less instruments and less coercion.

The study has its inherent limitations. The elephant in the room is the missing direct causal link between the currently implemented 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 states and open the door for future research that focusses more explicitly on the causal effects of actors' preferences on instrument selection. This can for example be done by studying a policy process qualitatively in great detail, especially when the direct impact of design criteria on actors' decisions is of interest; or by taking a more quantitative approach and using panel data. Another important limitation of the study is that there are other factors enabling or restricting the choice of 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, Lundin, & Thelander, 2015). This paper was also an attempt to integrate MCA into policy design on a theoretical level. There are many sophisticated decision tools on the level of decision making that include many more criteria than this study does (see e.g., Henggeler Autunes & Oliveira Henriques, 2016), however, the more theoretical design criteria have rarely been applied in a way as this paper does.

In sum, this paper has shown that policy design criteria as well as actors' preferences are a valuable element of analyzing instrument selection. It seems most relevant for the adoption of policy mixes fostering the deployment of renewable electricity to focus on instruments that score well with both design criteria and preferences. Especially decision makers as the primary actor group in charge of

instrument selection needs to be aware of the factors that are often crucial for other actor groups and consider their beliefs and preferences when making a final choice in order to guarantee that interests are at least somewhat considered. The approach of the paper might therefore be an interesting approach for decision makers, as well as for other actors, to structure their decision with regard to the high complexity of the subject matter.

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