Enabling change: experimental insights on electricity policy acceptance[1]

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Abstract

This paper asks why citizens are reluctant to accept incentive-based energy policies even though such instruments are widely acknowledged to be most effective to attain ecological goals. We argue that in order to better understand why incentive-based policy instruments are so unpopular, we should take a closer look at the specific components of these policies. Put differently, we assume that individual political decisions on renewable energy proposals are multi-dimensional choices, where individuals may support certain elements of a proposal while other aspects trigger rejection. Using conjoint analysis allows us to identify which components of incentive-based proposals undermine acceptance and whether there are aspects that have the potential to generate public support. Moreover, by distinguishing between voters with different ideological background, we gather additional insights on who could join left-green voters to form a political majority in favor of renewable energy policies. Our findings based on Swiss data imply that personal costs act as a strong hurdle to individual acceptance, while citizens favor policies that specifically target renewable energy sources in general and solar power in particular. Overall, several findings support the conclusion that citizens do not well understand the logic of tax-based ecological policies, which may not only hamper their acceptance but also reflects in the fact that, in a non-campaign context, party-political differences in policy preference are astonishingly small.

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1. Introduction

Global warming and the unsolved issues in nuclear power technology (e.g., nuclear waste disposal, security) challenge the global community to change the energy supply and reduce energy consumption. In the electricity sector and namely after Fukushima 2013, 'change' includes the phasing out of nuclear energy as formally decided by several nations in Europe such as Germany and Switzerland. The next steps to make the transition from the fossil and nuclear energy age towards alternative and renewable electricity demand not only a solution how to finance the phasing out. Increasing the share of renewable electricity is seen as indispensable to solve the energy supply dilemma. However, the big challenge that most industrialized countries face is how to politically implement new technologies and solutions. In fact, many countries have introduced some "soft policies" (Carattini et al. 2016), for instance voluntary self-regulation (Ingold 2008) or subsidies for renewable energies (Marcantonini and Ellerman 2014), which are however either not effective enough in terms of goal attainment or financially very expensive. By contrast, the introduction of new incentive-based policy instruments (e.g., energy or carbon taxes, or even ecological tax reforms), which are widely acknowledged to be the most ecologically effective and economically efficient instruments, proves to be particularly difficult mainly due to problems of political acceptability (Dresner et al. 2006: 896). The situation is even more complicated in political contexts in which citizens are directly integrated into the policy making process by means of direct democracy. Previous research has repeatedly documented that citizens in their role as veto players are very reluctant to accept renewable energy policies in general, and incentive-based instruments in particular (Stadelmann-Steffen 2011; Thalmann 2004). This dilemma has typically been attributed to cost factors that heavily impact individual vote decisions (Bornstein and Lanz 2008), but also to the fact that people fail to understand the logic and benefits of these instruments (Carattini et al. 2016).

This article aims at a better understanding of why citizens do not support incentive-based policy instruments to promote renewable energy, but also of whether there is a way out. Put differently, can we identify factors that trigger citizens' acceptance or rejection of incentive-based energy policies? Focusing more specifically on renewable electricity policies, we therefore ask:

What factors influence citizens' acceptance of incentive-based policies, or what exactly makes incentive-based instruments unpopular?

Our main interest concerns policy design, i.e., the question of which instrument is selected to reach a political objective (Howlett et al. 2009). Policy instruments are defined as the measures of state action

to solve a political problem (Cairney 2011). Different instrument types are thereby distinguished: Besides persuasive measures, the main distinction is made between incentive-based and regulatory policies (Vedung 1998). In the following, we argue that in order to explain the acceptance of policies (by citizens) we should go beyond this dichotomy and consider the various elements of a policy proposal. A new tax, for instance, can be designed in very different ways. First, the question arises as to *what* is taxed, i.e., fuels and combustibles, electricity coming from non-renewable sources or electricity in general, etc. Second, the tax can vary as to *who* is taxed, i.e., consumers and/or producers. Third, the tax rate can be *higher or lower*. Fourth, the revenues collected through these taxes can be *spent* differently: the money can be invested to promote renewable electricity production, or it could be redistributed to the citizens (in different ways). This brief example shows that one policy proposal contains various dimensions, out of which some may be accepted by a majority of the people while others are more contested. Hence, in order to get new insights into a possible "way out", i.e., how to make renewable electricity proposals acceptable to citizens, we need to know what specific elements are supported and which ones are the "red lines" that make policy proposals fail at the ballot. For this reason, we focus on different variants of incentive-based instruments to gain new insights into what exactly makes incentive-based instruments unpopular.

Moreover, in order to gain valid insights on citizens' reactions to policy proposals, it is crucial to adopt a research design which allows to confront challenges such as the value-action gap (see Kollmuss & Agyeman 2002), the problem of social desirability in survey research on 'green behavior', and which allows to predict behavior in future votes and is not only limited to an ex-post analysis of votes (such as Stadelmann-Steffen 2011; Bornstein & Thalmann 2008; Halbheer et al. 2006; Kahn & Matsusaka 1997; Deacon & Shapiro 1975). Furthermore, when researching the conditions under which a renewable energy proposal could pass a popular vote, it is particularly important to focus on voters from the political center/right and those with only limited pro-environmental preferences. While left and green voters are most likely to accept renewable electricity solutions, in most political contexts they cannot form a majority on their own. Knowing more about how voters with different ideological background vary in their preferences for renewable electricity proposals (or single parts of them), will therefore provide relevant insights into possible voter coalitions that could help a proposal gain a political majority.

Following these theoretical and methodological considerations, we present results based on a large-scale representative survey from Switzerland. A forced-choice paired conjoint analysis (Hainmueller, Hopkins & Yamamoto 2014) allows us to evaluate how specific aspects of an incentive-based policy proposal influence individual acceptance or rejection of the whole proposal. Hence, this helps us to

identify possible drivers and red lines for a proposal's popular support. Considering, moreover, varying individual ideologies and party affiliations provides us with new insights into possible voter coalitions when voting on renewable electricity proposals. Furthermore, in our experimental approach we are not limited to already existing policy solutions, but rather are able to take an ex-ante perspective on citizens' voting preferences.

While our experimental approach very closely corresponds to a realistic direct democratic vote context as regularly practiced in the U.S. states and Switzerland, we argue that our findings are relevant beyond. Most importantly, the puzzle that incentive-based instruments are considered by economists to be the most effective and efficient way to attain environmental goals, while they are unpopular in the broader public, can be observed in many European countries, and has been a crucial obstacle to environmental tax reforms also in contexts without direct democracy (Carattini et al. 2016; Dresner et al. 2006). Hence, gaining insights into the factors that influence citizens' acceptance or rejection of renewable electricity proposals can also importantly inform policymakers from other political systems.

The remainder of this article is structured as follows. In the following section we present our theoretical framework by discussing how different aspects of an incentive-based instrument may be generate public acceptance and rejection, respectively. Moreover, we elaborate on the role of political attitudes with respect to a potential political majority for renewable electricity policies. Next, the methodological approach, the data and the operationalization is introduced. In section 4 we present our empirical findings. The article ends with a summary of the most important results and conclusions.

2. Theory

In this section we present our theoretical framework and the hypotheses to be tested. We start with a public choice perspective assuming that cost-benefit calculations are crucial for individual vote decisions. However, in a second step we acknowledge that rising problem awareness have increased preferences for renewable energy, which may increase support for policies that explicitly and transparently target renewable electricity. Finally, these attitudes most importantly matter at the individual level. The interesting question that thereby arises is under which conditions voters from the political center and right might join left-green voters to form a political majority for incentive-based electricity policies.

The choice of policy instruments – a public choice perspective

As mentioned in the introduction, the starting point of this article is a puzzle regarding the choice of policy instruments in environmental policy in general and renewable electricity policy in particular. In this context, ecological economists strongly argue in favour of incentive-based approaches. Most importantly, this instrument type has shown to be most effective for environmental protection in the long-run, as it generates continuous and long-term incentives for environmental friendly innovation and practises. Moreover, economic advantages have been mentioned (Carrattini et al. 2016). In the best case, i.e., an ecological tax reform, taxation is shifted from the economic "good" (e.g., labour) to the ecological "bad" (i.e., excessive electricity use) resulting in fiscal neutrality and a double dividend (Carrattini et al. 2016; Deroubaix & Lévèque 2006).

However, incentive-based approaches have only recently been given more attention by policymakers, while conventional regulative instruments (i.e., rules and bans) tend to be more popular for practical implementation (Felder & Schleiniger 2002; Kirchgässner & Schneider 2003). Most importantly, however, voters seem to prefer policies of regulations and prohibition rather than market-oriented policies (Deroubaix & Lévèque 2006; Kirchgässner & Schneider 2003: 375; Stadelmann-Steffen 2011).

The public choice perspective suggests that voters basically decide based on *cost-benefit calculations* (Bornstein & Lanz 2008; Kirchgässner & Schneider 2003). Put differently, renewable energy projects will generate (at least) short time costs, meaning that voters typically have to choose between a higher future environmental quality and higher real income (Kirchgässner & Schneider 2003: 375). This school of thought assumes that most often individuals will care more about their personal situation than about (future) environmental conditions. While Bornstein and Lanz (2008) show that individuals who prioritize personal and national welfare rather than investments for the environment are most likely to reject such proposals, even well-educated and informed citizens with pro-environmental attitudes will not necessarily accept pro-environmental policies in elections or at the ballot (Kirchgässner & Schneider 2003: 375). Hence, a first and simple expectation – which applies not only to incentive-based instruments but to environmental policies in general (Stadelmann-Steffen 2011) – we derive from this discussion is that the support for incentive-based policy proposals decreases with increasing personal costs.

H1: The likelihood that citizens support incentive-based instruments decreases with increasing personal costs.

The rejection of costly proposals should moreover be particularly pronounced if the running time of the measures is long, since the personal costs in this case add up over many years. Hence, we formulate the second hypothesis:

H2: Longer running times of incentive-based instruments decrease the likelihood that citizens support a policy proposal.

A more policy-centered view argues that cost-benefits considerations may not always be based on real costs but rather on perceptions thereof. This perspective is particularly helpful to explain why citizens prefer rules and bans over incentive-based instruments. Schulz (2011) speaks of a "cost-illusion" in so far as the costs of traditional regulative environmental policies are less visible compared to incentive-based instruments that often directly affect individual income or expenses (Halbheer et al. 2006; Stadelmann-Steffen 2011) and are perceived to be more equal and fairer (Deroubaix & Lévèque 2006: 947). However, different variants of incentive-based instruments may create varying individual perceptions of how costly the measure will be. In this vein, it is important to further distinguish between policies that provide incentives to reduce non-desired behaviour (e.g., taxes on electricity consumption) and policies that stimulate desired behaviour (e.g., investment grants, feed-in tariffs; Goulder & Parry 2008; Howlett 2005; Howlett and Ramesh 1993; Windhoff-Héritier 1987). This distinction reveals that from a citizen's perspective a measure may be perceived as costly either with reference to the revenue side (i.e., how money is collected) or the spending side (i.e., how much money is spent and for what measure).

Most obviously, and from a personal point of view, a policy measure may be perceived as costly because a tax is introduced or increased. However, not all types of taxes are equally visible to citizens. Gingrich (2014) for instance argues that direct income or revenues taxes are more traceable to citizens than indirect taxes. In other words, direct income and revenue taxes will be perceived as costlier and inescapable than indirect, i.e., consumption taxes. Regarding the latter, a consumption tax following the 'user pays' principle may not only correspond to norms of fairness and equality, but also appear to be more evitable, i.e., with my personal behaviour I can influence how much I have to pay. From this discussion we conclude:

H3: Incentive-based instruments that rely on revenues from indirect taxes following the user pays principle rather than on direct taxes will be perceived as less costly and are therefore more likely to be accepted by citizens.

Focusing on the spending side, a classic example of incentive-based policy instruments is to provide economic incentives for technological investments and progress (e.g., investment funds, feed-in tariffs). During the last decade, feed-in tariffs – i.e., guaranteeing prices for fixed periods of time for electricity produced from renewable energy sources – have been considered the most effective tool to promote the acceleration of renewable energy production (Couture & Gagnon 2010). Different to investment-based policy measures, feed-in tariffs reward actual performance. However, most recently and not least based on German experience, feed-in tariffs have also been criticized for being inefficient

and too expensive due to over-market prices paid to producers of renewable electricity.[2] This discussion may have influenced citizens' perception of feed-in tariffs.

In contrast, and in order to implement a fiscally neutral ecological tax reform, revenues collected through taxes on electricity consumption can also be redistributed to the population. This kind of steering system that minimizes state intervention is actually the long-term aim of the current Swiss government as proposed in its Energy Strategy 2050 (Swiss Confederation 2015). From a personal cost perspective, this seems to be an attractive solution, since an electricity saving behavior may even result in a financial benefit. Hence, taking the cost argument seriously, citizens should prefer redistribution to any investment- or performance-based spending. This leads to the following hypothesis:

H4: Regarding revenues from taxes on energy consumption, citizens prefer the redistribution to the population rather than spending these means to promote the production of renewable electricity.

While the latter hypotheses are based on individualistic cost-benefit calculations, research on direct democratic votes in Switzerland has repeatedly shown that considerations regarding the national economy and the interests of enterprises play an important role for voters' decision. In the debate on tax-based renewable electricity policies, the high financial burden for firms and potential negative effects on (international) competitiveness has indeed received attention in many countries. For this reason, exceptions and privileges for energy-intensive industries are a crucial element in the discussion on how to design (future) renewable electricity policies (Grave et al. 2015). Given that the claim to provide good conditions for economic prosperity enjoys high priority in Switzerland, we expect that whether or not a policy proposal includes some kind of exceptions or privileges for energy intensive enterprises affects a proposal's acceptance:

H5: Incentive-based policies that contain exceptions or privileges for energy intensive firms will be more likely accepted by citizens than proposals without such exceptions or privileges.

The choice of policy instruments – increasing preferences for renewable energy

Even though the relevance of public choice arguments has been corroborated repeatedly, the rising awareness for environmental problems and the increasing negative predispositions for conventional energy sources may counterweigh economic cost arguments and increase the individual willingness

[2] E.g., http://www.greentechmedia.com/articles/read/germany-moves-to-reform-its-renewable-energy-law (retrieved on August 4, 2016) or http://www.nzz.ch/meinung/kommentare/ineffizient-und-zu-teuer-1.18657976 (retrieved on August 4, 2016).

to pay for renewable electricity measures (Borchers et al. 2007; Stigka et al. 2014: 100, 104). Put differently, citizens are likely to prefer policies that are targeted at the promotion of renewable energy in a very transparent and visible way. For instance, rather than levying a tax on electricity consumption in general, the purpose of a policy may be more easily visible and understandable if only non-renewable energy sources are taxed. Likewise, measures that explicitly promote renewable electricity production will find more support compared to proposals that only steer the consumption side (e.g., by redistribution revenues from an energy tax back to the population), as citizens see how a (generally negatively perceived) tax is a mean of reaching a positively perceived goal. We therefore hypothesize:

H6: Incentive-based policies have a higher likelihood to be accepted by citizens if they explicitly focus on the deployment of renewable energy both in consumption and production.

Note that the latter expectation can be seen as contradicting to hypothesis 4. While hypothesis 4 assumes that – due to cost arguments – voters will prefer measures that are fiscally neutral, here we expect that – due to problem awareness and increasing preferences for renewable energy – citizens support policies that explicitly and visibly invest in the promotion of renewable electricity production.

Eventually, several studies imply that not all renewable energy sources are equally supported by the citizenry. This is related to the fact that renewable electricity production has its well-known disadvantages, namely changes in the aesthetics of the landscape, visual intrusion of facilities, impact on flora and fauna, or noise pollution (Stigka et al. 2014: 104), which however will also vary between renewable energy source. While for instance wind projects are most obviously conflictive in this respect, consumers have been shown to be more supportive of solar energy (Borchers et al. 2007; Hanley & Nevin 1999). Given that empirical evidence on other energy sources is limited and as preferences for specific energy sources must be expected to vary depending on the country context (e.g., space is much more an issue in Switzerland than for instance in Germany or the U.S.) we just formulate a non-directional hypothesis:

H7: The support for incentive-based instruments varies depending on the energy source it is targeted at.

The individual perspective: Who joins a potential yes-coalition?

As previously mentioned and even from a public choice perspective, citizens' decision on renewable electricity policies can be expected to be influenced by political and environmental values. While hypotheses 6 and 7 consider these attitudinal aspects at the aggregate level, we should also take individual variation into account.

First, earlier studies have found that a *left-green ideology*, i.e., rating environmental protection and public goods as important, generally corresponds with a higher likelihood to vote environmental friendly. More precisely, Deacon & Shapiro (1975) and Kahn & Matsusaka (1997) report that a Republican predisposition leads to a lower support for environmental measures in California. For the Swiss case, similar results have been obtained both regarding party affiliation (Bornstein & Lanz 2008; Stadelmann-Steffen 2011) and ideology groups (Bornstein & Thalmann 2004; Sciarini, Bornstein & Lanz 2007): Left-green ideology significantly increases the probability for voting in favor of environmental friendly proposals. Similarly, pro-environmental attitudes are positively related to the support of environmental friendly policy proposals (Stadelmann-Steffen 2011; Halbheer et al. 2006).

Based on this discussion we can easily derive the expectation that individuals with left-green ideology will most likely accept renewable electricity projects at the ballot. However, this group alone cannot form a political majority in most political entities. In order to understand the conditions under which renewable electricity policies can pass the direct-democratic hurdle, the pure distinction between left-green voters and all others is not helpful. By contrast, the interesting question is whether individuals from the political center or the political right will for specific proposals join the left-green voters to form a political majority in favor of a renewable electricity policy.

In line with our previous argumentation, we argue that not all aspects of a renewable electricity proposal are equally important to all voters but rather that depending on the ideological background priorities will vary. For instance, given that center-right individuals tend to have weaker pro-environmental values, the cost argument should particularly matter for their voting behavior. Moreover, we expect that center-right voters are more skeptical towards redistributive policies. In order to grasp these potentially different priorities between different groups of voters, we will therefore test whether the role of specific policy components varies contingent on party affiliation.

3. Research Design

In this section we present our methodological approach, the data and operationalization.

The methodological approach: A conjoint analysis

From the literature and the specific research interest at hand, two major issues arise when investigating citizens' acceptance of renewable electricity proposals: First, acceptance shall be captured in a way that may actually reflect behavior and not only a mere opinion, and second, we should consider that the acceptance of renewable electricity measures at the ballot corresponds to multidimensional

choices, i.e., a specific ballot proposal consists of various elements out of which a voter may support some while rejecting others. The individual vote decision is therefore the result of balancing pros and cons of a proposal.

Both issues can be approached methodically by implementing a factorial survey experiment, which faces respondents with varying policy solutions to rate and to choose between (see Fig. 1). In contrast to single-item questions (e.g., "would you support an incentive tax in order to reduce energy consumption?"), the results thus reflect choice preferences for various designs of renewable electricity policies and come closer to a realistic vote, where not a single attribute but a combination of multiple factors is relevant for a decision. Methodologically, this paper follows Hainmueller et al. (2014) and Bechtel et al. (2015) applying a fully randomized conjoint design. As each respondent is exposed to seven paired policy choices (forced choice), we are able to collect enough information on varying attribute combinations, i.e., many potential variants of future policy measures, and thus ex ante information about how citizens might vote in future decisions.

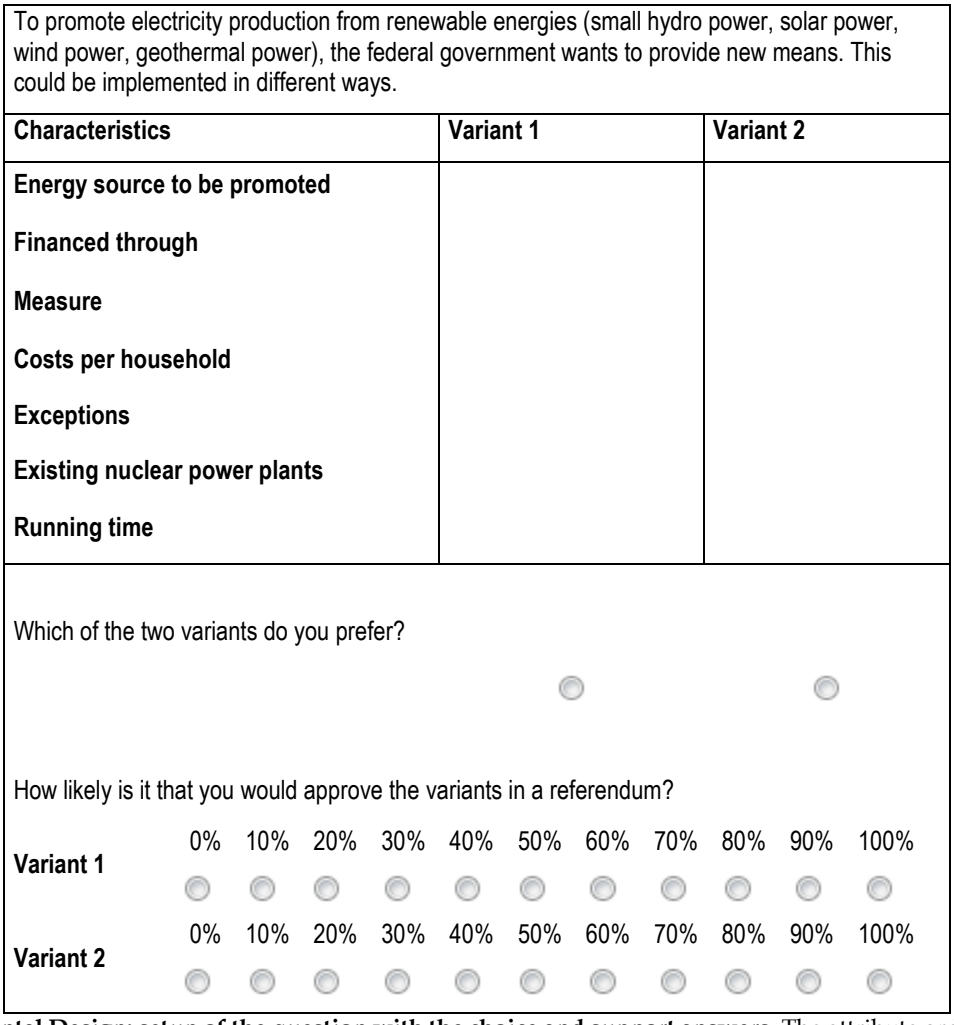

Fig. 1: Experimental Design: setup of the question with the choice and support answers. The attribute order was randomized, whereby the two dimensions "Financed through" and "Measure" where kept together.

To contextualize the choice experiment, we explicitly asked respondents to envisage the decision as a vote which would take place the following Sunday. For each paired policy variant respondents had to indicate which one she/he would choose in a confrontational vote (*choice answer*) and for both proposals individually "how likely they would approve the variant in a referendum" on a scale from 0 to 100 percent in decimal steps (the *support answer*). This design corresponds to a realistic ballot situation in Switzerland when the government presents a counter-proposal to a popular initiative. In this case, citizens are asked (1) whether they are in favor of the two presented proposals individually[3], and (2) which proposal they prefer if both receive a majority of votes.

Although an experiment will of course never have the same consequences as a vote and therefore per definition has its advantages mainly with respect to internal rather than with external validity, we argue that the chosen conjoint design offers very ideal conditions to analyze voter decisions at the ballot for two more reasons. First, we argue that deciding based on a conjoint table (see Fig.1), i.e., based on key expressions, corresponds quite closely to voters' real-world decision making. On the one hand, many citizens are likely not profoundly informed of the proposal at stake but take several key points mentioned in the campaign (and the parties position on these points) as cue for voting yes or no (Kriesi 2005, 2012; see also Chong & Druckman 2007; Druckman 2001; Lupia 2015). In this sense, the effect of abstraction of a conjoint table (for example compared with a vignette design) likely corresponds to mentioning the main issues that arise during a campaign, which eventually are weighted by citizens to make their decision. Second, the approach captures a behavioral component since respondents are asked to choose between alternatives. Hence, we argue that the factorial survey design does not only allow us to at least partly overcome the value-action gap (Bell et al. 2013; Kollmus & Agyeman 2002) but also to bring us closer to measuring actual 'acceptance' and 'support' (van Rijnsoever et al. 2015; Dermont, Ingold, Kammermann & Stadelmann-Steffen 2016) of renewable electricity policies. Third, a conjoint choice-experiment perfectly fits our theoretical argument that the acceptance of a policy instruments heavily depends on its specific components and the importance to identify combinations of these components that are most popular among citizens (Hainmüller et al. 2013: 3). Fourth, environmental questions are prone to a social desirability bias, i.e., people pretend to be more environmental-friendly in surveys than they actually are. Conjoint experiments provide respondents with multiple reasons to justify a particular choice and rating and thus have the potential to reduce social desirability bias (ibid.).

[3] Citizens especially have the possibility to support or reject both simultaneously, i.e., it is not necessary to vote yes for one of the proposals. Moreover, even if a citizen rejects both proposals, he can still express his will in the tiebreaker.

Data

The data set used in this contribution was collected in Switzerland, home to most direct democratic decisions in the world. In the discussion on a transition from nuclear and fossil energy to renewable sources of energy, in the near future citizens will likely be asked to confirm the policy solution drafted by government and parliament in a vote (Swiss Confederation 2015). The trilingual survey[4] on future energy provision in Switzerland collected 8'287 answers from a representative sample provided by the Federal Office of Statistics, whereby respondents where invited by postal mail to participate in an online survey.[5] The response rate after three invites was at 41.7%. The demographic and structural composition of the final sample corresponds quite closely to the Swiss resident population (see Appendix). This is particularly true with respect to gender, civic status, and education. Foreigners living in Switzerland as well as citizens older than 75 years had a lower response rate, which is likely caused by the exclusive use of an online survey. In terms of political orientation, the collected sample is very similar to the composition of Swiss voters according to the Swiss Election Study 2015 (Lutz 2016), the exception being that support for the bigger parties is comparatively higher while the ideological position of the respondents on the left-right scale is somewhat less polarized.

The survey comprises two conjoint modules, whereby respondents were randomly assigned to one of the two. The module on policy acceptance was answered by 4'146 individuals, while the second focused on the acceptance of local infrastructural projects and is not covered in this contribution.

Operationalization and implementation

The two dependent variables constitute the choice and the support for a given combination of attributes presented to the individuals. For each paired conjoint, the respondents were asked to choose which variant they would prefer, which results in a variable with the value of 1 for the chosen variant and 0 for the other. Furthermore, support for each proposal was recorded based on the rating question, i.e., individuals had to indicate how likely they were to cast a yes-vote on a specific ballot (see Fig. 1).

The conjoint on renewable electricity policies varies on seven attributes (for a detailed description of the attributes and attribute levels see Table A.1. in the Appendix): The targeted energy source, the

[4] The survey was conducted in German, French and Italian, the three larger of the four national languages of Switzerland. 65.4% filled out the survey in German, 26.0% in French, and 8.6% in Italian. Romansh individuals likely used the German version to answer the survey.

[5] The data collection process was conducted by LINK Institute in Lucerne. The sample was provided by the Federal Office of Statistics out of the "Stichprobenrahmen für Personen- und Haushaltserhebungen" (SRPH).

policy measure, how the measure is funded, the measure's running time, additional monthly cost per household, whether there are exceptions for energy intensive industries, as well as the procedure with existing nuclear power plants.

These seven attributes have been defined based on the current public and political debates and thus reflect "real" possible solutions for reducing the consumption of electricity and/or for the promotion of renewable electricity production in Switzerland. As such, the presented policy solutions thus closely reflect potential ballot proposals in the near future. As some elements of the presented policy proposals are less known among the electorate (given that there is currently not yet a political campaign on these issues), we tried to provide some basic information (e.g., explanations of geothermal power, small-scale hydro power, feed-in tariffs etc.) within the survey. Beside pop-up information we placed a module with single-item questions on energy policy before the conjoint module to make respondents reflect on these issues before answering the conjoint questions. In this vein, we compensated to a certain extent for the lack of vote campaign that in real life precedes individual decision making.

4. Results

In this section we present the empirical findings. In order to interpret the conjoint analysis we most importantly rely on the so called Average Marginal Component Effect (AMCE), which represents the "marginal effect of attribute I averaged over the joint distribution of the remaining attributes" (Hainmüller et al. 2013: 10). Using the AMCE we can take into account that the effect of a specific attribute might differ depending on the values of other attributes. To provide an example: Assuming that the costs of a proposal have an effect on the likelihood that citizens cast a yes-vote, it is reasonable to believe that this cost effect is heterogeneous across different energy sources. In other words: it could be that citizens will more easily bear an additional monthly cost of CHF 20 for a measure to support solar energy rather than on geothermal power. Despite such heterogeneous effects, the AMCE allows us summarizing the overall effect of an attribute across all other attributes of a proposal. Fig. 2 depicts the results of the conjoint analysis, i.e., in how far the varying components of a renewable electricity proposal influence the probability that a specific proposal has been chosen in the paired comparison.

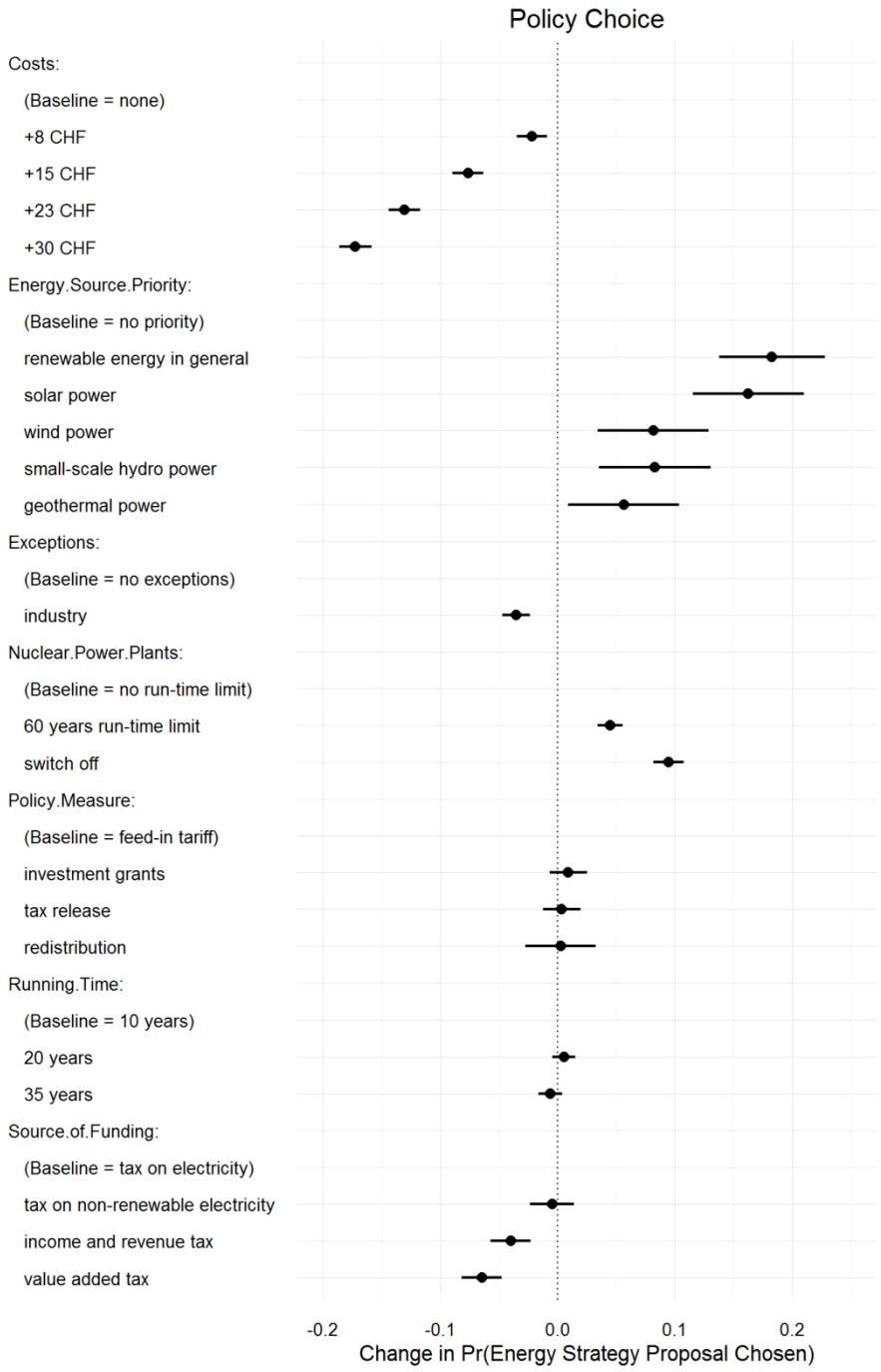

Fig. 2: Policy attributes and the probability that a proposal is chosen. Note: Average Marginal Component Effect (mean and 95% confidence interval).

Initially, we observe many significant AMCEs which imply that the specific design of a proposal indeed matters for whether respondents prefer a proposal over another. On the funding side, our results show that compared to proposals funded through general direct taxes or the value added tax (VAT), a consumption tax on electricity is preferred by citizens. Put differently, in a paired comparison, policy measures that are funded through taxes on (renewable) electricity consumptions are more likely to be chosen by respondents than proposals that aim at funding measures through direct taxes

or the VAT. Hence, these findings can be interpreted to mean that Swiss citizens generally support the 'user pays' principle, which might be seen as fairer compared to general taxes. While this fits our theoretical expectations (H3), the probability that respondents chose a specific proposal does however not significantly depend on whether only non-renewable or also renewable electricity is taxed (in contrast to H6). In contrast to hypothesis 5, Swiss citizens also do not support exceptions or privileges for energy intensive firms.

Moreover, citizens are largely indifferent concerning the actual policy measure: Their choice decision is unrelated to whether the tax revenues are redistributed to the population or used to finance feed-in tariffs, investment grants, or tax releases.[6] The reason for this non-finding can be at least threefold. On the one hand, we have seen that theoretically we could formulate opposing expectations on whether citizens prefer to finance measures to actively promote renewable electricity production or to "get their money back". If both tendencies in reality play a role, this could lead to an insignificant AMCE. The indifferences between the policy measures may, on the other hand, also imply that citizens have difficulties to understand the varying possibilities to promote renewable electricity and in particular the logic behind an ecological tax reform (Carrattini et al. 2016). As a result, they do not base their choice decision on this attribute. Finally, we cannot strictly exclude the possibility that the insignificant AMCS for the policy measures just reflect real and informed indifference between the varying measures.

In contrast, individuals heavily rely on the very visible cost argument. As soon as a proposal involves additional costs for households the likelihood that an individual selects this proposition decreases. Moreover, there is a more or less linear and negative relationship between increasing costs and the probability that a proposal is preferred by the respondents. These results strongly corroborate the public choice argument – as stated in hypothesis 1 – that personal cost considerations crucially influence the public acceptance of renewable energy policy. Important to note, however, that running time and thus a potential adding up of costs does not at all influence the preference for a policy proposal (in contrast to hypothesis 2).

Furthermore, we can see from Fig. 2 that the preference for policy solutions indeed depends on the energy source to be targeted (hypothesis 7). If a proposal specifies a focus on a particular energy source the likelihood that individuals choose this proposal increases (compared to the baseline where a proposal does not specify a target). Interestingly, the highest AMCE can be observed for renewable

[6] Further analysis not presented here moreover revealed that the indifferences between policy measures persist if the policy measures are interacted with the source of funding.

energy in general, closely followed by solar energy. By contrast, citizens seem to be somewhat less supportive of wind energy, small-scale hydro power and geothermal energy. These findings thus are in accordance with earlier findings from different country-contexts (Borchers et al. 2007; Hanley & Nevin 1999).

Finally, it is interesting to note that a phasing out of nuclear power receives strong support by Swiss citizens. This aspect, which we integrated in our analysis mostly to bring the status quo in, proves to significantly influence the probability that respondents choose a proposal. Citizens thereby not only prefer maturity restrictions compared to no restrictions at all, but most strongly go for proposals that propose an immediate phasing out of nuclear power.

In a second analytical step, we test how far political ideology matter for the choice of policy proposals. For this purpose, Fig. 3 depicts separate conjoint analyses for supporters of different political parties. We particularly expect that voters from the political center and right will weigh cost arguments more heavily and be particularly skeptical towards proposals that involve redistribution. However, the main message we take from Fig. 3 is that the patterns across different political parties are astonishingly similar. Most importantly, green and left voters do care about costs roughly as much as voters from the political center/right do – even though they are slightly more open to really high additional costs than voters from the Christian Democrats (CVP), the liberal party (FDP) or the Swiss Peoples' Party (SVP). In contrast, voters from the right-wing SVP do equally choose policies explicitly targeted at renewable energy sources in general and solar power in particular as voters from the Social Democrats or the Green party do. Furthermore, voters from all parts of the political spectrums show a preference to fund renewable electricity through an energy tax rather than through general direct or indirect taxes.

Only two notable differences between parties occur. First, voters from the FDP show the most "divergent" preferences concerning policy design. Generally, we see from Fig. 2 that these voters – who according to party ideology could be considered the prototypes of public choice voters – indeed choose between policy proposals almost only based on the cost argument. More precisely, this group of respondents is the only one for which energy source and how to treat existent nuclear power plants does not influence their choice decision. The second notable difference between parties concerns the SVP-voters: these voters are the only group which prefers policy proposals not including nuclear phasing out.

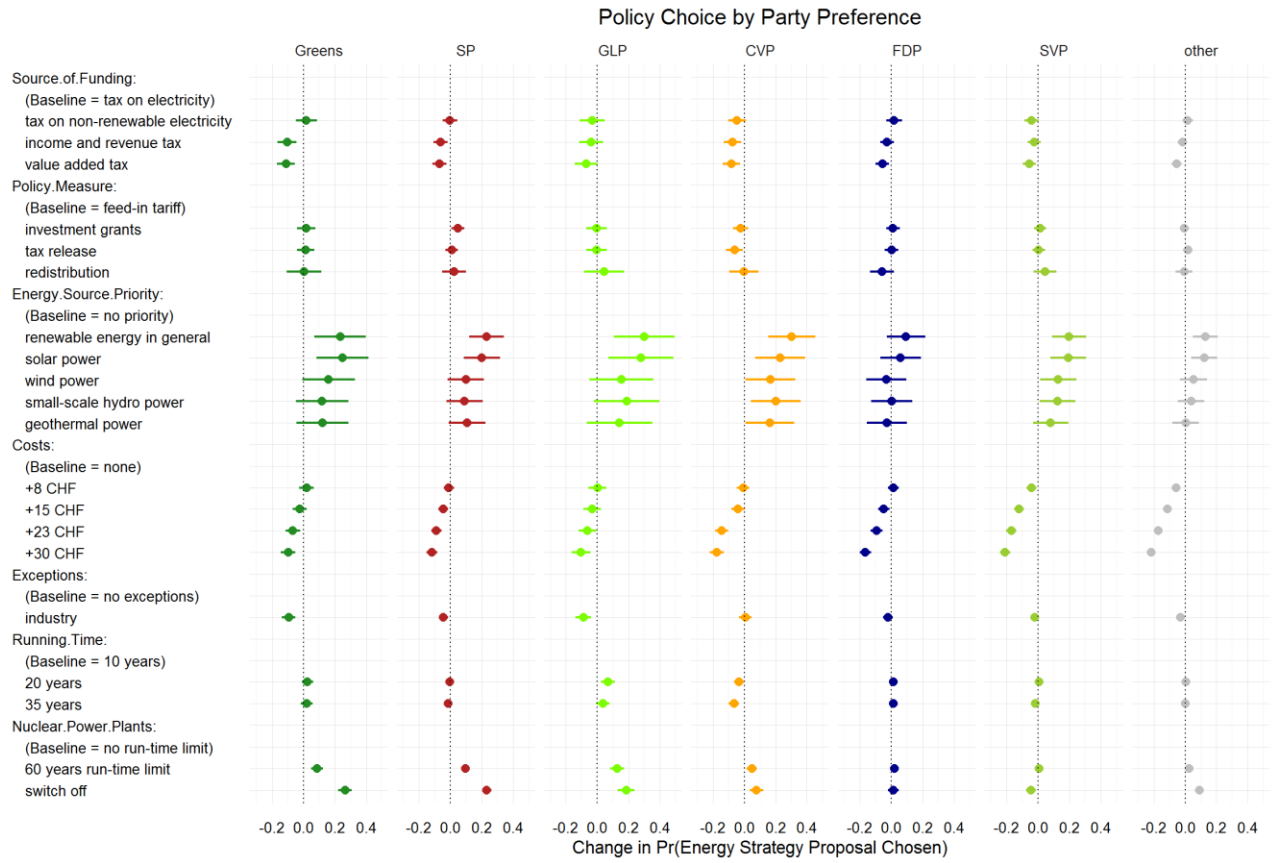

Fig. 2: The effect of policy components by party-ideological voter groups. Note: Average Marginal Component Effect (mean and 95% confidence interval).

While the previous analyses were based on the choice decision and thus provided insights on what aspect of a proposal increases acceptance or rejection for a specific proposal, in the last empirical step we use the rating decision as dependent variable. In other words, based on this data, we gain insights into how likely voters actually support specific proposals at the ballot. For this reason, we recoded the rating information, i.e., how likely it is that the respondent would cast a yes-vote on a proposal, into a dummy variable: If individuals indicated a probability of 80% or higher to cast a yes-vote, the observation was coded 1, and zero otherwise. By choosing a threshold clearly above 50%, we consider that individuals might over-report acceptance for renewable electricity policies in a survey context. In other words, by counting only those who are very likely to cast a yes-vote as acceptance we hope to get a more realistic picture of a proposal's actual chances at the ballot given the arising campaign before a ballot.

Fig. 3 reveals that a majority of possible policy proposals is not supported by a majority of voters (the plot has its highest density just below 50% acceptance rate). However, the figure also documents that there is a potential for incentive-based renewable electricity proposals to pass a direct-democratic vote. In fact, for roughly one third of all proposals more than 50% of respondents indicated to accept

the respective proposal with a probability of 80% or more. This finding actually underlines the relevance of our previous analyses: incentive-based electricity proposals have the potential to be accepted on the ballot, but its acceptance rate will be contingent on its specific design. The same can be said for the current preferred proposal by the government with the combination of an energy tax and a redistribution (see Fig. 3): while a majority of the combinations with these specific characteristics are rejected on a high threshold of 80%, this envisaged policy has not a distinctly lower support rate compared to all other possible policies.

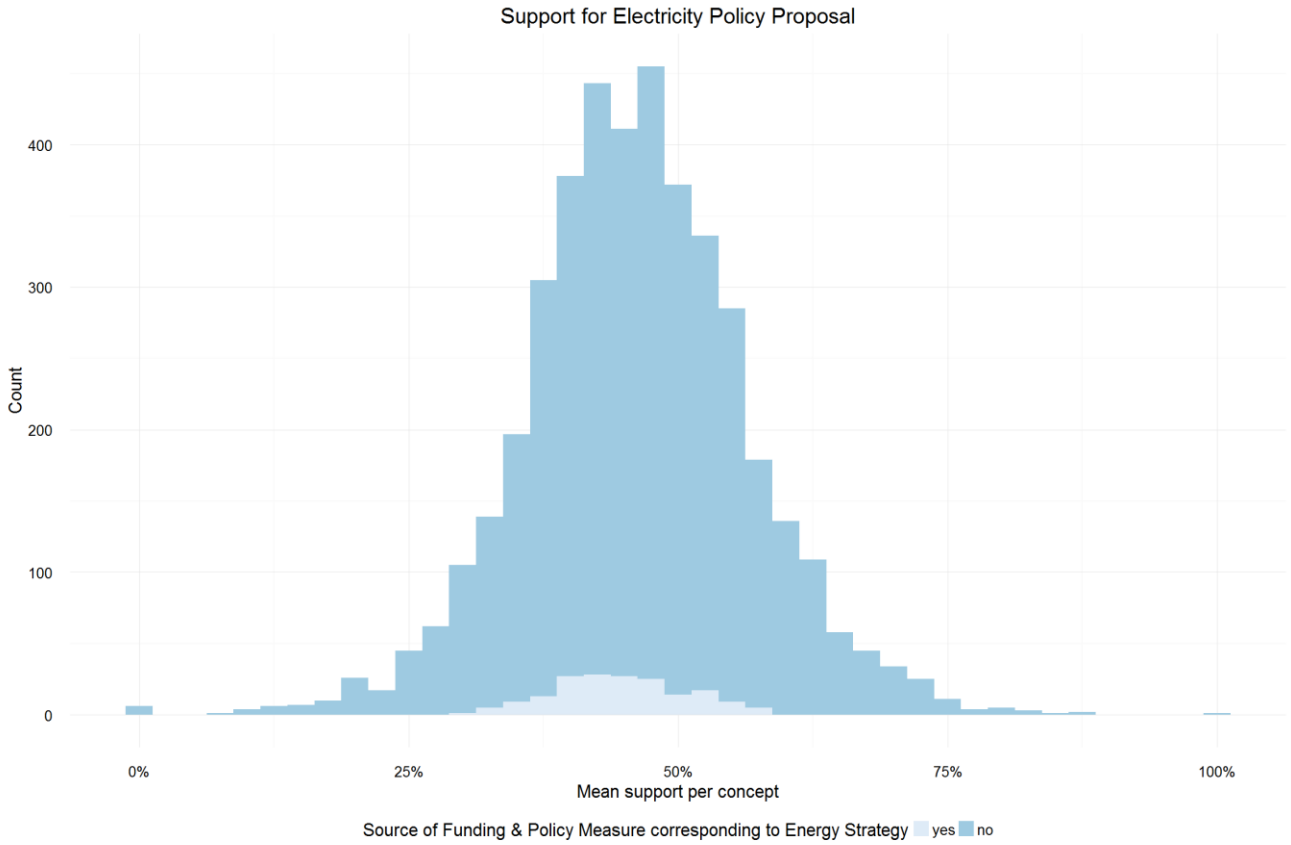

Fig. 3: Acceptance of electricity policy proposals. Mean support per proposal, i.e. share of respondents who indicated to accept a given proposal at the ballot with a probability of 80% or higher.

In further analyses not presented here we moreover regressed the support of a proposal on the proposal attributes as well as individual characteristics (e.g., party affiliation). These estimations show that our results regarding the choice decision can easily be transferred to the rating decision. While a focus on renewable energy in general and solar power in particular clearly increases the probability that an individual supports a proposal, increasing costs, exceptions for energy intensive industries, as well as a funding based on general taxes decreases the support of a proposal. The results furthermore confirm our previous conclusion that citizens have no clear preference regarding how exactly renewable electricity should be promoted. The only measure they support significantly less is the

redistribution of energy taxes to the population. Moreover, individual values and attitudes influence the likelihood to accept a renewable electricity proposal at the ballot. We observe that – not surprisingly – leftist and green voters are most likely to cast a yes-vote on these proposals. However and again in accordance with our previous results on the choice between proposals, the liberal voters are the only political group that is systematically more skeptical towards renewable electricity policies.

5. Conclusion

The starting point of this contribution was the question of why citizens are reluctant to accept incentive-based energy policies even though such instruments are widely acknowledged to be most effective to attain ecological goals in environmental policy in general and energy policy in particular. We argued that in order to learn more about the difficulties to politically implement incentive-based instruments, we should go beyond the traditional distinction between incentive-based, regulative and persuasive instruments, and look more closely at the varying dimensions specific incentive-based instruments consist of. Hence, by using conjoint analysis we aimed at providing new insights into the factors that make citizens accept or reject incentive-based policy proposals at the ballot. The main findings of our analyses can be summarized as follows:

First, our results suggest that while a majority of incentive-based proposals probably would indeed fail to receive a majority of votes at the ballot, some of them a fair chance to pass the direct-democratic hurdle. On over 35% of our potential policy proposals, a majority of voters indicated to cast a yes-vote with a probability of 80% or more.

Second, however, acceptance of and preferences for incentive-based instruments clearly depend on their specific characteristics, i.e. the various components of a policy proposal. On the one hand, personal additional costs arising from a policy proposal can be considered one of the crucial obstacles to a proposal's public support. There is in fact not much room for maneuver regarding the cost aspect, i.e., already a modest rise of only 8 CHF per household and month leads to a significant lower probability that a policy proposal is chosen and supported by citizens. Moreover, this negative cost effect almost linearly increases with rising costs. Given that most incentive-based measures will result in some additional costs and in order to gain a political majority, a proposal hence needs a trigger of acceptance that is able to compensate for the negative cost effects.[7] In this context, the payer pays

[7] In other policy areas, particularly with regards to welfare state reforms, compensation has been in fact identified as crucial mechanism to increase public acceptance of a proposal (Bonoli 2000; Häusermann 2010; Häusermann et al. 2016).

principle is widely accepted by citizens and clearly preferred over general income taxes or the VAT – even more so if an electricity tax is targeted at non-renewable energy only. In the same vein, our results support the view that citizens have quite strong preferences for renewable energy (compared to conventional energy production) and may therefore eventually be willing to pay more for according policy approaches in the (near) future (Borchers et al. 2007; Stigka et al. 2014: 100, 104).

Third, our findings suggest that an information deficit may strongly influence citizens' preferences towards renewable electricity policies and eventually hamper the acceptance of the most effective instruments. This conclusion is based on several results. First, in contrast to the crucial role of the revenue side, citizens do barely base their decision on how the money is spent. The only exception is a strong rejection of proposals aimed at a pure steering system, i.e., where the revenues from an energy tax are redistributed to the population. Note that this latter result is at odds with the crucial role of the cost argument previously discussed. We interpret this to mean that citizens fail to understand the logic of an ecological tax reform (see also Carattini et al. 2016). On the one hand, the various possibilities to actively promote renewable electricity are not familiar to citizens, which is why they do not base their decision on this aspect. Against the background that promoting renewable electricity as such is broadly supported by citizens, the only thing that seems less reasonable is to pay the money back to the population instead of actively install measures to promote renewable electricity production.

Fourth, when taking into account political ideology, our findings demonstrate an astonishing similarity of voter groups. Put differently, across all parts of the political spectrum voters seem to heavily rely on cost arguments and to prefer a specific focus on renewable electricity in general and solar power in particular. Voters from the Liberal Party are the only group that is significantly more skeptical towards renewable electricity proposals and bases their preferences towards these proposals almost exclusively on the cost argument. Hence, there is no strong ex-ante opposition towards incentive-based energy policies in general. However, against the background of previous research and experiences, this points to the crucial importance of political campaign. While our survey has been taken in a non-campaign context, a promising way for future research is to integrate this aspect in order to see whether and how preferences towards various policy proposals change during a political campaign.

In terms of policy implication, our results are highly relevant. In fact, in its Energy Strategy 2050, the Swiss government defines the introduction of a steering system with revenues from an energy tax being redistributed to the population as medium term objective. Our results imply that this proposal

might have difficulties to gain a political majority at the ballot (see also Fig. 1 in the supporting material). However, the main obstacle is probably not – as most often assumed (ZIT) – the introduction of a new tax as such, but rather the way the money collected through this tax is spent afterwards. Hence, one possibility to increase the acceptance of such a policy proposal might by to provide citizens with a better understanding of why and how an ecological tax reform works. A second option, against the background of our results, is to combine targeted tax-measures (i.e., an energy tax) with explicit promotion measures in order to accommodate citizens' (growing) preferences for renewable energy not only at the revenue but also on the spending side.

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Annex

Table A. 1: Attribute list and levels used in the conjoint analysis

ATTRIBUTES	LEVELS	
Energy Source Priority	Renewable Energy in general	
	Solar power	
	Wind power	
	Small-scale hydro power	
	Geothermal power	
	No specific target	
Souce of Funding	General tax revenues	
	Added-value tax	
	Tax on electricity (VAT)	
	Tax on electricity from non-renewable sources	
Policy Measure	Investment grants for the construction of a new plant	
	Feed-in tariff for renewable electricity	
	Tax reductions for firms that produce renewable electricity	
	Redistribution to the population	!= General tax rev., VAT*
Costs	No additional costs	
	Around 8. – CHF additional monthly costs	
	Around 15. – CHF additional monthly costs	
	Around 23. – CHF additional monthly costs	
	Around 30. – CHF additional monthly costs	
Exceptions	No exceptions	
	For energy intensive industries	!= General tax rev., VAT*
Nuclear power plants	Close down within 5 years	
	Maturity restriction of 60 years	
	No maturity restriction	
Running Time	for 10 years	
	for 20 years	
	for 35 years	

Notes: The attributes and levels were assigned to each task in a fully randomized way (see Hainmüller et al. 2013). *These combinations were excluded from the conjoint designs, since they do not represent reasonable variants of renewable electricity proposals.

Table A.2: Variables, operationalization and descriptive statistics

VARIABLE	VALUES
Individuals	4'146 for Conjoint on Policies
Answers	7 tasks * 2 concepts * 4'146 individuals = 58'044
Language	
German	66%
French	26%
Italian	9%
Gender	
male	53%
female	47%
Age	
18-35 years	27%
36-50 years	29%
51-65 years	28%
65+ years	16%
Education	
No education & mand. school	10%
Professional education	37%
Middle School	11%
Higher professional education	20%
Higher education	22%
Income	
less than 3'000 CHF	8%
between 3'000 and 4'999 CHF	17%
between 5'000 and 6'999 CHF	23%
between 7'000 and 8'999 CHF	17%
between 9'000 and 10'999 CHF	13%
between 11'000 and 13'000 CHF	9%
more than 13'000 CHF	12%
Party Preference	
Greens	10% (for model: 7%)
SP	20% (for model: 16%)
GLP	7% (for model: 5%)
CVP	12% (for model: 9%)
FDP	19% (for model: 15%)
SVP	22% (for model: 17%)
other	10% (for model: 31%, coded for all missings)

Notes: Summary statistics refer to the subsample of individuals who answered the conjoint-module.