University of Bern
Faculty of Business, Economics and Social Sciences
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Citizens' support for the energy transition

The influence of policy and politics on citizens' opinions towards renewable energy promotion

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Abstract

As a result of climate change and several countries' decisions to phase out nuclear power, several countries are currently facing the question of how to take effective action to secure energy provision for the future. However, reducing CO_2 and replacing non-renewable energies with renewables to provide electricity faces a barrier of 'social acceptance', i.e., support for targets and measures from both the political elite and the public. This dissertation focuses on the role of citizens. It answers the questions of why citizens matter in energy policy, how they form opinions on different policies, and how their opinions can be influenced and manipulated. It provides insights into how the political elite can design energy policy proposals in order to ensure public support, and also discusses the degree to which citizens participate in this conversation. Furthermore, this work shows which political processes are behind these energy policies, argues for a multidimensional approach to decision-making, and analyses which policy elements are relevant for citizens.

Viele Länder stehen aufgrund des Klimawandels und der Entscheidung, aus der Kernenergie auszusteigen vor der Herausforderung, wirksame Massnahmen zur Sicherung der Energieversorgung der Zukunft umzusetzen. Die Reduktion des CO_2-Ausstosses sowie der Ersatz von nicht-erneuerbaren Energien mit sauberen Energiequellen steht allerdings vor der Herausforderung der 'sozialen Akzeptanz'. Dies bedeutet, dass die Unterstützung der Ziele und Massnahmen durch die politische Elite und der Bevölkerung ein zentraler Faktor für den Erfolg einer Energiewende darstellt. In dieser Dissertation wird die Rolle der Bevölkerung näher betrachtet. Die Dissertation bietet Antworten auf die Fragen, wieso die Stimmberechtigten in der Energiepolitik relevant sind, wie sie ihre Meinung zu den verschiedenen Vorlagen bilden, und welche Faktoren diese Meinung beeinflussen können. Daraus ergeben sich Einblicke, wie zukünftige Vorlagen im Bereich der Energiepolitik ausgestaltet werden können, um nicht an der Hürde der Zustimmung der Bevölkerung zu scheitern. Zudem

wird der Grad diskutiert, zu welchem die Stimmberechtigten in den Prozess einbezogen werde sollten. Weiter zeigt die Dissertation auf, welche politischen Prozesse hinter politischen Vorlagen im Energiebereich stehen, argumentiert für eine multidimensionale Betrachtung von Entscheidungssituationen und analysiert welche Elemente einer Vorlage die Bevölkerung als wichtig erachtet.

Chaschunà da la midada dal clima e la decisiun da renunziar a l'energia nucleara èn plirs pajais al mument confruntads cun la sfida da chattar soluziuns effectivas che segireschan la provisiun d'energia dal futur. Ma la reducziun da CO_2 ed il remplazzament d'energias betg regenerablas cun energias regenerablas dovra 'l'acceptanza sociala'; q.v.d. l'elita politica e la populaziun ston sustegnair las finamiras e las mesiras per producir tala electricitad. En questa dissertaziun è la rolla da la populaziun en il focus. La lavur dat respostas a las dumondas, pertge ch'ils votants e las votantas èn relevants en la politica d'energia, co ch'els furman in'opiniun tar las differentas propostas, e co che quest'opiniun po vegnir influenzada e manipulada. Tras quai èsi pussaivel per l'elita politica d'avair invistas, co che propostas futuras en la tematica da la politica d'energia pon vegnir concepidas per betg far naufragi causa l'approvaziun da la populaziun mancanta, e tge inclusiun da votantas e votants ch'è necessaria. Plinavant mussa la dissertaziun tge process politics ch'èn davos questas propostas, argumentescha per ina perspectiva multidimensiunala da situaziuns da decisiun, ed analisescha tge elements d'ina proposta ch'èn relevants per la populaziun.

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Run, fin fenadur 2018

Chapter 1

Introduction

"Seferma viandont
E teidla ell'aua
Il tun da tristezia
Suonda il clom
E salva la Greina"
— *Il clom dalla Greina*, Alexi e Marcus, 1986

1.1 Citizens: a powerful barrier to change

In early July 2018, a global heat wave brought with it record-breaking temperatures around the world, including some of the highest temperatures ever recorded. According to the *Washington Post*, the weather patterns observed in Southern California, Scotland, Georgia, Oman, and many other places are "consistent with the kind of extremes we expect to see increase in a warming world."[1] Both climate change and the anthropogenic, i.e., human, cause are scientific facts (Cook et al., 2013), even if these facts are challenged by certain, at times extremely vocal, political actors and non-negligible portions of the public. The international consensus (with prominent exceptions, e.g., the US under the current Republican regime) is that we need to find answers to climate change. This consensus has led to a number of international agreements and treaties, such as the 1997 Kyoto

Note: The rumantsch song "Il clom dalla Greina" is a protest song against the plans to build a hydroelectric power dam on the high plateau Greina. The song calls to hikers to pause, listen to the sorrowfulness, and to heed the call to save the Greina.

[1] https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/07/03/hot-planet-all-time-heat-records-have-been-set-all-over-the-world-in-last-week/ (retrieved on July 26, 2018).

Protocol and the 2015 Paris Agreement, to reduce CO_2 in the hemisphere, slow global warming, and limit extreme weather events. As such, the heat records in July 2018 are one more sign of a changing world in which glaciers melt, extreme weather events occur frequently, sea levels rise, and therefore demonstrate the necessity of international agreements on climate action.

Triggered by the Fukushima nuclear disaster in 2011, countries such as Germany and Switzerland decided to phase nuclear power out completely due to its inherent dangers, while other countries such as Italy and Belgium affirmed their existing phase-out policies. The goal of simultaneously reducing carbon emissions and nuclear dependency gave rise to renewable energies such as hydroelectric, solar, and wind power. Germany, for example, decided to shut down all of its 17 nuclear reactors by 2022 (Jahn and Korolczuk, 2012) and currently wants to increase the share of renewables in energy generation to at least 45 percent by 2025 (Bundestag, 2016).

In Switzerland, a new Energy Act was approved in May 2017. The act addresses both climate change and Switzerland's nuclear dependency by reducing the use of fossil fuels and by not replacing nuclear power plants as they are decommissioned, respectively. As a preliminary set of measures to establish the energy landscape of 2050, the new Energy Act also includes measures to promote the generation of electricity using renewable energies (Swiss Confederation, 2016; Rieder and Strotz, 2018). In a referendum in May 2017, 58.2 percent of voters supported these targets; however, the vote is by no means the last time that citizens will have to make decisions regarding the future of energy and electricity provision in Switzerland. On the contrary, Swiss citizens are regularly involved in shaping energy policy in the form of cantonal implementations of consumption regulations, reductions of CO_2, or decisions regarding the sites of renewable power plants. Moreover, a policy package with a second set of measures aimed at completing the energy transition is planned by government and will be debated in the near future in parliament prior to the next possible referendum.

For this reason, support from the citizens specifically and society in general, referred to as 'social acceptance' (Wüstenhagen, Wolsink and Bürer, 2007), is a crucial hurdle for implementing measures to mitigate climate change or reach the aforementioned targets for renewable energy technologies. The notion of social acceptance encompasses the (positive) reaction of the public, the political elite, markets, and communities to renewable energy targets. As such, social acceptance as an overall concept is a necessary condition for the success of targets like the one formulated in Switzerland's Energy Strategy 2050. The way in which social acceptance is reached (or not) varies depending on

the specific context, and requires either a form of consent, such as voting in favor of or not opposing a certain proposal, or behavioral reaction, such as implementing a rule or complying with target, on the part of individual or collective actors. More specifically, with regards to Switzerland's Energy Strategy 2050, the basic steps are as sketched out as follows:

- The political elite and the public need to vote in favor of a wide-ranging policy that initiates a broad set of measures intended to promote renewable energy production. This falls into the dimension of *socio-political acceptance* and implies that political actors will vote in favor of the targets. In the case of Switzerland's Energy Strategy 2050, this has already occurred.

- Markets and market actors, most importantly energy providers, need to react to the new regulations and shift their investment from non-renewable energy sources to the expansion of renewable energies such as solar, wind, and hydroelectric power, as well as geothermal and biomass energy; consumers need to purchase electricity from those sources or even personally invest in the small-scale production of electricity with those means, thus evolving from consumers to prosumers. This aspect of social acceptance is the dimension of *market acceptance*, which requires the market to adapt how electricity is produced and consumed, therefore resulting in compliance with the formulated targets.

- Lastly, in order to achieve greater production of renewable energies, decentralized production of electricity needs community approval in order to install the corresponding power plants – this is the dimension of *community acceptance*, and requires communities to approve construction plans.

The success of this transition, which was decided on by the Swiss government in 2011 and by the people in 2017, depends on a positive reaction by individuals across several stages. Most importantly, individuals have a multitude of entry points into this process, ranging from decision-makers changing the constitution in order to establish a new energy paradigm to more mundane, commonplace behavioral changes such as saving electricity by switching off the lights. Social acceptance and its three nested sub-concepts of socio-political acceptance, market acceptance, and community acceptance (Wüstenhagen, Wolsink and Bürer, 2007) rely on individuals acting or consenting in favor of changing regulations, new technologies, and solutions.

In Switzerland, public debate about electricity and energy provision has been a contested issue

for decades: in the 1970s and 1980s, the anti-nuclear movement managed to block the construction of a reactor in Kaiseraugst in the canton of Aargau; national opposition arose to block the construction of a large hydroelectricity dam in the Greina Plateau in the canton of Graubünden, which is now a protected area; and one anarcho-activist even went so far as to bomb high-voltage line pylons in protest. Fortunately, not all opposition towards nuclear power plants or large hydroelectricity dams was violent as in the last example. Still, the issue of energy policy in general and electricity policy specifically is regularly on the political agenda in Switzerland, and social acceptance for environmental measures is not a given. With regards to nuclear power, for example, the Swiss people voted in 1979, 1984, 1990, 2003, and 2016 on popular initiatives that sought to limit nuclear power or phase it out either immediately or within a certain time frame. The success of the 2017 Energy Act was also made possible because it is a comprehensive policy that not only mandates the phasing out of nuclear power plants within a certain time frame, but also addresses ways to replace the missing electricity production through hydropower and other renewable energy sources. Opponents to the Energy Act portrayed a future characterized by exorbitant electricity prices and cold showers due to unstable electricity provision, demonstrating that the debate about energy policy is still heated in Switzerland (Heidelberger, 2017). And this debate is ongoing: while the citizens of the canton of Lucerne voted in favor of a (subsidiary) energy act in June 2018, the citizens of the canton of Solothurn rejected a similar energy act on the same day.

This raises the question of what citizens think about energy policy. This extends in particular to the role of citizens as political decision-makers, which is crucial in situations such as the vote on the 2017 Energy Act in Switzerland. Due to the culture of direct democracy, Swiss citizens have a voice when it comes to the policies to establish the regulations promoting renewable energies. According to Wüstenhagen, Wolsink and Bürer (2007), neglecting the citizens when it comes to energy issues is therefore potentially a 'powerful barrier' to achieving renewable energy targets. If support or acceptance is low among the population, this could lead to a rejection in a referendum. Therefore, the lack of research on citizens' opinions towards energy policies and politics, and the potentially strong influence of citizen reactions towards targets formulated by the political elite call for a closer look at what citizens think about energy policies.

This dissertation attempts to fill the gap in research on citizens' opinions towards energy policies and the large-scale transformation of the energy sector. The research question at the heart of the

following chapters is *why citizens matter in the transition towards renewable energies, and how their opinions are influenced?* The dissertation will build on interdisciplinary research on the topic of energy and contribute insights from political behavior to this strand of literature. While the topic of energy provides a common theme and overlaps with the research carried out in studies from several other disciplines that are also concerned with energy and the environment, this work takes a political science approach to this topic, placing citizens center stage as political actors. Switzerland will serve as the case study, allowing the work to focus on citizens who are directly involved in decision-making thanks to the country's direct-democratic system, and electricity provision will be at the center of the discussion embedded in the larger energy field context.[2]

Before turning to the individual sections within this dissertation, I want to discuss the overarching focus on individuals in energy policy in greater detail and also take a closer look at the context of the case study at hand, Switzerland.

1.2 Paths of investigation regarding the role of citizens in energy policy

While there has been an increase research on renewable energies from a technological perspective (Manzano-Agugliaro et al., 2013) and societal perspective (Tabi and Wüstenhagen, 2017) over the past decades, the focus on individuals has remained a niche at the intersection of social sciences and energy research. Based on Sovacool's (2014) overview, we can derive three 'avenues for research' that center around individuals and that could increase the impact of the perspective of the individual in research on renewable energy technologies.

What role do citizens play in the future of energy policy? Solutions to challenges such as climate change require a shift in behavior on the part of large portions of the population in order to be effective. This raises the question of whether citizens and their opinions need to be considered in energy policy and research on energy policy, and if so, how. Research on energy policy often focuses on the political elite, public policy, and economic models when it comes to resources, technologies,

[2]The Energy Act and the Energy Strategy 2050 are intended to address the issue of energy in a more encompassing way, also including buildings, mobility and other aspects of energy. Nuclear power and renewable energies primarily address the aspect of *electricity provision*, but the debate on electricity sources is embedded politically within the context of energy policy. Although the dissertation focuses on citizens' opinions towards electricity production and renewable energies specifically, it also takes into consideration the broader context of research on energy policy and environmental policy.

and prices. Individuals have mostly been included in research when it comes to consumption or local opposition, reducing their role merely to consumers on markets or unwanted opponents of locating power plants within communities. In countries with a direct democracy, such as Switzerland, citizens take on the role of decision-makers, defining whether policies are adopted or not; however, the question of what role individuals need to play in order to effectively shape and implement energy policy, and therefore how citizens participate in determining future energy policies, should also be assessed for other countries as well (Bidwell, 2016*b*; Schweizer-Ries, Rau and Zoellner, 2010). In this approach, a transition is not only considered to be a question requiring a technological fix (Heberlein, 2012; see also Stern, Sovacool and Dietz, 2016), but also a goal that can be achieved, at least in part, by considering individuals, their interests, and their possible shifts in behavior.

What are the preferences of individuals in terms of environmental politics and energy policy? Research on citizens and their opinions towards energy policy often has a negative connotation, focusing primarily on opponents rather than supporters. Although concepts such as NIMBY[3] have been criticized as too simple an answer to complex questions and used less frequency in recent years (Wolsink, 2006; Batel and Devine-Wright, 2015), the stance of individuals as stakeholders in designing and determining energy policy, and not only local projects, is still negligible in studies in the field of energy (with notable exceptions, see for example Bechtel and Scheve, 2013). Deeper insights into the reasons why citizens prefer or support a certain policy solutions or technologies, or under which conditions support is achievable, are therefore needed (Bell et al., 2013; Bell, Gray and Haggett, 2005; Kollmuss and Agyeman, 2002). One hurdle to a broader understanding and more tangible answers is the focus on intended behavior rather than potentially misleading general attitudes (van Rijnsoever, van Mossel and Broecks, 2015; Batel and Devine-Wright, 2015; Batel, Devine-Wright and Tangeland, 2013), which keep us from understanding individuals' reactions to policies aimed at promoting renewable energies.

What influences the way people form opinions on environmental politics and energy policies? Lastly, political science and social psychology both offer insights into individuals' attitudes, as well as on voting behavior both in general and with regards to environmental politics (e.g., Stadelmann-Steffen, 2011; Bornstein and Lanz, 2008; Halbheer, Niggli and Schmutzler, 2006). However, this research is almost never linked to research on energy questions and approaches such as social acceptance

[3]NIMBY stands for "Not In My BackYard" and is used to describe someone who, e.g., supports wind power in general but opposes the installation of wind turbines when they are too close to where that person lives.

(Wüstenhagen, Wolsink and Bürer, 2007) and the gap between attitudes and behavior (Bell, Gray and Haggett, 2005). Bridging political behavior research with research on individual opinions and attitudes towards energy policy would therefore allow us to gain new insights on how information on policy details and communication by the political elite influences what individuals think about energy policies, or where the limits are for political actors and scientists in terms of influencing decision-making.

Along with the need for more research in the energy field from a social science perspective, these 'avenues for research' (Sovacool, 2014) therefore sketch that individuals and citizens have several interrelated and central roles in energy governance. In this dissertation, the role of citizens as *political actors* determining and influencing renewable energies and energy policy in general is in the focus. Citizens, from this perspective, have two central roles. First, on federal and cantonal level, they vote on energy policies which establish the rules to promote renewable energies, therefore situated in the socio-political branch of acceptance as formulated by Wüstenhagen, Wolsink and Bürer (2007). While the subject or context may change, e.g., the federal level of the comprehensive Energy Act with stipulations such as a nuclear phase-out vs. a cantonal energy act that largely establishes regulations for energy efficiency in buildings, from this perspective, citizens are the decision-makers who adopt or reject the regulations drafted by the political elite.

Secondly, in terms of more local decisions that address the issue of community acceptance, it is not only general opinions towards a specific technology or policy that are relevant, but also concepts such as justice, fairness, and opportunities to participate (for an overview, see Stadelmann-Steffen and Dermont, 2018*a*, 104-111). Also, in communities, citizens have the possibility to make decisions about the location of power plants if these matters are subject to communal decisions at town hall meetings or local votes with regards to financing or zoning issues.

The first role as decision-makers in terms of socio-political acceptance is the primary focus of this dissertation. By concentrating on this aspect, I also address one shortcoming of Sovacool's (2014, 11) outline, namely the reduction of individuals to consumers rather than political actors who also shape energy policy at a higher level (see also Brown and Sovacool, 2018). Several authors have stipulated the necessity to consider individuals as active participants in various fields of energy policy (Bidwell, 2016*b*; Batel and Devine-Wright, 2015; Gross, 2007) who are able to generate support for the defined targets and thus increase social acceptance through inclusion.

1.3 How citizens form opinions: voting behavior and energy policy

Research on public opinion and voting behavior has a long-standing tradition in political science and provides a multifaceted perspective on the reasoning behind voters' decisions (from a Swiss perspective, see Milic, Rousselot and Vatter, 2014 for an overview; see also Kriesi, 2005; Lachat, 2007; Kriesi, 2012). Moving from traditional research on voting behavior to interdisciplinary insights on environmental attitudes and behaviors, one limit of our understanding is deviations from behavior and attitudes as described in the value-action gap (Bell et al., 2013; Owens and Driffill, 2008; Bell, Gray and Haggett, 2005; Diekmann and Preisendörfer, 2003; Kollmuss and Agyeman, 2002). Although citizens would be expected to vote in favor of environmental measures due to their political and environmental attitudes and as suggested by traditional voting behavior models, i.e., we would expect socio-political acceptance from their other characteristics, they may also reject policy measures which would correspond with their attitudes. However, an attitude is "only one of the many factors" that has an influence on behavior (Ajzen and Fishbein, 1980, 26). The relationship between attitude and behavior therefore needs a closer look, and we need to move past the major theories of voting behavior to understand how socio-political acceptance is possible.

An attitude can be described as a feeling a person has towards a certain object (Ajzen and Fishbein, 1980). Attitudes comprise values, e.g. altruistic motives to save the environment or egoistic views where the individual is the main focus; beliefs, i.e. about the existence of climate change; and lastly societal norms such as the expectation to act in an environmentally friendly manner and try to save energy (Steg et al., 2014; Milfont and Duckitt, 2010; Spence et al., 2010; Dietz, Fitzgerald and Shwom, 2005; Clark, Kotchen and Moore, 2003; Stern, 2000; Fransson and Gärlin, 1999; Stern et al., 1999). These attitudes shape an individual's evaluation of a certain subject, e.g. an opinion towards new renewable energy technologies. Environmental awareness, beliefs about nature and energy resources, and prior knowledge about these resources and their impact on the environment and society are thus used to form an opinion.

This opinion, which can, e.g., be understood as the question of whether an individual generally likes or supports a certain technology, has regularly been used as a measurement or cue for the acceptance of (renewable) energy sources (see for recent examples Visschers and Siegrist, 2014; Schweizer-Ries, Rau and Zoellner, 2010). However, several authors have pointed out that these general reactions to a policy or technology are an imprecise attempt at understanding how indi-

viduals react to proposals intended to implement measures or build power plants in specific cases (Batel and Devine-Wright, 2015; Batel, Devine-Wright and Tangeland, 2013; van Rijnsoever, van Mossel and Broecks, 2015). This therefore makes these reactions a poor indicator of socio-political acceptance. Rather, they serve as initial point or predisposition, which is later shaped or altered by more concrete circumstances of a decision.

As argued in the qualified support thesis by Bell, Gray and Haggett (2005), individuals may well have favorable attitudes towards a policy measure and its overarching goal; however, if there are conditions or policy details which they cannot agree upon, those conditions will lead them to reject a specific design of a measure regardless of their general support. An example for this is a fossil fuel tax: individuals might generally be in favor of taxing fossil fuels in order to reduce consumption, but only to a certain threshold amount, after which they are against a tax, or only under the condition that there are no exceptions for, e.g., industries. For this reason, researchers should not only answer the question of whether or not individuals would support a certain measure *generally*, but *under which conditions specifically* they would support this measure. This would allow policy makers to anticipate which solution is more likely to reach social acceptance in the public.

Therefore, when citizens are asked to decide on environmental measures, both the design of the policy itself and the individuals' opinions towards green solutions can be assumed to influence the way they vote, and therefore impact socio-political acceptance. Various studies analyze how citizens have voted on environmental ballot measures, mainly for Switzerland (Stadelmann-Steffen, 2011; Bornstein and Thalmann, 2008; Bornstein and Lanz, 2008; Halbheer, Niggli and Schmutzler, 2006; Thalmann, 2004), and the US States (Wu and Cutter, 2011; Kahn, 2002; Kahn and Matsusaka, 1997; Fischel, 1979; Deacon and Shapiro, 1975), where direct democracy is a central part of decision making. These ex-post evaluations of ballot decisions are not fully able explain what led to the support or rejection of specific policies; however, they offer an overview of the factors influencing socio-political acceptance of environmentally friendly proposals in the direct democratic arena. Among those factors, the cost of a proposal, the chosen policy instrument, and the citizen's political predisposition, i.e., ideology and attitudes towards the environment, play a role in whether or not that citizen will vote in favor of or against environmental measures.

The political elite has the ability to influence citizens' reactions both through the design of a policy and through political allegiances. On the one hand, the political elite is responsible for defin-

ing the details of a policy that they have submitted for a popular vote, and therefore the political actors who draft the legislation have the possibility to, e.g., cut costs or choose a policy instrument to which the public reacts more favorably (Howlett, 2011). On the other hand, the political elite can argue in favor of or against policies, and can speak to ideological or attitudinal aspects of a policy that lead to support or rejection, for example spreading skepticism towards the necessity of climate change mitigation (Brulle, Carmichael and Jenkins, 2012).

The details of a policy and its goals are thus possible reasons for support or rejection by the public (Bell, Gray and Haggett, 2005). In order to analyze which conditions are considered by voters in a decision, political science studies that take a look at the influence of policy information and elite cues are able to determine which policy aspects are considered to be more relevant by voters. Notably, the experimental approach by Bullock (2011) and Boudreau and MacKenzie (2014) combined with the multidimensional setup of conjoint analysis (Hainmueller, Hopkins and Yamamoto, 2014; Hainmueller, Hangartner and Yamamoto, 2015) makes it possible to approximate decision situations in which the influence of such conditions can be analyzed more in-depth. Since a policy consists of more than one aspect, considering the fact that some voters might react to other conditions and allowing voters to weigh which policy details are more salient in terms of their decision adds to the explanatory power of new insights into opinion formation for environmental measures, and therefore for socio-political acceptance.

1.4 Contribution and relevance

In line with these ideas, this dissertation contributes to the existing literature on energy policy and opinion formation in three ways.

Firstly, I examine why citizens matter in energy policy with a broader lens using an exemplary case in order to study citizens' involvement in policymaking: Switzerland. The involvement of citizens in several steps along the way when it comes to deciding on and implementing energy policy addresses several of Sovacool's (2014) open questions at the intersection of energy research and social sciences with regards to citizens. By focusing on individuals and their (political) answers to energy policy questions, we can determine whether the political inclusion of citizens is a beneficial or even necessary approach to designing and implementing tangible solutions for a future without nuclear power and fossil fuels in order to prevent citizens acting as a barrier for socio-political

acceptance of renewable energy targets (Wüstenhagen, Wolsink and Bürer, 2007).

Secondly, I address what citizens think about energy policy. Closely related to the question of what role citizens play in energy policy, I will argue for a more precise take on the opinions that individuals hold towards large-scale shifts such as the energy transition. Misconceptions regarding individuals' reactions to policies, lack of behavioral change, or answers to where projects will be located are also caused by attempting to explain or deduce those reactions from a perspective imposed by politicians, economists, and researchers, rather than from the perspective of citizens and individuals. Clarifying the role of the citizen in those situations also guides us to a better understanding of what their opinions are on various aspects of energy policy.

Thirdly, I address the question of what influences or shapes the way citizens think. By focusing more generally on opinion formation, I move beyond studying the general effects of information or policy design and take advantage of the interdisciplinary insights on individuals' opinions in environmental settings. Building on approaches to political behavior, I take a closer look at the conditions that move individuals to support or reject certain policies, providing insights for environmental studies issues such as the social gap and qualified support (Bell, Gray and Haggett, 2005). Searching for answers to environmental questions with established approaches to political behavior also allows us to further develop our general understanding of citizen opinion formation in terms of other issues, for example considering more encompassing, multidimensional aspects of policies that citizens care about, which refines our insights into what exactly might lead to socio-political acceptance. Methodologically, this dissertation also takes advantage of experiments to gain greater insight into what influences citizens' decision-making.

From a societal perspective, including citizens and considering their political role in energy policy is not only a benevolent aspect that politicians should aspire to. Citizens have the power to block developments directly by voting against policies or by failing to comply with implementation goals, and indirectly by electing parties that care or do not care about tangible solutions to climate change and therefore creating veto points, for example (Tsebelis, 2002). A better insight into what citizens care about in terms of energy policy is therefore a helpful precondition for designing measures that will be accepted or even supported by citizens. The targeted transition is not only a technological task, but relies also on behavioral change (Heberlein, 2012). Moreover, climate change and the deep-rooted transition from fossil fuels to a future of renewable energies could also potentially

result in 'losers', similar to the process of globalization. This feeling of being left behind or not being considered by politicians or included in economic developments provides grounds for opposition towards drafted solutions and therefore for failed policies, or even dissatisfaction with the political system. If some actors actively nurture this disaffection in order to gain political power, a large-scale transition such as reducing dependency on fossil fuels is likely impossible. Understanding the extent to which citizens should be integrated in energy policy so as to avoid a powerful barrier to renewable energy targets is therefore an issue that is relevant to the success of the goals stipulated in international agreements such as the Paris Agreement, and therefore to the success of attempts to address the threats of global warming.

1.5 Switzerland in comparison with other European states

The focus on Switzerland in this dissertation is guided by two central pillars. First, we are best able to focus on individuals in their role as decision-makers by observing a political system in which citizens have more opportunities to voice their opinions and thus influence energy policy. In Switzerland, a constitutional change requires a referendum, and changes to laws are subject to a facultative referendum, which involves a vote on the part of the entire electorate[4] so that the citizens can vote on these policies directly. Second, measures targeting climate change and phasing out nuclear power are currently being debated in several countries, while Switzerland has already decided which path it will take in the next few years. The strong tradition of direct democracy and the rise of direct democratic instruments worldwide (Altman, 2010) as well as the pronounced decentralized implementation of policies in a federal setting (Kammermann, 2018) and Switzerland's leading role in formulating targets to address climate change and phase out nuclear power make this case worth looking at.

Switzerland's Energy Strategy 2050 (Swiss Confederation, 2016) is, among other things, a policy aimed at mitigating climate change, and as such, the reaction of the Swiss people towards this energy strategy and its measures can be considered a first test of citizens' socio-political acceptance of the international attempts to address climate change as outlined in the Paris Agreement. When we look beyond the borders of Switzerland, the European Social Survey (2017) offers us insights into

[4] A constitutional change has always to be voted on (mandatory referendum), and requires a majority of the votes from both people and the federal states to be adopted. A legal change is subject to a facultative referendum, whereby 50 000 citizens can call for a popular vote and a majority by the people is necessary for a (new or changed) law to pass.

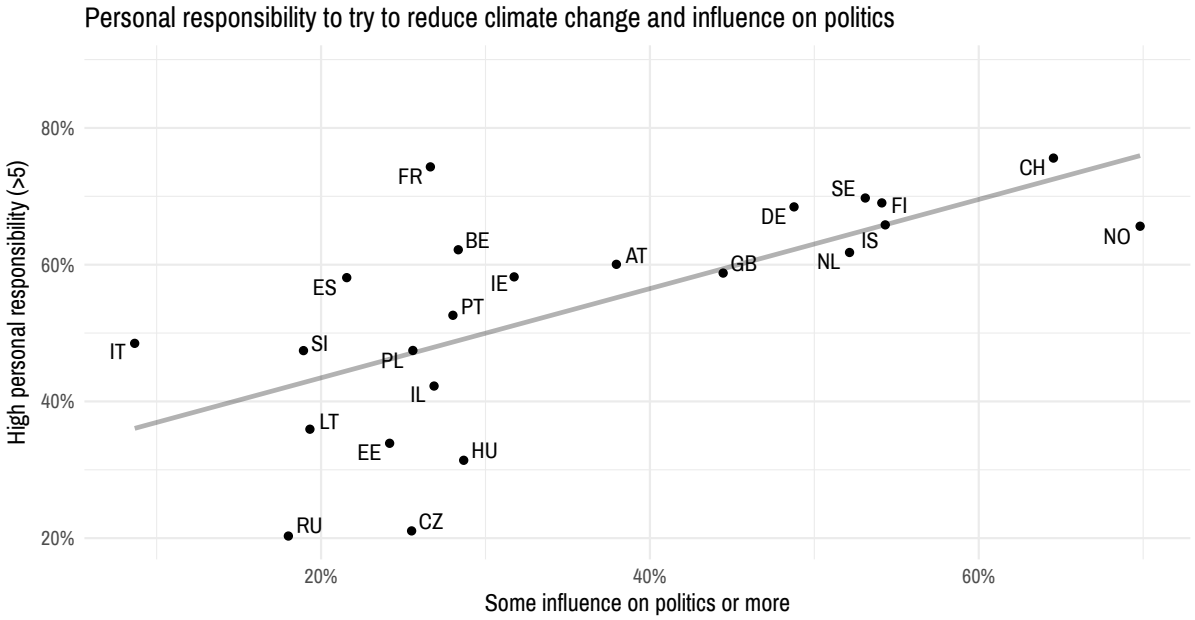

Figure 1.1: Personal responsibility to respond to climate change in relation with a feeling of being able to influence politics. Source: European Social Survey (2017).

what European citizens think about climate change and its causes, and how Swiss citizens feel in comparison to citizens from other countries.

Firstly, the results of the European Social Survey (2017) show that most European individuals are aware of climate change. As to the causes, in all countries included in the European Social Survey (2017), more respondents attributed climate change causation to humans than to natural causes, with large percentages of the responses claiming that both options contribute to climate change. In most European countries, a large share of the population even feels a personal responsibility to try to reduce climate change. As shown in Figure 1.1, the populations of Switzerland and France demonstrate the greatest perception of personal responsibility, followed by the Scandinavian countries. Individuals are therefore not a challenge for policy makers in terms of designing climate change mitigation policies, but instead could be an asset when it comes to implementing tangible solutions to fight climate change to a greater extent, because citizens themselves are interested in finding solutions and effecting change.

With regards to the question of to what extent participation or involvement of citizens contributes to the success of policies (Bidwell, 2016*b*), one condition for support could be involvement in policymaking and determination. Figure 1.1 therefore also shows the relationship between the feeling of responsibility to act against climate change and the feeling of having an influence on the

politics in one's country. The linear model shows a significant correlation ($r = 0.66, p < 0.001$) indicating a connection between the feeling of having a voice and the responsibility to act. While this correlation does not tell us about causation and is only a crude bivariate relationship, Figure 1.1 indicates that the feeling of personal responsibility to counteract climate change is higher in countries where people also have the feeling they have more of a say in politics. Therefore, in a first conclusion, we can see involvement in policymaking as a trigger for the feeling of responsibility to act, and thus argue in favor of involving citizens in the mitigation of climate change to a greater extent. A closer look at this relationship would be necessary, however, given that many Western European countries with stronger economies also perform high on both values depicted in Figure 1.1.

The relevant question in terms of the success of an energy transition is not only the feeling of responsibility, but also the readiness to accept or support measures that would address climate change. In the European Social Survey (2017), individuals answered how they would feel about measures such as limiting energy consumption and how they would gauge the effectiveness of these measures. Figure 1.2 shows the answers for two measures: promoting renewable energy production through public subsidies, and increasing taxes on fossil fuels.

The results in Figure 1.2 offer us two interesting insights: Firstly, the citizens prefer spending money on green energy sources over raising the costs of energy sources that are considered to be less environmentally friendly. Secondly, many individuals do not have a strong opinion on the matter, i.e., most individuals have not yet made up their minds about these measures and whether they would strongly support them if they had to decide.

When it comes to European countries, these insights show that attitudes towards policy measures that would address climate change by promoting renewable energies and reduce the use of fossil fuels are not generally dismissive. Relating this back to the 'powerful barrier' of social acceptance (Wüstenhagen, Wolsink and Bürer, 2007), individuals are open to these kinds of measures, and acceptance is therefore not an impossible task for policy makers. However, policy makers also need to capitalize on this openness. Most importantly, given that many individuals do not have not strong opinions, policy makers need to convince individuals to support their solutions and avoid losing them to the opposing side. Especially for individuals who do not have strong opinions on the various measures, the details of a policy are key as they are either potentially persuasive arguments or

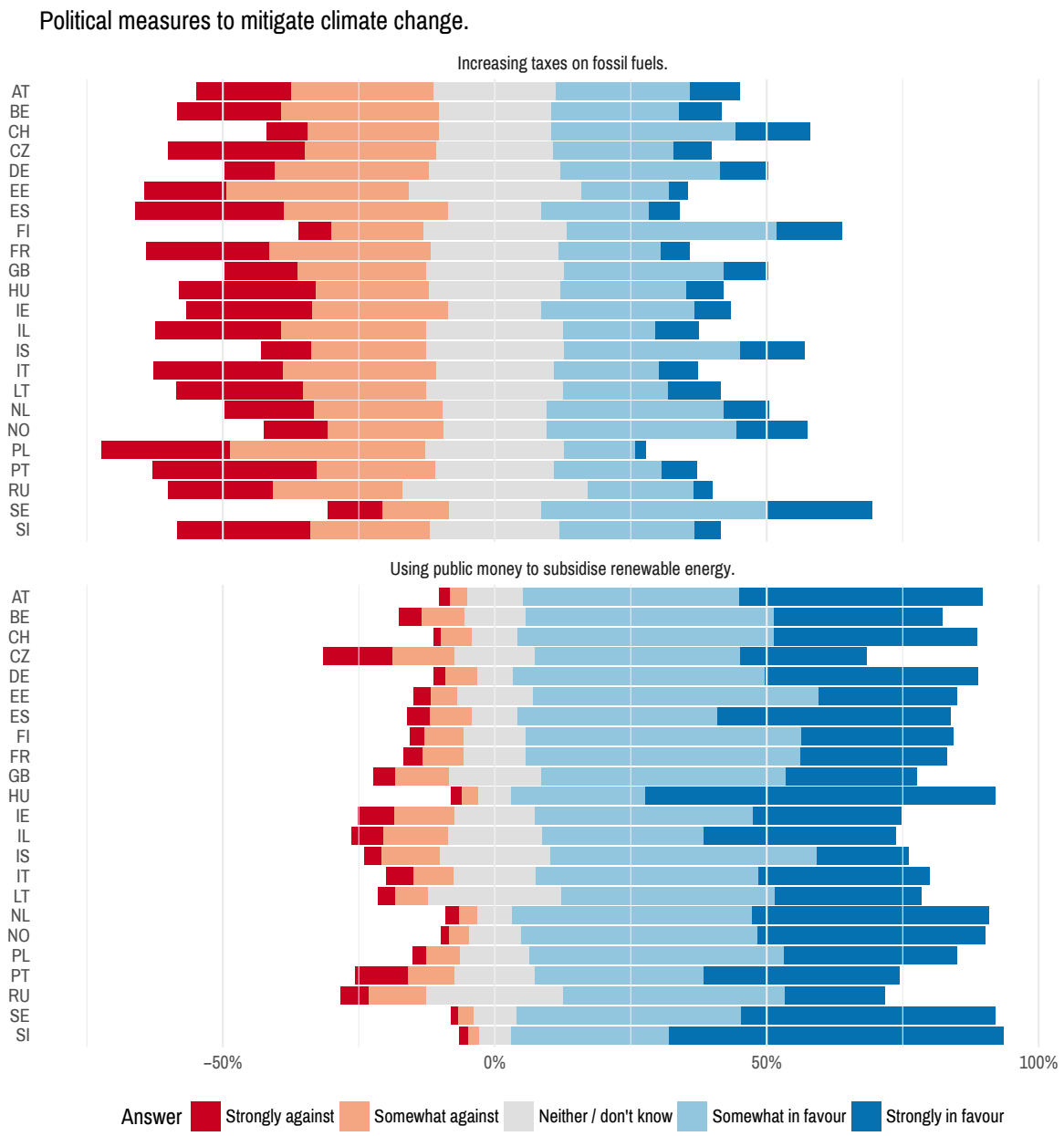

Figure 1.2: Attitudes towards policy measures to address climate change. *How to read this chart*: Negative answers are arranged on the negative side of zero, positive answers on the positive side. In the upper panel, the majority of answers is on the negative side, which means that many countries have a share of more than 50% on the negative (left) side, while in the lower panel most of the answers are positive with most countries having more than 75% of the answers on the positive (right) side. Source: European Social Survey (2017).

effective reasons for rejection as discussed in the qualified support thesis in the previous chapter (Bell, Gray and Haggett, 2005).

When we compare Swiss citizens with other European citizens, the Swiss feel most personally responsible for reducing climate change. In terms of the two policy measures presented in Figure 1.2, they exhibit above-average favorable reactions to those policies, especially when it comes to taxing fossil fuels in order to reduce their consumption. Compared to other European countries, citizens in Switzerland could therefore be expected to be more likely to demonstrate socio-political acceptance for such measures.

1.6 Outlook

Given these first insights into the state of research in energy policy, and also possible new insights gained by taking a closer look at individuals as decision-makers and how they form opinions, I will conclude the introduction of this dissertation with a brief outlook for the following chapters.

This dissertation is comprised of four essays that have been published in different journals at the intersection of political science and energy and environmental research. While the first is a theoretical essay, the other three build on data collected through the project "Future energy policy: the acceptance of alternative electricity supply", which was financed by the Swiss National Science Foundation, and are thus empirical. All of them speak to the three 'avenues of research' formulated by Sovacool (2014) in different ways and particularly highlight the role of individuals as political actors in the fields of energy and electricity policy.

Acceptance framework: how to design research on social acceptance and how to be clear about what you want

The first essay in chapter 2 presents a political science framework for the concept of social acceptance. The essay builds on the work by Wüstenhagen, Wolsink and Bürer (2007) and takes a closer look at social acceptance as a process that relies on political institutions, actors and processes. It therefore calls for a more precise approach to design research on social acceptance, so as not to mistake general answers towards a policy measure or technology for valid answers to specific proposals.

While this essay views simple answers for complex questions critically, it also offers a three-

step procedure for creating a concrete approach to social acceptance studies. It thereby draws on existing concepts from policy studies and political behavior studies that shift the focus towards individuals in the energy field, while also refining the perspective on the political elite at the same time. The first essay particularly addresses the research question of what role citizens play in determining energy policy.

It also serves as the larger theoretical background for the later empirical studies. However, the first essay is not only theoretical, but also describes how the presented framework can be practically applied based on two examples tailored to the political elite and individuals.

Opinion formation: a look at conditions and how citizens think

The first empirical essay in chapter 3 addresses the issue of opinion formation and the influence of conditions of policies – more specifically, the policy information on the vote on the new Swiss energy act – on citizen support. As such, this essay builds on and further explores political science studies such as Bullock (2011) to answer questions in the interdisciplinary field of energy policy such as the thesis of qualified support (Bell, Gray and Haggett, 2005). Using a multidimensional experimental approach through the use of conjoint analysis (Hainmueller, Hopkins and Yamamoto, 2014), I am able to describe which specifics within a proposal incite opposition or result in support in a popular vote. The second essay therefore especially addresses the research question of how information shapes citizens' opinions.

While the analysis shows that cost is indeed influential, individuals also consider more ideological or contextual aspects such as the link to nuclear power policy and environmental targets when evaluating policies. The results of this essay add to both political science and energy research: firstly, the use of multidimensional information treatments demonstrates that voters are indeed able to consider a multitude of information in a vote campaign, and that the voters choose which aspect they want to focus on, while secondly, the approach in terms of information treatments offers a new response to the thesis of qualified support.

Incentives: the limited influence of economic thinking on the population

The second empirical essay in chapter 4 builds on the same data and experiment as chapter 3, but takes a closer look at the relevance of the economic aspect of energy policy. Among the po-

litical elite, debate on the future of energy policy is most heated when it comes to the specifics of which policy instruments are implemented and thereby impact the economy through subsidies, taxes, or promotional measures (Carattini et al., 2017).

From the perspective of the political elite, discussions about steering taxes – i.e., taxes intended to raise the price of electricity and redistribute the funds in a fiscally neutral way – is crucial, but not from the perspective of the people.[5] As this chapter will show, individuals mostly react to the costs of incentive-based instruments, which aim to provoke behavioral changes such as reducing electricity consumption, and do not fully believe in or are not fully able to grasp the theoretical model behind such instruments. As such, one could argue that citizens do not think in the same way that policy makers do when it comes to the details of policy instruments, but rather focus on the consequences of such measures: the effect they will have on the environment from a 'positive' perspective, which can help to gather support for such a policy, and the cost it will inflict on the individual from a 'negative' perspective, which in turn generates opposition. The third essay thus addresses the research question of how policy design is relevant for citizens, and where individuals' opinions on these types of questions deviate from the political elite in terms of the attribution of salience.

The results also show that the preferences with regards to policy instruments are quite consistent when considering different ideological groups. Given that the design of an incentive-based measure has been a crucial point in parliamentary debate, and yet has limited influence on support by citizens regardless of their political ideologies, this invokes the question of how the political elite and the public communicate with one another with regards to central elements of energy policy and popular votes, and illustrates the necessity for the political elite to address this lack of belief in or understanding of such economic models if they are to remain at the center of political debate in the future of energy policy.

Beliefs: the risk of loud messages distorting perception and facts

Lastly, a third empirical essay in chapter 5 addresses the varying beliefs of the political elite and the public. It bridges the gap between the political elite and the citizens by looking at a survey of elite actors and a survey of citizens, both of which include information on beliefs about

[5]For a more extensive description of subsidies, steering taxes, incentive-based instruments and other instruments of this kind, I refer to the discussion in chapter 4, rather than repeating the description here.

several policy measures that are intended to promote renewable energies. The conclusion from this cross-level attempt at analyzing preferences on the part of both the elite and the public simultaneously is twofold: Firstly, the political elite is much more polarized than the public when it comes to policy preferences, and consensus amongst the public for policies such as a CO_2-tax or increasing taxes for renewable energies is greater. The public's readiness to act in favor of renewable energies and climate mitigation is therefore considerably greater than the positions of the political elite would suggest. Secondly, the results suggest that political ideology influences skepticism towards the reality and causes of climate change (confirming Brulle, Carmichael and Jenkins, 2012), which in turn influences support for environmental measures.

As economic arguments might not convince the public (a finding from chapter 4 with regards to opposition towards incentive-based instruments in general, for example), climate change skepticism could serve as a proxy to be used by opponents of an energy transition in order to question the necessity of environmental measures that would promote renewable energies. The results suggest that this mechanism might especially influence voters on the populist right by emotionalizing the debate on climate change rather than focusing on the facts. While the essay is only an initial insight into the link between party preference and climate change skepticism, it nevertheless also shows the risk of skepticism towards science in general and climate change specifically being instrumentalized in order to gain political power or reach other political goals, such as less or no state intervention in the energy sector. Similar to the findings in chapter 3, it demonstrates how context is also relevant when it comes to decisions on environmental measures in general, and not only in terms of the individual aspects of a specific policy. The last essay therefore addresses the research question of how the political elite can influence or even manipulate individual opinion towards energy policy.

Chapter 2

Bringing the policy making perspective in: a political science approach to social acceptance

Recent years have seen a growing interest in the concept of social acceptance, especially in the wake of the transition from non-renewable to renewable energy sources. Social acceptance is thereby studied from very different backgrounds and based on distinct conceptualizations. We argue that the reason for the great variety in the use of 'acceptance' is not mainly its interdisciplinary and multidimensionality, but a missing policy making perspective and its insights and knowledge about processes, actors and (in)formal decision-making. This contribution proposes a framework to refine the concept of social acceptance. Taking into account that the stage and specificity of the policy making process heavily influence the response towards RET and the process triggered, we identify three steps that need to be addressed when defining a research design that includes social acceptance: the object and context under scrutiny, the relevant actors, and the roles they play. Our proposed framework thereby adopts a political science point of view and the main research interest deals with political actors deciding upon and implementing future policies.

Note This chapter is the accepted manuscript of an article co-authored with Karin Ingold, Lorenz Kammermann and Isabelle Stadelmann-Steffen and published in *Energy Policy* by Elsevier as Dermont et al. (2017), doi:10.1016/j.enpol.2017.05.062.

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2.1 Introduction

Recent years have seen a growing interest in the concept of social acceptance, especially in the wake of the transition from non-renewable to renewable energy sources (Tabi and Wüstenhagen, 2015). At the same time, it has repeatedly been argued that the notion of 'acceptance' is being used inconsistently in the context of renewable energy research (van Rijnsoever, van Mossel and Broecks, 2015). One reason might be that many disciplines such as psychology, geography, economics and political science have been using the concept, meaning that 'acceptance' is studied from very different backgrounds and based on distinct conceptualizations. However, inconsistencies are also related to the fact that the notion of acceptance is used both as reference to a research perspective in renewable energy policy, and as reference to one among various actors' responses towards renewable energy technologies.

In the first and more general sense, Wüstenhagen, Wolsink and Bürer (2007, 2683) describe the notion 'social acceptance' and its breakdown into three dimensions as "one factor that can potentially be a powerful barrier to the achievement of renewable energy targets". This perspective emphasizes that the successful implementation of, e.g., a technology, has a "social side" (Batel, Devine-Wright and Tangeland, 2013, 1) which has to be considered scientifically but also practically. Hence, the notion 'social acceptance' denotes the *interest in and research area concentrating on* understanding different potential responses to renewable energy policy, while it does not inform us about the actual manifestation of these reactions. This is where the second perspective comes in: In fact, regarding the more specific use of the word 'acceptance', several authors (e.g., Batel, Devine-Wright and Tangeland, 2013; Fast, 2013) characterize acceptance *as one among various reactions* towards renewable energy technologies, whereby opposition, preferences, and support are other such reactions.

Both perspectives have their strengths and weaknesses: The first, general perspective, and par-

ticularly the three-dimensional approach by Wüstenhagen, Wolsink and Bürer (2007), effectively guides the contextualization of (research) questions regarding social acceptance. However, this view is rather general or even unspecific regarding the processes, the actors, and their specific reactions towards renewable energy policy. The second, more actor-centered approach, can in contrast fill this latter gap. Research in this field contributes to a better understanding of these varying actors' reactions as well as the processes behind. An example is Gross' (2007) contribution on how a lack of perceived procedural justice can lead to opposition in communities towards a wind farm. This second perspective so far lacks a specification and theorization of the context in which actors' reactions towards renewable energy policy take place.

This is the starting point of this paper arguing that we need a framework that helps to *structure* these different perspectives on and aspects of social acceptance. We propose that a *policy making perspective* can serve as a foundation of such a framework. Our central argument is twofold:

First, we aim at integrating the strengths of both perspectives to propose a framework which guides researchers to create a precise research design in renewable energy research. We argue that the type of response towards RET under investigation is heavily dependent on what aspect of social acceptance we are looking at. Second, including the policy making perspective allows bringing in important knowledge about processes, actors and (in)formal decision-making. We emphasize that the context in which actors' reactions take place is strongly contingent also on the stage of the decision making process. The latter determines the role political actors play in a specific case under investigation (e.g., being a decision-maker or the target group; having the power to actively support a proposition or only stating preferences while lobbying for them), and thus their potential reactions (Batel, Devine-Wright and Tangeland, 2013).

In the following, we are going to illustrate that adopting this political science perspective can contribute substantially to a better definition, conceptualization, and finally empirical operationalization of the different processes and responses leading to social acceptance. In this vein, we will present in the third chapter three steps that need to be addressed when defining a research design that includes social acceptance: *the object of interest, the relevant actors, and their roles*. While our framework integrates a political science approach to develop on the conceptualization of social acceptance and responses towards RET, this does not mean that all research on social acceptance needs to adopt a policy science perspective. Our main claim is that our framework can be applied to many

different approaches and thereby helps researchers from different disciplines to specify their view on how a policy is implemented or a target reached. Conversely, it is important to note that previous research on renewable energy policy has actually integrated political (science) aspects. Most importantly, the role of policy design (van Rijnsoever, van Mossel and Broecks, 2015), actor constellations (Kriesi and Jegen, 2001), or public attitudes and voting behavior (Bidwell, 2016*b*,*a*; Bornstein and Lanz, 2008; Stadelmann-Steffen, 2011; Thalmann, 2004) have been investigated. While this earlier work illustrates that varying actors' reactions are relevant in different political stages of the policy making process and regarding various aspects of the political sphere, we make this more explicit by systematizing the effect of the policy making perspective on social acceptance research in general, and the role actors assume when shaping or implementing policies in particular.

In this vein, the contribution and relevance of our framework is at least twofold. From *a scientific point of view*, our framework – based on the policy making perspective – structures the different existing views on social acceptance in renewable energy policy. Moreover, the framework helps to characterize various responses to RET, which in turn will be associated with varying definitions and research designs. Against this background, our framework augments the clarity and the comparability of results. Moreover, and from a *practical perspective*, a transparent conceptualization, taking into account the stage and specificity of the policy making process, is necessary in order to derive the correct practical implications from scientific research. Our framework and this paper both focus on *policies*. We thereby adopt a broad understanding of what a policy refers to. In most general terms, a policy stands for decisions and rules by the political system, e.g., in the sense of a broader political program or strategy, but also a policy instrument or measure or a vote on a specific infrastructural project. The perspectives researchers might have on these various understandings of policies furthermore include not only the decisions about a specific policy itself, but could also focus on how a policy is formed, how a policy is implemented, the reaction towards a policy by stakeholders before/after its adoption, and also if the envisaged goals are fulfilled by the chosen solution.

The remainder of this article is structured as follows: The next section provides a literature review about how 'social acceptance' and 'acceptance' have been defined and conceptualized in previous research. Section 2.3 then proposes our own framework by identifying three steps for researchers when preparing their research design. Next, to illustrate our arguments, we will use the case of energy policy and the related restructuring of the energy sector towards more renewable

energy. Questions related to social acceptance are particularly relevant in the field of renewable energies, which also reflects in the broad application of the concept in this area of study. The article concludes with a summary of the main findings and their implications.

2.2 Conceptualizing social acceptance – a literature overview

2.2.1 What social acceptance is about

In their introduction for a special issue on 'Social Acceptance of Renewable Energy Innovation', Wüstenhagen, Wolsink and Bürer (2007, 2684ff) propose an interdisciplinary and three-dimensional approach to social acceptance. First, socio-political acceptance is the most general level, referring to how policies and technologies are seen by political stakeholders and the broad public. Second, community acceptance is relevant when trying to build a power plant in a community, where local stakeholders and especially residents are asked not to oppose a certain project. Lastly, market acceptance builds on the economy, where new technologies have to be introduced by market players on the supply side and used on the demand side (e.g., the diffusion of innovation).

However, while these dimensions mostly guide researchers on the approach of their research and do not constitute fixed categories, research on responses towards RET, based amongst others on perspectives from geography, psychology and political science, have identified other aspects to be considered when researching reactions to RET. Most authors' thereby put an emphasis on factors at the actors' level that may help to achieve consent. Fast (2013), for instance, argues that *geographical concepts* including place, space and landscape should be considered in order to understand actors' responses to alternative energy technologies. Huijts, Molin and Steg (2012) present a framework emphasizing *psychological factors* that influence how technologies are perceived. Moreover, van Rijnsoever, van Mossel and Broecks (2015) draw attention to the need of clearly conceptualizing the *roles* individuals can have in the different dimensions of social acceptance. Research on social acceptance, conclusively, can depart from varying starting points and may be based on various perspectives.

Despite this variety of arguments and conceptualizations, some common challenges can be identified. First, one crucial point refers to the question what the notion of 'acceptance' at the actors' level actually refers to. Batel, Devine-Wright and Tangeland (2013, 2), in this vein, criticize that the

notion of 'acceptance' normatively implies a top-down perspective on RET implementation, where actors' rather passive acceptance of a new technology or a project is considered sufficient. Hence, these authors ask for a multilateral and participatory approach to renewable energy technologies and policies, which involves citizens more actively, and eventually may lead to support for these projects. Moreover, a more differentiated wording regarding actors' reactions also prevents researchers from ignoring other types of responses to RET, for example support or uncertainty, resistance, or apathy (ibid.). Batel et al.'s 2013 argument points to the fact that the heterogeneity in how actors' acceptance is conceptualized actually concerns two levels: a) the conceptualization of acceptance either as attitude or behavior and b) what kind of actual (re)action we look at.

When reflecting on the difference between *attitude* and *behavior*, acceptance has been used to describe very different reactions of individuals towards a new technolog (van Rijnsoever, van Mossel and Broecks, 2015). The relevance of these different responses subsumed under acceptance, for example, stimulates the prominent discussion regarding the value-action gap and the not-in-my-backyard (NIMBY) syndrome. The value-action gap refers to the observation that behavior actually *deviates* from an individual's attitudes (Batel and Devine-Wright, 2015; Bell et al., 2013; Bell, Gray and Haggett, 2005; Owens and Driffill, 2008; Castro, 2006; Diekmann and Preisendörfer, 1998; Kollmuss and Agyeman, 2002). With a focus on local projects, according to Wolsink (2000, 50), it has been "one of the most common mistakes in facility siting to take general support for granted and to expect people to welcome developments they claim to support", whereby the oversimplifying explanation is the *NIMBY* syndrome (see van der Horst, 2007; Wolsink, 2007, 2006, 2000). More recent publications show that these two concepts are not to be intermingled, as general public support is an inapt point of departure when one is interested in the specific reaction of a community towards a siting project. More specifically, van der Horst (2007) and others (Bidwell, 2016*a*; Batel and Devine-Wright, 2015; Devine-Wright, 2009; Gross, 2007; Möller, 2010) show, that the elements provoking resistance towards a project are not the technology itself (e.g., related uncertainty, or lacking experience) or distance, but rather how the project and process is designed, such as fairness, environmental impact, how people value the land used for siting and the information on the specific project people receive to form their attitudes. One reason for the persistence of NIMBY (as criticized by Wolsink, 2007) is thus the shortcut from public opinion to expected local behavior, i.e., from attitude to behavior.

On the other hand, and beyond the attitude-behavior distinction, many notions have been used to describe actors' reaction to a policy.[1] Besides 'acceptance' itself, 'acceptability', 'support' and 'preference' are often referred to Huijts, Molin and Steg (2012, 526), for example, distinguish between attitude as 'acceptability' and behavior as 'acceptance'. van Rijnsoever, van Mossel and Broecks (2015) refer to 'preferences', as they ask respondents to choose which energy source should be used in the future Dutch energy system, and thus request a comparative evaluation in the choice tasks. The heterogeneity is not just a matter of wording but makes a substantive difference. Schweizer-Ries, Rau and Zoellner (2010, 11), in this context, state that 'acceptance' has been operationalized both as 'no opposition' and 'active endorsement', whereby silent citizens would be counted as accepting in the first case, but not in the second. While one perspective simply asks for passive silence to 'achieve' social acceptance in a community, the other asks for an active reaction. Moreover, as Batel, Devine-Wright and Tangeland (2013) show, the wording we use in surveys influences what people report: In their study, 16.5% of the participants indicated that they would accept high voltage lines, but not support an according project. For this reason, Batel, Devine-Wright and Tangeland (2013) emphasize that researchers need to differentiate between the various responses by citizens.

A second, common challenge concerns the question *to what extent social acceptance (both as an outcome and referring to actors' reaction) is necessary*, and, relatedly, whether research on social acceptance should focus on 'non-opposition' or rather aim at a better understanding of public attitudes and responses in a more encompassing manner (Aitken, 2010; Barry and Ellis, 2011; Batel and Devine-Wright, 2017). Batel, Devine-Wright and Tangeland (2013) clearly propose the latter and argue that policy makers should strive for real 'support' instead of top-down imposed consent. Taking the example of RET and the transition to a low carbon energy system in mind, it can be argued that according policy measures require a certain level of active support not only regarding to the decision making process but most importantly regarding their effective implementation (Batel, Devine-Wright and Tangeland, 2013). Finally, it has been emphasized in this context, that researchers need to consider the normative aspect of social acceptance, i.e., whether social acceptance of a new technology or project is really the desired outcome. In fact, opposition to specific projects can also arise for good reasons, e.g., because a project or policy is not suitable for a community or simply not elaborated sufficiently (Aitken, 2010).

[1] For an example, within the 967 papers citing Wüstenhagen, Wolsink and Bürer (2007) as of November 2016, a Google Scholar search yields 895 hits which use the word 'acceptance', 850 'support', 480 'preference(s)', 329 'acceptability', and 539 the negative 'opposition', 352 'resistance' and 170 'objection(s)'.

2.2.2 The role of the political elite

Most research contributions to the success of RET and related infrastructures focus on the public, while research on the political elite as decision-maker or stakeholder is less widespread. However, when adopting a stronger policy perspective, the field of policy studies, which largely focuses on elites in policy processes, seems valuable in order to grasp the design, introduction, effects and impacts of so-called policy outputs. Policy outputs can be conceived as political goals or instruments designed to achieve such goals (Knill and Tosun, 2012; Schubert and Bandelow, 2014). Here, the notion of acceptance is defined as an antecedent condition for success in agenda-setting, policy formulation or implementation (Ingold, 2011; Kriesi and Jegen, 2001). In policy process theories (see Weible and Sabatier, 2014; Kingdon, 1984), 'acceptance' is one among different factors impacting policy change. Preferences of policy instruments and measures are strongly dependent on the deeper values and beliefs of an actor, which define coalitions in decision-making processes (Ingold, 2011; Sabatier, 1988). Similarly, 'acceptance' also matters in policy design studies (see Howlett, 2011). When evaluating what instruments best meet predefined policy goals or targets, traditional policy choice theories focus on instrument categories (see Hood and Margetts, 2007; Vedung, 1998) and on the different groups of actors that benefit from an instrument or pay for its implementation (Knill and Tosun, 2012). In order to define which actors are relevant for the decision-making process, Stokman and Zeggelink (1996; see also Stokman and Van den Bos, 1992) differentiate between the negotiation stage that is open to a broader set of actors and the voting stage that is only open to formal decision-makers. Similarly, when distinguishing between agenda-setting and political formulation, policies are designed and introduced only during the latter. In this context, two sets of actors seem to be relevant (Wilder, 2015): so-called *advocacy groups* during the agenda-setting process and *policy communities*, including party officials as well as administrative entities and experts, during policy formulation (Dostal, 2004). Hence, in political elite studies, two types of actors' reactions matter: first the reaction of those actors who have the opportunity to lobby and advocate, and second the reaction of those who additionally have the formal power to decide. The first group and their participation in the process is typically being identified through the decisional approach, the second group through the positional approach and thus through their capability to formally vote. Through the reputational approach further actors that are perceived to be powerful in any of the four stages can be identified (Magill and Clark, 1975; Pappi and Henning, 1998).

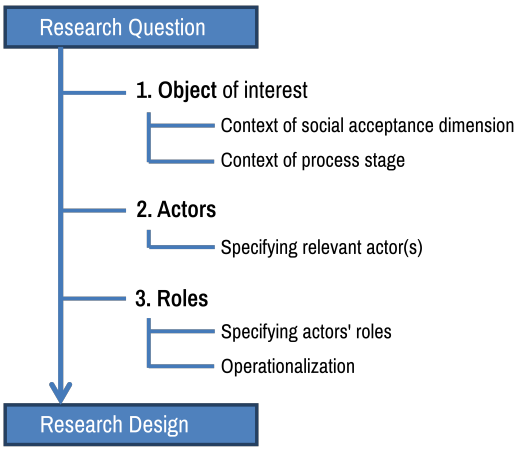

Figure 2.1: Three steps to define a research design in social acceptance studies.

2.3 A policy science framework on social acceptance

The previous chapter illustrates the challenges while conceptualizing a valid research design on social acceptance. In the following, we argue that combining the existing knowledge from these different perspectives on social acceptance and explicitly *including the policy making perspective* helps to address these issues. The added value of a political science stake in social acceptance is the knowledge about *processes*, *actors* and (in)formal *decision-making*, as in many cases the researched responses are inherently related to political decisions and preferences by citizens, local authorities, or government. Considering what aspect and stage of the policy making process is of interest in their own study, researchers will be able to better clarify their own conceptualizations and definitions of specific responses towards policies. Hence, in this section, we present three steps researchers should consider when researching social acceptance in order to reflect how the policy making process frames what context, who and what reaction is relevant (see Fig. 2.1). This framework relies on the basic assumption that researchers start with a specific research interest. Researchers usually want to shed light on a certain object, e.g., they are interested in how a certain policy was shaped, decided or implemented. From a policy making perspective, these varying research objects are not only very different things, but will also trigger quite different *processes of social acceptance*. For example, depending on whether one investigates how political actors and stakeholders chose between varying policy proposals at a pre-parliamentary stage, or whether the parliament or even citizens decide on the introduction of a final policy instrument, actors' reactions are quite different. Moreover, these multiple types of responses are related to varying processes of social acceptance.

2.3.1 Step 1: Defining the object of interest

Given a specific research question, researchers need to define the object of interest, and particularly the related *context* under which the success of a policy or technology will be observed. As mentioned above, this context depends on the treated object, on the related policy decision as well as on the timing or maturity of the proposal.

Regarding the first aspect, the three dimensions of social acceptance previously identified by Wüstenhagen, Wolsink and Bürer (2007; see also Wolsink, 2012, 827 for an adapted version) are relevant. These three dimensions define the type of 'decision' we are interested in. It is important to distinguish whether researchers are interested in the social acceptance of measures for the promotion of renewable energy at the ballot box (socio-political acceptance), the construction of local wind plants in resident specific municipality (community acceptance), or of increased energy costs for consumers (market acceptance). Hence, in order to correctly interpret analytical findings and their implications we have to be aware of this decisional *context*. It is important to note that the three dimensions are in reality typically interrelated, i.e., the successful realization of a local wind park necessities a certain degree of socio-political, community, and market acceptance, although the focus of research might be specifically on the community. Indeed, when focusing on a particular research question, but also due to constraints in research practice, many studies will focus on just one of the three dimensions. In this context, the distinction between the three dimensions can guide researchers in their focus on *what* is at stake and *whose* response is of interest (Wolsink, 2012; Wüstenhagen, Wolsink and Bürer, 2007).[2]

The context, moreover, is also more specifically related to the characteristics of policy making. In particular, the type of response and the process triggered is contingent on the timing and maturity of a policy proposal. Generally, we distinguish three process stages during which questions of acceptance may be relevant, almost independent of whether a specific policy or a project is under investigation. A first stage refers to the *drafting* of a policy or a project, the second stage concerns the *decision to introduce* a policy or a project, while the third stage is about the *implementation* of a policy or realization of a project. Fig. 2.2 depicts an exemplary process for a policy that moves from drafting to adoption and implementation in the socio-political dimension. Depending on the

[2]Exceptions are holistic explorations, such as Sovacool and Ratan (2012), which are interested in how several factors of acceptance are necessary for the overall success of a technology in a country, and therefore will need to consider all dimensions simultaneously.

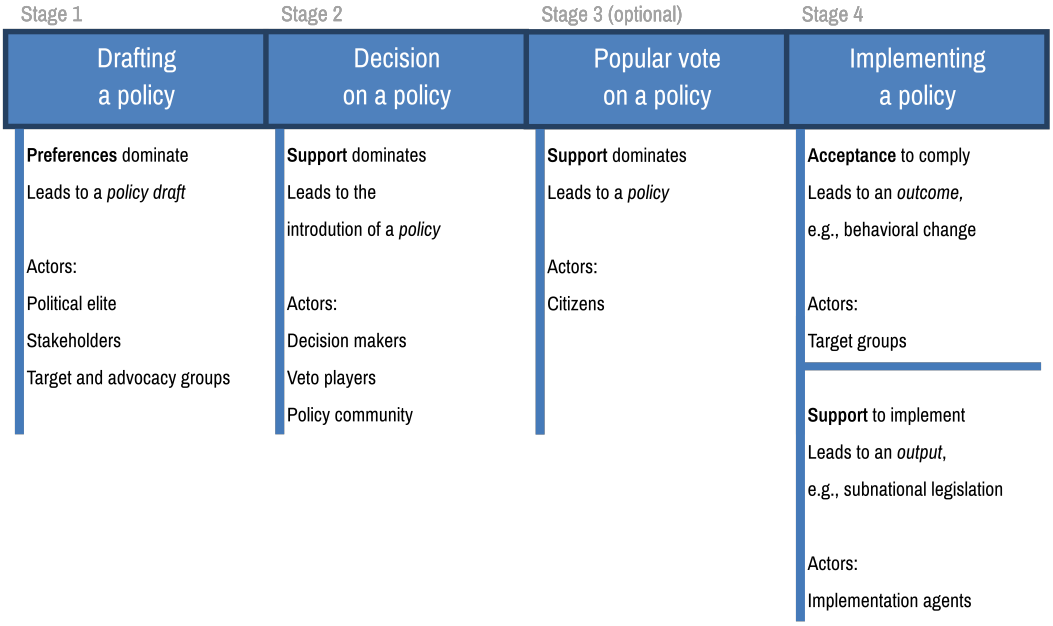

Figure 2.2: Exemplary stages of a policy from drafting to implementation including relevant actors and their roles.

timing of the decision and thus the maturity of a proposal, varying types of responses and most importantly different actors will be relevant. Each stage may be investigated as a full stand-alone research project. Actually, this is often the case, e.g., different research disciplines in political science are interested in distinct stages of the policy process and thus mostly also different researchers investigate subfields of the development of a policy. Moreover, if the focus is on the implementation stage of a new energy act, for example, the specific focus on how this energy act is translated into subnational policy or local projects will trigger new processes including again stages 1-3.

Defining the context of a research interest is thus the first step in order to translate a research question into a research design. It specifies the crucial outcome of interest, i.e., the specific aspect of social acceptance, which then allows in the next steps to identify actors, their roles, and the more specific actors' reactions.

2.3.2 Step 2: Identifying relevant actors

The second step largely centers on the question of whose' reaction is relevant regarding the object of interest as specified in step 1. In this second step, we move more specifically to the actors' level (see Fig. 2.1): Given the object and the context, researchers can now identify the actors who are relevant for answering their research question, i.e. whose reactions to a policy should be studies.

Most importantly, the timing and maturity of a policy proposal determines whether just formal decision-makers should be considered for the analysis or whether the group of relevant actors needs to be more comprehensive. Let's take the example of a new policy in the socio-political context: If we are interested in the stage of formal adoption of this policy (i.e., the second stage in Fig. 2.2), formal decision-makers including executive and legislative branches seem in the core of a researcher's attention. However, if earlier stages of policy making, i.e., when a new policy is drafted, are in the focus of research, a larger set of actors – with more or less direct access to decision makers and the drafting of a policy – needs to be considered (Stokman and Zeggelink, 1996; Magill and Clark, 1975). Also following Knoke et al. (1996; see also Kriesi, 1990), not only formal, but also informal arenas of decision-making or implementation should be taken into consideration when studying policy processes and preferences: Actors participating to hearings, round tables, etc. should hence be at least as much considered as government officials or parliamentarians.

However, it is important to note that the stage alone does not automatically determine the relevant actors. Most obviously, relevant actors may vary contingent on the object under scrutiny (e.g., the policy area or the characteristics of a policy), but it may also depend on institutional factors. For instance, changes in a policy are not necessarily restricted to the political elite. Through direct democratic measures, for example, citizens, and thus individuals, can either introduce a popular initiative to ask for a change or call for a referendum on new legislation by parliament (Linder, 2012). At the local level, they moreover might be involved even more strongly in specific projects (Bidwell, 2016*b*; Gross, 2007; Stadelmann-Steffen and Dermont, 2015). In both cases, citizens lastly decide in a vote on the proposal at stake. Similarly, and depending on the research question, the set of actors might be extended to target groups, subnational entities in federal settings or private implementing actors in corporatist systems.

This discussion shows that the context defined in Step 1 influences but does not completely determine the relevant actors. This means that researchers, against the background of the context, still need to identify which actors are relevant for their specific research question (see Fig. 2.2).

2.3.3 Step 3: Determining actors' roles

Following up on the formal and informal actors relevant for a decision, actors' reactions to a policy refer to varying roles an actor assumes (see Fast, 2013). First, Batel, Devine-Wright and Tangeland

(2013) already illustrated the difference between actors' acceptance and support. These authors argue that acceptance is"non-agency, the reaction to something which is proposed externally", while support is more "action-oriented". While in their approach it is not clear how exactly to define the threshold between "non-agency" and "action-oriented", based on a political science perspective we suggest an institutional argument. We argue that dependent on the research question we should focus on the specific response that is at a specific stage of the process *politically necessary for successful implementation*. Using an institutional criterion allows defining the relevant response in a given research project without getting involved into a more normative discussion about what is the desirable reaction.

At least three different actors' responses or roles may be investigated: *preferences* in a stage where a solution is searched and various options are available for the actors, *support* in a stage where a final solution shall be adopted, and finally *acceptance* referring to tolerance towards or compliance with a policy (see Fig. 2.2).

Support comes closest to the *de facto* decision or vote, i.e., if an actor disposes institutionalized power or competences to decide or vote (Stokman and Zeggelink, 1996), as typically veto players would (Tsebelis, 2002). Second, *acceptance* is relevant for more informal actors who possess no immediate power to block a decision, but can prevent a successful outcome by refusing cooperation or not complying with a made decision (Schweizer-Ries, Rau and Zoellner, 2010). Third, at a process stage where various options are still considered, a notable response are preferences (van Rijnsoever, van Mossel and Broecks, 2015), i.e., which options are preferred in comparative evaluation with others.

This threefold distinction helps us also to describe different roles within the same stage. For example, this can be illustrated regarding the implementation stage (stage 4): a policy on the reduction of energy consumption through efficiency measures is debated and introduced by parliament and later confirmed in a public vote, i.e., a majority of citizens voted in favor of this policy and thus *supported* it with a yes-vote. In the implementation stage now, two research questions involving different citizens' roles may be interesting:

Most typically, researchers will be interested in whether the target groups of these measures, i.e., citizens comply with these new efficiency measures and actually change their behavior in the intended way. Hence, the focus should be on individuals' *acceptance* of these measures in the sense

of accommodating oneself to the new rules. Note that this conceptualization also implies that acceptance is not necessarily only passive. For example, acceptance may involve some active behavioral change in order to comply with a new policy (e.g., a policy to reduce energy consumption asks for actual energy saving behavior by the targeted population). But from an institutional point of view, this action is a *re*action to a policy which does not entail that a policy is rejected or blocked as such, but undercuts the success in implementation (e.g., if energy saving is not accepted, the goals of the policy will not be reached, however the policy is still enacted). From an individual point of view, complying with a new policy may therefore involve some "action-oriented" reactions as described by Batel, Devine-Wright and Tangeland (2013). However, since these individual reactions are not targeted at the policy itself, but rather at behavioral chang in accordance with a new, externally proposed rule, citizens' accommodation to the new measure in the implementation stage refers to *acceptance* rather than support.

However, another research question could concentrate on how these new national efficiency measures are implemented. Typically, implementation agents such as subnational entities have to transfer the general decision to introduce a new policy into a specific policy output. In this perspective, policy implementation might become policy re-design and the relevant response being very close to the conceptualization as typically outlined in stage 2 (Mayntz, 1979; Goggin, 1990; O'Toole, 2000). Besides public implementation agents and administrative entities, this policy-related aspect of the implementation process might also include citizens' decisions. Typically, citizens and local communities are exposed to the specific implementation of national energy policies via the support of local infrastructural, energy saving, or renewable energy projects (Feenstra, Mikunda and Brunsting, 2010; Brunsting et al., 2011). In a federal system like Switzerland, subnational legislation is also subject to direct democracy. In this situation, citizens again need to express *support* for the new policy output also in the implementation stage.

The relevance of this distinct specification of actors' responses to a policy (support, acceptance, preferences) becomes obvious when we think of a valid operationalization. As discussed previously, common challenges in social acceptance research are related to the fact that, for instance, a general public opinion (which can be considered to reflect attitudes rather than intended behavior) is used as a measure of support – often due to the lack of better data. Taking our framework seriously, this would correspond to a miss-specification of the relevant response, since it does not fit the specifica-

tions made in steps 1 and 2. Lastly, responses by actors can be integrated in research designs not only as a dependent but also as an independent variable. If the focus is laid on the drafting of a policy prior to its adoption, i.e., taking a policy studies perspective, how actors rate varying proposals is typically one among various explanatory variables for the resulting policy mix.

2.4 Designing research on social acceptance: two examples in the field of energy policy

After having presented our framework to structure different processes of social acceptance in an empirical research design, we aim at illustrating our framework based on two specific examples. We shall demonstrate that contingent on the precise research interests, different processes and thus actors' reactions are under scrutiny.

In the examples, we take the Swiss energy strategy 2050 as a starting point. In the wake of the nuclear disaster in Fukushima 2011, the Swiss federal government and parliament decided a step-by-step nuclear phasing-out. In order to restructure the energy system, the government drew up the energy strategy 2050 (see Swiss Confederation, 2015). This new strategy contains ambitious targets such as the reduction of electricity and final energy consumption, the increase of the share of renewable energies as well as the reduction of energy-related CO_2-emissions. The transition towards the new energy system consists of two steps: In the first step, the government suggested to increase the promotion of renewable energies. The second step is the transition from a promotion system towards a steering system that primarily relies on climate and electricity taxes. The drafted constitutional article allows the introduction of a tax on fuels and combustibles and a tax on electricity.

In the first example, we focus on the second step of the policy design and thus on the question of how to move from a promotion system to a steering system. Hence, the introduction of an ecological tax reform, i.e., a steering system, is the object of interest, what mostly activates the socio-political dimension of social acceptance (Wüstenhagen, Wolsink and Bürer, 2007). We will illustrate how, given the specific object of research, the research question and further specification of the context (Fig. 2.1), will lead researchers to different paths and eventually research designs (see Fig. 2.3). The first example discusses the drafting of a policy proposal, i.e., from multiple possible solutions, various steering systems and policy elements (stage 1) to the adoption of one particular system

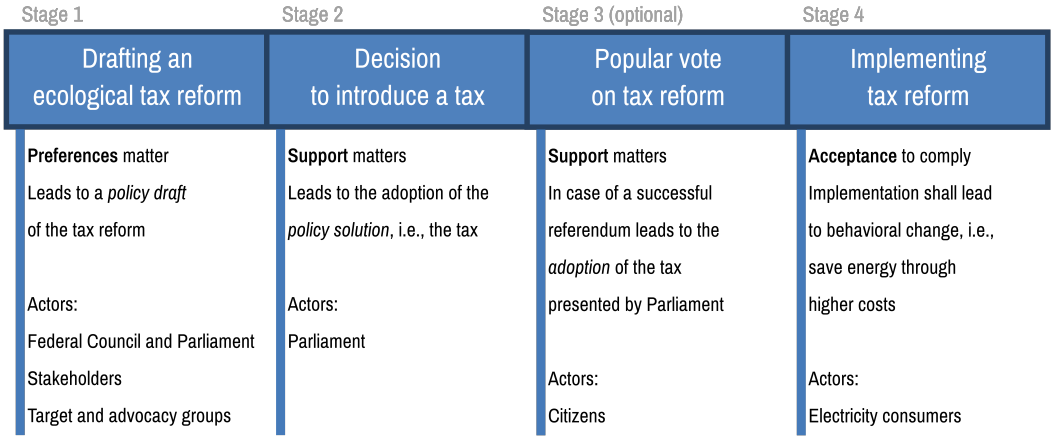

Figure 2.3: Specific stages of the introduction of an ecological tax reform.

including specific instruments or a policy mix (stage 2). Moreover, the example will discuss the challenge of the connection between stage 1 and 2, where initial preferences for various solutions are updated into support or rejection of a final version of a policy.

The second example will discuss the policy goal of extending the production of (new) renewable energy through a decentralized production of electricity, changing the focus to the community perspective, where citizens decide in a participative matter on the siting of RET. In the broader picture of the energy strategy 2050, decentralized production is part of the implementation of the policy (i.e., stage 4 in Fig. 2.3). However, in the concerned communities discussing RET siting, the specific object under scrutiny is not the energy strategy itself, but hundreds of individual siting projects, whereby each project is in itself a process of social acceptance (and probably the so far most researched aspect of social acceptance of RET).

2.4.1 Example 1: the focus on the political elite

Research interest: What steering system and related policy mix is adopted by the parliament to reach future goals of renewable energy production?

Step 1: the object of interest

Most policy studies would just be interested in the policy output as introduced by the political elite, and thus the introduced instrument mix to reach the defined policy goal (e.g., a certain percentage of renewable energy production in the overall energy portfolio of the country). However, the repertoire of available steering systems and related policy instruments to reach this goal is limited only by

policymakers' imagination (Eliadis, Hill and Howlett, 2005). Therefore, several steering systems and policy instruments that all have the potential to contribute to the same policy goal are played off against each other. More concretely, the different design options that could constitute an ecological tax reform are compared to the status quo and with other steering and maybe even promotion systems that aim at an increase of renewable energies. Such other systems may already be in place, are newly drafted up or might simply be reframed.

In elite studies, the final version of the policy design as typically anchored in laws and legislations, here the steering system probably consisting of multiple policy instruments (policy mix) would be the dependent variable (see Fig. 4). The response of interest and thus the *elite's policy preferences*, in contrast, would be conceived as independent variable. Social acceptance is thus seen as an antecedent condition but might only be one factor among others for policy success. The elite's preferences for a *policy* or for one element of a policy (e.g. *policy instrument*, tax) are typically located within the frame of *socio-economic acceptance* where a large number of collective, public and private actors are engaged in designing the policy or policy negotiations. As previously discussed, a steering system contains various elements that may be conflictive as a whole, but also individually. Regarding an ecological tax reform, its levy (who has to pay them), its redistribution (who gets their revenue) or both can be controversial (Stavins, 1996; Thalmann, 2004). Researchers might thus be interested in what exact policy mix is preferred by political actors. When the policy goal is strongly related or even dependent upon technological developments (as in the case of renewables), the legitimacy, maturity, and potential (local) success stories might also considerably affect the social acceptance of new steering mechanisms (Dewald and Truffer, 2012; Markard, Wirth and Truffer, 2016). This shows that even at the elite's level, socio-economic acceptance is intertwined with market, and even community acceptance.

Furthermore, and in the example outlined here, the new steering system is not introduced yet: we are thus considering social acceptance in *stage 1*, where a problem was successfully put on the agenda. Policies are now drafted and different solutions considered. Subsequently, the crucial questions arise what instrument mix passes from stage 1 to stage 2, and what solution finally gets introduced in stage 2. Positive reactions by some or the majority of elite actors (i.e., preferences, or support) might be one explanatory variable for both questions.

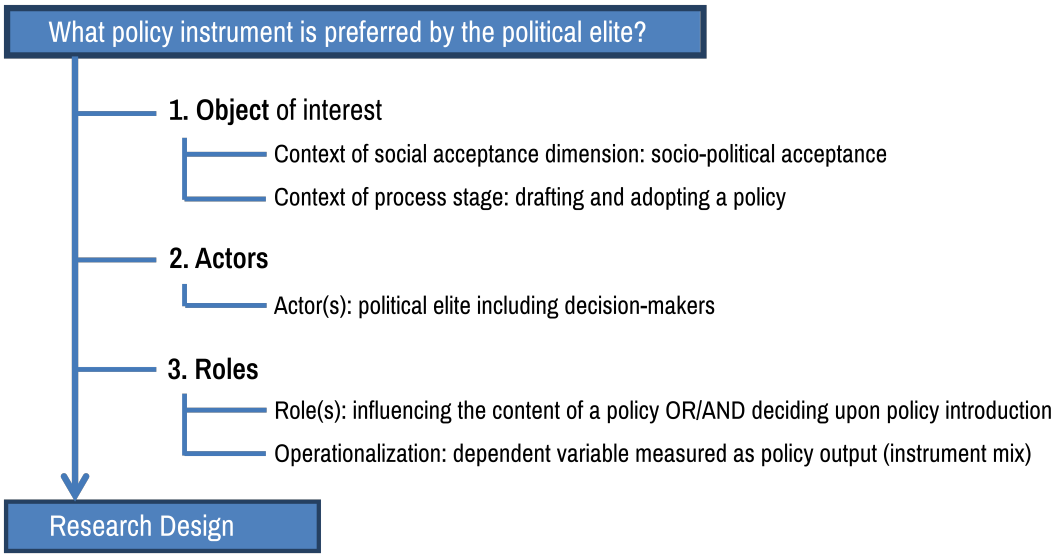

Figure 2.4: The defining steps to formulate a research design in example 1.

Step 2: relevant actors

The final decision whether the steering system is introduced (stage 2) is in the hands of very few, while the political elite integrated in stage 1 is considered as a larger body including private (interest groups, trade unions) and public (administrative entities) *actors* without the right to vote. Nevertheless, in policy studies, in general, and in our first example, in particular, those actors are expected to have a decisive impact on the drafting of a policy and thus eventually on the final decision through bargaining and resource exchange relations (Henning, 2009) as well as through lobbying and venue shopping (Pralle, 2006).

Step 3: actors' role(s)

According to the *role those elite actors play*, policy analysts empirically identify organizations based on their decisional, positional, or reputational power in the policy process under study (Knoke et al., 1996; see also Kriesi, 1990 for an earlier study). When following the decisional approach, the process is split in its different steps and arenas such as preliminary research projects, hearings in the parliamentary commissions, consultation procedures, elaboration of proposals by the administrative entities, and finally the parliamentary vote. All actors that appear at least once in the process are retained. This causes a rather long list of actors that either have formal or informal (or both) decisional power. The positional approach only considers actors with formal competences (e.g. the

Federal chancellery in Switzerland) that often do not directly appear in the decision-making process. Through the reputational approach, and expert interviews, actors that are perceived to be powerful are added to the list of elite actors. This combination of three approaches shows that the political elite can be conceived as something broader than just the formal body of decision-makers.

If researchers are interested in stage 1 and the broad organization of actors in a policy process, they might apply the advocacy coalition framework and try to identify coalitions of actors which actively get involved in discussing, framing, or lobbying for and against the design of different steering systems. Typically, such advocacy coalitions coordinate actions based on their deeper ideologies, beliefs and convictions (Henry, 2011; Weible and Sabatier, 2005).

Should researchers be more interested in whether an instrument or the proposed ecological tax reform succeeds and passes from stage 1 (being negotiated) to stage 2 (being adopted) they might focus on single actors such as brokers or entrepreneurs being said to seek policy compromise among competing coalitions (Ingold and Varone, 2012) or to strategically impact decision-making according to their self-interest (Kingdon, 1984; Mintron and Vergari, 1996). Finally, veto-players (Tsebelis, 2002) hold decisional power and can thus block a political process. It is thus crucial to know if a veto-player accepts or rejects the proposed steering system.

Beliefs or institutionalized power (e.g., veto players), but also single actors like brokers or entrepreneurs are known to particularly impact final decisions. All of those elements (that can also be conceived as independent variables here) were (at least partly) identified through the concept and operationalization of responses towards policies, whereby policy instrument preferences are the envisaged type of response. It thus seems important to understand such mechanisms of social acceptance at the level of the political elite on the independent side as well as on the dependent side in the form of a tangible policy output (e.g., steering system).

2.4.2 Example 2: the focus on the citizens' level

Research interest: What leads to citizens' acceptance and support of RET siting in local contexts?

Step 1: The object of interest

Changing focus from the overall policy of the energy strategy 2050 to the specific decentralized implementation, siting of RET infrastructure in a municipality is the object of interest and citizens

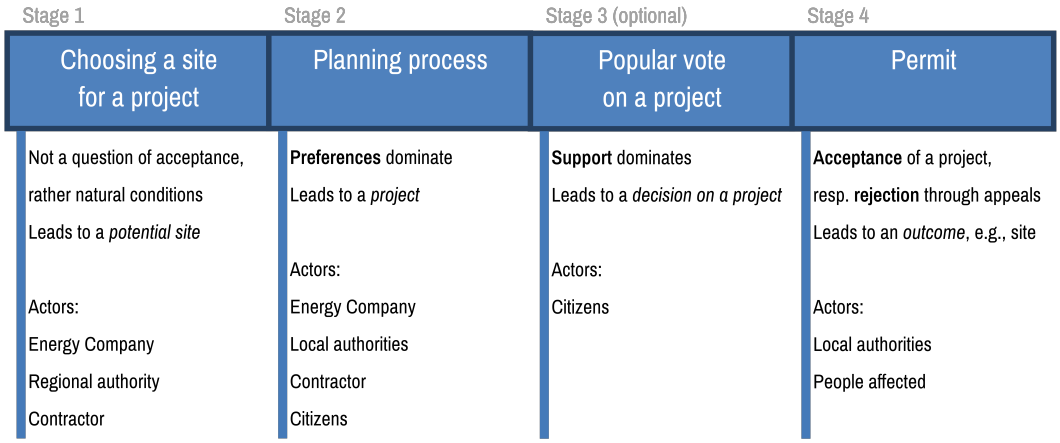

Figure 2.5: Exemplary stages of a project from initial project idea to final permits.

are in the center of the process, as they have several possibilities to participate and voice their opinion. In practice, these specific RET siting projects may look quite differently, not only depending on the energy source (e.g., whether a wind park, a large-scale PV site or a small-scale hydropower plant should be sited), but also contingent on cantonal characteristics, i.e., regulatory differences, varying physical conditions and regional cultures. Although part of the implementation of the energy strategy 2050 (i.e., stage 4 in Fig. 2.3), the research question implies that the focus is much more on the specific siting projects and the related political processes. Hence, these siting projects should be considered as stand-alone policy making processes including the different stages. Consequently Fig. 2.5 depicts an exemplary process with several stages from project planning to building of a RET.

Based on previous research on the social acceptance of RET siting projects, we will focus on three aspects in this example: the relevance of procedure (Gross, 2007), the difference between support and acceptance as responses to RET (Batel, Devine-Wright and Tangeland, 2013; Walter, 2014), and the expression of these reactions in a municipality setting. As Gross (2007) has shown, the procedure of planning a new RET site is highly relevant for the social acceptance of the project, whereby especially the perception of fairness or justice determines whether citizens will be in favor or against a project. As van der Horst (2007) showed, the process of planning a project likely leads to people deferring from supporters to opponents of projects. Stakeholders involved in the preparation of a project thus need to carefully address the issues of involvement and information of citizens. Depending on the project and its scale, the community might not only be involved through information and planning, but might actually have the possibility to also vote on the project, as is the case in Switzerland due to the direct-democratic tradition. While the decision might not directly

be on siting or not siting a project, related issues such as a change in the zoning scheme, possible communal financial participation in the project or to buy/sell the land used for the project might pose the possibility for the residents to effectively influence the project and voice their concerns (and for developers and stakeholders to incorporate those in the project, see Aitken, 2010; Barry and Ellis, 2011). In contrast to comparable cases in other countries, the residents need not only to tolerate the project, but actually vote in favor of it, which emphasizes the difference of acceptance (being in favor, not opposing a project) and support (actively do something in favor of a project) again (Batel, Devine-Wright and Tangeland, 2013; see also Walter, 2014).

Thirdly, and beyond the specific Swiss case, if a project has passed the political hurdles, the last possibility to prevent a project is through an appeal, i.e., objections on grounds of landscape and environmental protection or deprecation of private property. While the goal may simply be to settle the appeal after compensations, the opposition might also be a matter of principle, i.e., the most negative possible response not only 'not accepting', but actively trying to block a project at all (Schweizer-Ries, Rau and Zoellner, 2010). A relevant research question that therefore arises is under which conditions citizens are not only ready to accept a project siting and refrain from an appeal, but actually support it given a likely vote in their municipality. Conceptually, this research interest is in the third and fourth stage as depicted in Fig. 2.5.

Step 2: relevant actors

Regarding a specific project at the local level, relevant actors in this context would be the local executive, but also the involved energy company and environmental organizations participating in (and influencing) the process leading to the decision to adopt a project or not (see also Brunsting et al., 2011; Feenstra, Mikunda and Brunsting, 2010). While – as the choice of potential sites depends on economic feasibility and readiness to invest – market acceptance may be an important pre-condition for a successful RET siting project, our example focuses on the role of citizens in this process (see Fig. 2.6). Residents deciding about an RET siting in a commune or region typically refers to the community dimension by Wüstenhagen, Wolsink and Bürer (2007) and thus focuses on the stakeholders of a project and the residents which have the possibility to influence the siting through voting or appeals. Given the case of a vote, the central actors are the citizens living in this community, as they will decide whether or not a project will be realized (Walter, 2014).

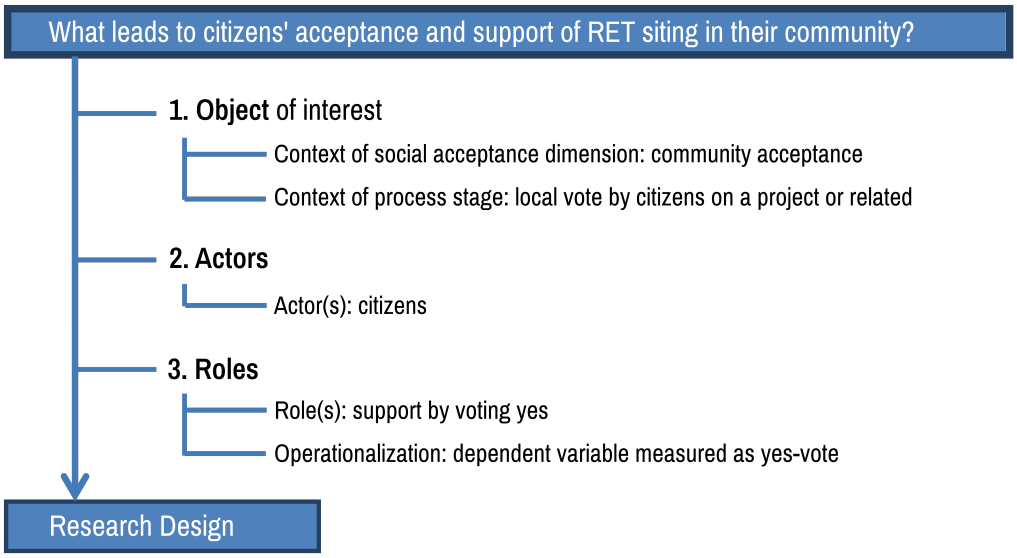

Figure 2.6: The defining steps to formulate a research design in example 2.

Step 3: actors' role(s)

As long as citizens do not have the possibility to vote on a project, the stakeholders need citizens' acceptance (in terms of non-opposition, e.g., no appeals) to realize a project. However, if there is a vote, citizens' role changes; they now need to respond in a more specific and active way, i.e., they need to *support* the new policy in a direct democratic vote (Schweizer-Ries, Rau and Zoellner, 2010). This means that citizens' role in the decision-making process is now the one of a veto player (Stadelmann-Steffen, 2011).

Citizens' acceptance or support of RET is typically investigated based on survey data. As Batel, Devine-Wright and Tangeland (2013) have shown, researchers need to specifically ask for support if interested in this more active reaction, as they might else overestimate the chances of a project in a vote. Even more problematic is the question whether a person intends to appeal to a project or not – due to the problem of social desirability and the (simplistic) stigmatization of people blocking a project as NIMBYs or saboteurs, surveys might largely miss the full potential of people concerned with the project and ready to take further measures to inhibit it.

2.4.3 Summary

Summarizing the two examples, they illustrate the relevance of our three steps – object of interest, actors, and roles. Most importantly, the two examples make clear that even in two political science

contexts research on 'social acceptance' can refer to very different things. Most obviously this is due to different objects of interest, which, in the first example, is related to policy design at the elite level and thus socio-political acceptance, while in the second example refers to community acceptance of a new RET project. Emphasizing the different stages of the policy making process, the relevant actors and their roles, reveals that we speak of very different processes of social acceptance as illustrated in Fig. 2.4 and Fig. 2.6. The consequence is two very distinct research designs. While in the first example, the conceptualization of social acceptance refers to elite's preferences as independent variable, in the second example the citizens' support is necessary and thereby the dependent variable. Eventually, the two examples demonstrate that our framework can serve as common parenthesis of very different research questions from varying (sub)disciplines in social sciences.

2.5 Conclusion and policy implications

The starting point of this contribution was the observation that recent years have seen an increasing number of studies on 'acceptance', using very different definitions and conceptualizations. One of the main problems of this heterogeneity in the use of the concept is that seemingly comparable findings under the notion of 'acceptance' are actually not comparable at all, since they are based on divergent definitions, perspectives and processes of social acceptance and varying responses towards RET (Fast, 2013; Batel, Devine-Wright and Tangeland, 2013). The main aim of our paper was therefore to present a policy science framework to the analysis of social acceptance, in order to emphasize the political process inherent to most decisions on policies and RET infrastructure. Most importantly, we argue that this framework adds to research on social acceptance and this through a unique and threefold contribution. First, we highlight the distinction between 'social acceptance' as an important social factor in RET implementation (more in line with Wüstenhagen, Wolsink and Bürer, 2007); and 'acceptance' as one of different specific reactions to a policy at the actors' level during policy making (more in line with Batel, Devine-Wright and Tangeland, 2013; Fast, 2013). By integrating the strength of both perspectives to the research of renewable energy policy, we structure the elaboration of a precise research design.

Second, we bring in a political science perspective: contingent on the research interest and the related political decision to be analyzed, as well as the timing and maturity of the policy proposal, very different processes of social acceptance are triggered, which influence not only the definition

of the crucial concepts but also the conclusion to be drawn from the research. We argue that the distinct process of social acceptance and thus actors' responses that are 'activated' depend on specific elements of policymaking such as actors' roles (e.g., decision-maker; target; sovereign), timing (e.g., proposal; final decision at the ballot), or the institutional room of maneuver given to the actors (e.g., direct democracy; lobbying).

Third, we go beyond traditional political science approaches by combining insights of political behavior with policy studies. This allows generalizing our framework to a broader range of potential actors and the role they can play in policymaking in general, and in social acceptance processes in particular.

Specifically, we propose *three steps* that lead from a research question to a conceptualization of acceptance, namely the specification of the (1) object of interest, (2) the relevant actors, and (3) their roles. Moreover, we were able to show that the differentiations made in the three steps are not only important for conceptual clarity, but also regarding the conclusions and policy implications that can be drawn from a given study. Furthermore, we outline social acceptance as one, among several, factors that drive policy success or failure. However, our framework does not make any explicit a priori claim about whether social acceptance is a necessary, sufficient, needed or even desired condition for successful policy introduction or implementation. Further, ideally comparative research and empirical evidence is needed in this respect.

While in this contribution we have concentrated on renewable energy technologies, where a large part of social acceptance research has emerged until now, our framework should easily be transferable to other policy fields, for instance to the domain of welfare state reforms where the (socio-political) acceptance of new solutions regarding the socio-demographic changes and the general ageing western welfare states might be of interest. Moreover, our framework may be important for infrastructural projects in general, since questions of how to organize the local decision making process and on how to compensate for local costs will be relevant for projects beyond energy policy.

Chapter 3

Environmental decision-making: the influence of policy information

The success of technological development depends on citizens' social acceptance, whereas several challenges related to the understanding of citizens' reactions to renewable energy and its policies are identifiable. Most importantly, the gap between general attitudes toward the environment and specific voting behaviour regarding environment-friendly policy proposals calls for an explanation of how a policy's design causes citizens who might otherwise support environmental measures to express opposition in direct democratic votes. Therefore, how policy design and policy information impact opinion formation is investigated. Salient aspects are identified and the different types of information or qualifications that may cause opposition are considered. This new approach reveals that citizens, in environmental decision-making, do indeed consider policy design and policy information, which they regard as conditions for support, and that the type of policy information matters since citizens do not consider all of the policy details when they make decisions.

Note This is the authors accepted manuscript of an article published as the version of record in *Environmental Politics* ©Taylor & Francis doi:10.1080/09644016.2018.1480258 as Dermont (2018).

Supplementary material is available at doi:10.7892/boris.116969.

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3.1 Introduction

In the aftermath of the Fukushima incident and the Paris climate accord, many countries debated policies geared toward a transition from the nuclear and fossil energy era to renewable energies. For example, in 2011, the Swiss government expressed the aim to discontinue dependence on nuclear energy by 2050 by replacing the approximately 40% of nuclear energy in electricity production with renewable energies. The challenge for the political elite in this and similar processes is to select suitable policies to reach this target, as there are many possibilities. As a second challenge, the question arises as to how the public will react to such targets and policy proposals, which Wüstenhagen, Wolsink and Bürer (2007) refer to as 'social acceptance'. Social acceptance refers to the favourable reaction of the public, markets and political actors towards renewable energy technologies and policies, and is considered a necessary condition for the success of those technologies and policies. Policies aimed at climate change or promotion of renewable energies therefore need the support of the public, especially if voters have the opportunity to decide on the proposed policy through direct democratic means.

Here, I will focus on citizens' voting on the future of energy policy in Switzerland. While the call to let the people decide resonates in the growth of direct democratic decisions in many countries (Altman, 2010), Switzerland is still an ideal case to investigate how individuals decide and vote on policy instruments due to the wealth of direct democratic decisions. Moreover, in May 2017, the citizens of Switzerland voted on a new energy law (Swiss Confederation, 2016), which sets the guidelines for the development of the energy sector. The law stemmed from intense debate on the pros and cons of the policy targets and the design of the policy itself, essentially confirming the Swiss government's aim to phase out nuclear power triggered by the critical event in Fukushima 2011 (Bernardi et al., 2018). This vote is therefore a prime example of social acceptance (Wüstenhagen, Wolsink and Bürer, 2007).

When focusing on citizen decision-making in regard to environmental issues, researchers should

address several issues. First, in environmental decisions, the gap between general opinion and specific behaviour – known as 'the value-action gap' (Bell, Gray and Haggett, 2005; Kollmuss and Agyeman, 2002) – poses a challenge for capturing how citizens will vote in a specific proposal even if they are in favour of the general target. Assessing the social acceptance of intended policies therefore depends on the possibility to validly measure how citizens will react to the political elite's propositions. One explanation for the gap is 'qualified support,' whereby individuals support a target only conditionally – i.e., if the specifics of a policy correspond to their preferences (Bell, Gray and Haggett, 2005). Second, in order to reflect on this gap, the question arises as to which aspects of a policy citizens consider in opinion formation – i.e., the qualifications or conditions that policies need to fulfil. Conceptually, I will build on insights on opinion formation and investigate how citizens consider substantial policy information when deciding on environmental measures (Bullock, 2011; Boudreau and MacKenzie, 2014). Third, as encompassing proposals such as a new energy law include multiple elements that could all incite rejection of a policy if those conditions fail to meet the expectations of some supporters, I will investigate this multidimensionality of decision-making more thoroughly. An example of policies with multiple elements is proposals which include both promotional measures for renewable energies and restrictions for nuclear power. As such, policy-makers combine various aspects into one decision, which can potentially lead to conflicts of interest. From a methodological point of view, this contribution therefore applies multifactorial experiments modelled after actual decision-making situations (Hainmueller, Hopkins and Yamamoto, 2014).

I therefore investigate how decision-making concerning energy policy depends on the specific design of a policy. Specifically, how does policy information influence the support for renewable energy policy? To address the mentioned challenges, I analyse a conjoint experiment implemented through a large-scale representative survey in Switzerland. A conjoint experiment is an approach to investigate preferences about objects that vary in multiple aspects and enables us to assess which attributes or elements of, e.g., a policy influence support for this policy (Hainmueller, Hopkins and Yamamoto, 2014). The multifactorial setup considers the multidimensionality of policy proposals and therefore informs us how the specific aspects or conditions of a policy drive citizens' decisions and provides insight into aspects that are potentially more salient. A survey experiment focused on citizens' preferences toward an energy policy is better able to capture how voters might actually vote on a specific proposal (Dermont et al., 2017) compared to asking direct questions about their

preferences regarding the environment. Lastly, this approach allows for an analysis of which citizens are more likely to consider substantial policy information and which citizens focus on certain key elements of policies.

3.2 Theory

In previous decades, developments in energy politics yielded several highly conflicting and emotional debates. Protests – especially against siting projects, such as nuclear power plants or large hydroelectric plants – eventually led to abandoned sites Kaiseraugst (AG) and the Greina Plateau (GR) in Switzerland. While those two cases are quite specific processes, they illustrate the relevance of social acceptance for technologies and energy policy targets (Wüstenhagen, Wolsink and Bürer, 2007). Effective policy change, regardless of the target, needs the support of citizens. If citizens act as decision-makers and therefore as veto players (Tsebelis 2002) through direct democracy, their reaction toward proposals such as a new energy law (Swiss Confederation, 2016) is central and policymakers interested in the realization of targets, such as those related to climate policies, should consider those reactions (Bayulgen and Ladewig, 2017; Szulecki, 2018).

3.2.1 Specificity of policies

What factors cause citizens to support or reject an environmental policy? In environmental decisions, the discrepancy between attitudes and actions limits our understanding of voting behaviour; scholars also refer to it as the 'value-action gap' or 'social gap' (Bell, Gray and Haggett, 2005; Bell et al., 2013; Kollmuss and Agyeman, 2002). Although public opinion usually favours renewable technologies, environmental protection, and 'green' solutions, the gap between this articulated general acceptance and the voters' rejection of tangible policy measures or particular energy sources is highly relevant for policymakers in attaining their targets. As Bell, Gray and Haggett (2005; Bell et al., 2013; Devine-Wright, 2005) suggested, one explanation for the social gap between general attitudes and actual behaviour is 'qualified support': people generally support wind energy but with certain limits or controls in mind. Therefore, in an actual decisional situation, citizens would reject a proposal lacking the qualifications or conditions they expect regardless of their general support for wind energy. Similarly, Hobman and Ashworth (2013, 865) reported that citizens reacted to simple information in evaluation of energy sources: support changes significantly when researchers provide respondents

with factual information about costs or emissions, which, for example, lead to lower support for cost-intensive energy sources (see also van Rijnsoever, van Mossel and Broecks, 2015).

Hence, the decision to support a proposal is contingent on the proposal itself, whereby the exact design of a policy could be a relevant explanation of why (general) attitudes and (specific) behaviour diverge (Dermont et al., 2017). Voters thus reject policies that fail to include the qualifications they require, although they would support the general target of a policy. A campaign providing citizens with more detailed information prior to a popular vote could thus incite a more systematic examination of the issue at hand (Hobman and Ashworth, 2013; van Rijnsoever, van Mossel and Broecks, 2015), which reduces their support for environmental measures as the corresponding costs, behavioural restrictions, or technocratic hurdles beat the appeal of environmental gains.

Researchers therefore need to carefully assess how to explicitly capture the reaction they want to analyse; tangible research on support for environmental policies needs to consider the specific design of a policy (Dermont et al., 2017). Most importantly, providing respondents with the pertinent information on a policy increases the validity of their responses, as they do not simply answer generally but rather consider the context of a proposal, as Bell, Gray and Haggett (2005) suggested for qualified supporters.

3.2.2 Opinion formation under consideration of information

What influence does information have on voting in direct democracy? According to dual-process theories on attitudes, citizens process information heuristically or systematically (Eagly and Chaiken, 1993; Petty and Cacioppo, 1986). The heuristic processing of information reflects simple decision-making based on cues such as a party or government position. The systematic processing of information, i.e. the examination of arguments and details of a policy, is more demanding and thus more appealing to voters who are highly involved and/or interested in politics or the issue at stake (Kriesi, 2005; Nai, 2010). In the Swiss setting, in which citizens participate every few months in direct democratic decisions, Kriesi (2005) and Colombo and Kriesi (2017) have argued that the systematic processing of information plays a key role in opinion formation. Essentially, consideration of arguments and policy details addresses the issue of qualified responses, as Bell, Gray and Haggett (2005) suggested. Voters focus on the specifics of policies instead of voting for environmental measures regardless of the details.

A promising approach to better understanding systematic processing involves presenting individuals with policy information and observing how this information affects their decision-making. As Bullock (2011) and Boudreau and MacKenzie (2014) have shown, policy information matters for decision-making, even when compared with heuristics. However, the approaches to examine the influence of policy information differ. Boudreau and MacKenzie (2014) use rather general frames, such as the reduction of state correctional costs by "tens of millions of dollars each year" (see supplemental material in Boudreau and MacKenzie, 2014). Yet, Bullock (2011, 498) criticized these kinds of "short and vague" policy descriptions in former research, since he regards detailed messages as more influential than vague frames. In his experiments, Bullock (2011) used newspaper articles that described either 'conservative' or 'liberal' changes in health care in which several details, such as coverage, co-pay, disability coverage, and costs, varied between the status quo and the proposed changes. Bullock's (2011) approach, i.e. detailing the specifics of a proposal, is a tangible approach to consider the 'qualifications' of support, as Bell, Gray and Haggett (2005) suggested, while the broader approach that Boudreau and MacKenzie (2014) applied would likely fail to capture the possible qualifications of a policy, which kindle rejection.

Since the liberal or conservative versions of Bullock's (2011) study have fixed policy details, the individual effects or salience of the policy details are not comparable. Thus, Bullock (2011) only compared the overall effects of the policy changes of the more liberal and more conservative alternatives to the status. However, each of these details in policy design could be the reason why a voter changes her or his opinion on an issue. Notably, Hobman and Ashworth (2013) tested the influence of costs and emissions separately, thus enabling separation of the effects of two possible treatments and, associatively, the determination of which treatment might be more salient. van Rijnsoever, van Mossel and Broecks (2015) went a step further by considering multifactorial treatments and five attributes of energy sources, adding factors such as spatial impact and security of supply. By building on the theory of systematic opinion formation, the expectation is therefore that voters consider each detail as relevant policy information or as a qualification, rather than only the overall condition such as in Bullock (2011). Each detail has the potential to be the relevant information or qualification that tips a voter's decision from yes to no and vice versa, especially for less opinionated citizens. An approach to considering multiple policy details at the same time is a conjoint experiment. A conjoint setup presents respondents with multiple information and can assess the influence of each

policy detail separately (Hainmueller, Hopkins and Yamamoto, 2014). Conceptually, such a setup allows for a further testing of the assumption of Bell, Gray and Haggett (2005) regarding qualified supporters. It also extends our understanding of the influence of policy design in environmental decisions. Moreover, it develops the insights of Bullock (2011) and others regarding the influence of policy information on decision-making; it more precisely analyses what affects the support of policies. In the following section, I discuss the factors that influence decision-making regarding the issue at hand.

3.2.3 Influence of policy information

Building on the general research on the influence of policy information[1] on decision-making (Boudreau and MacKenzie, 2014; Bullock, 2011) and on the more specific factors influencing the assessment of energy sources (Hobman and Ashworth, 2013; van Rijnsoever, van Mossel and Broecks, 2015), a question arises about how information influences the reaction toward policies, which is my focus here.

Various studies have analysed how citizens voted on environmental policies, mainly with respect to Switzerland (Bornstein and Lanz, 2008; Bornstein and Thalmann, 2008; Halbheer, Niggli and Schmutzler, 2006; Stadelmann-Steffen, 2011; Thalmann, 2004) and the United States (Deacon and Shapiro, 1975; Kahn and Matsusaka, 1997; Wu and Cutter, 2011). The literature attributed the main argument for acceptance or rejection of new environmental policies to the perceived costs of a proposal and cost-benefit considerations; voters will choose the option that leads to fewer costs for them (Bornstein and Thalmann, 2008). Additionally, the type of policy instrument is relevant. For example, Stadelmann-Steffen (2011) reports that citizens prefer bans and rules to incentives or market-based policies. The reason might be a "cost illusion" since bans or rules exhibit no direct economic costs, whereas "individual costs are better visible with incentive-based instruments" (Stadelmann-Steffen, 2011, 497f). Those aspects – costs, benefits, and instrument choice – pertain to policy information that likely belongs to the systematic path of opinion formation, i.e. provisions of a policy that might incite the opposition of voters who would otherwise generally favour environmental action (Bell, Gray and Haggett, 2005). Similarly, although they focused on energy sources

[1] The notion of 'policy information' stands for information, descriptions, and arguments regarding how a policy is designed, which instruments are included (such as taxes vs. bans), and the effect of a policy. Here, I consider the details and aspects of a policy as policy information, which I also use as conjoint attributes in the implementation of the experiment.

rather than policies, Hobman and Ashworth (2013, 864) considered costs and emissions of energy sources as systematic factors for decision-making.

Gathering from this, one central aspect for future energy policy decisions is costs and perceived costs, which work as conditions leading to the rejection of policies even if voters are generally in favour of the formulated target. The first two hypotheses regarding systematic processing are thus as follows:

H1a Higher costs reduce support for environmental measures.

H1b Policy instruments with less obvious direct costs raise support for environmental measures.

3.2.4 Moderation of systematic processing

If voters consider policy information as a part of their decision-making process, corroborating the qualified support explanation of Bell, Gray and Haggett (2005) for the social gap, the follow-up question would be which voters react to policy information and are thus qualified supporters. In dual-process theory, researchers have claimed that the volition to follow the cognitively demanding systematic path is dependent on the characteristics and involvement of the individual. As Chaiken (1980) has argued, an individual's involvement in an issue, or how important she perceives the consequences of her choice, moderates the strategy she employs. In the Swiss context, Kriesi (2005) has considered the influence of general (level of education) and issue-specific political competence as well as political interest as indicators of motivation, which lead to a higher likelihood of making use of arguments when deciding how to vote. With respect to the choices that voters make, Nai (2010) focused on knowledge of the issue at stake and spontaneous reasons as measures of political competence and how relevant a voter considers the ballot to be. Thus, individuals with high general and specific political competence and knowledge, political interest, and issue involvement and who feel the need to substantiate their responses are more likely to use more substantial policy information.

The more involved a respondent is, the more he will be attentive to more specific details – such as the type of instrument – of a policy. Less involved respondents will likely focus on the less demanding details of a policy that facilitate decision-making in the absence of cues. Two perspectives are relevant for evaluating how individual characteristics might moderate the use of policy informa-

tion in the decision-making process. First, individual characteristics can affect the extent to which respondents distinguish between varying policies, i.e. engage with the decision situation. Second, individual characteristics can influence the salience of policy information, so certain individuals may be more susceptible than others to aspects such as costs. Since the expectation is to be able to confirm the results of Kriesi (2005) and Nai (2010) for the Swiss context and the insights into partisanship, prior attitudes, and knowledge of previous studies such as those that Bullock (2011) and Boudreau and MacKenzie (2014) carried out, the following hypotheses corroborate their conclusions for energy policies:

H2a More involved individuals have a larger variance in their support for environmental measures since they engage more systematically in the decision-making process.

H2b For less involved individuals, the effect of higher costs on their support for environmental measures is larger.

H2c For less involved individuals, the effect of policy instruments with less obvious direct costs on their support for environmental measures is smaller.

The first hypothesis generally expects a relation between higher involvement and more systematic processing. The second and third hypotheses suggest that the type of policy information (i.e., the condition) that plays a role in systematic processing depends on involvement. Essentially, the assumption is that direct costs are more relevant with lower involvement than indirect, less perceivable costs (Stadelmann-Steffen, 2011).

3.3 A survey experiment

For the methodological approach, I follow Hainmueller, Hopkins and Yamamoto (2014) by applying a randomized conjoint design to present respondents with varying policy information. Researchers have previously conducted experiments on individual preferences in environmental decision-making (van Rijnsoever, van Mossel and Broecks, 2015), but these experiments have until now mainly focused on economic aspects such as consumer choices. Recently, Hainmueller, Hangartner and Yamamoto (2015) have shown that the results of hypothetical choices in conjoint experiments come

close to how voters actually voted in the real world (namely, in citizenship naturalization referendums in Switzerland), which is a strong argument for the external validity of stated preference experiments. Moreover, Häusermann, Traber and Kurer (2015) and Bechtel and Scheve (2013) have focused on policies, namely pension schemes and global climate agreements.

The advantage of conjoint experiments is the simultaneous consideration of several policy details (or attributes) that vary for each policy proposal. Instead of focusing on one single, suggested frame or on fixed alternatives (Boudreau and MacKenzie, 2014; Bullock, 2011), a conjoint setup presents respondents with multiple information and can separately assess the influence of each policy detail (Hainmueller, Hopkins and Yamamoto, 2014). Since each respondent repeatedly makes the same hypothetical decision, conjoint experiments enable two insights: first, the policy information or condition that drives the response and, second, the respondents who consider the policy information presented to them. In the present study, respondents participated in a conjoint experiment on support for the promotion of renewable energy. The question text asked respondents to envisage their decision as a hypothetical vote that would occur on the following Sunday. From seven paired concepts, each respondent answered which concept of each pair they would choose given a confrontational vote and how likely they would support each proposal. This approach corresponds to a voting process where the government presents a counter-proposal to a popular initiative and the ballot asks citizens whether they support each proposal separately,[2] and which proposal the majority would want implemented if both proposals received a majority.

The conjoint experiment on renewable electricity policies varies regarding seven attributes (policy information): the promoted energy source, the policy instrument, the instrument's funding, the running time of the instrument, the additional monthly cost per household, exceptions for energy-intensive industries, as well as the handling of existing nuclear power plants (see Supplementary material). The setup employs randomized treatments and attribute order. The randomization excluded illogical policy combinations (such as a general tax coupled with a redistribution, which has no effect on energy policy), and kept the attributes of the policy measure and funding in the same order and together for all the responses. The full setup of the experiment and the introduction are available in the Supplementary material, Fig. 3.5 in Appendix 3.A documents an exemplary setup of the question.

[2]Citizens especially have the opportunity to support or reject both simultaneously. In other words, it is not necessary to vote 'yes' for one of the proposals. Moreover, even if a citizen rejects both proposals, she or he can still express her or his preference in the tiebreaker.

Although an experiment will likely never have the same consequences as a real vote, and therefore has advantages mainly with respect to internal rather than external validity (McDermott, 2011), a conjoint design and a non-fictional issue offer ideal conditions to analyse voter decision-making for two reasons. First, decision-making based on a conjoint table, i.e. based on key expressions, corresponds quite closely to voters' real-world decision-making (Hainmueller, Hopkins and Yamamoto, 2014). It is likely that many citizens are not profoundly informed about the proposal at stake and instead base their vote on several key policy aspects mentioned in the campaign (and the party positions on these points, Kriesi, 2005, 2012). In this sense, the effect of the abstraction of a conjoint table likely corresponds to the mentioning of the main issues and characteristics of a policy that arise during a campaign, which citizens eventually weigh when they make their decision. Second, the non-fictional issue, which the media and politicians regularly debated prior to the analysed vote, suggests that respondents are familiar with the issue – at least to a certain extent. Also, Swiss citizens vote approximately four times a year for federal matters, and they recently decided on complex matters such as immigration restrictions, pension schemes, tax reforms, transportation, and public media. Swiss voters therefore typically decide on far-reaching policies. Moreover, conjoint experiments provide respondents with multiple reasons to justify a particular choice and thus have the potential to reduce the social desirability bias (Hainmueller, Hangartner and Yamamoto, 2015), which, as Milfont (2009) reported, is only a weak concern when measuring environmental behaviour. A negative aspect of the conjoint setup is that researchers define which elements are relevant and which are not; however, in the setup of the questionnaire I use in the present study, the research group closely followed the debate on the issue and is therefore confident that the setup covered the central factors.

To analyse the responses, I use models estimating the average marginal component effects (R package *cjoint*, Hainmueller, Hopkins and Yamamoto, 2014) and hierarchical linear regression models (Gelman and Hill, 2007). Plots of the estimates present the results, and full result tables are available in the Supplementary material.

3.3.1 Data

The trilingual survey[3] on future energy provision in Switzerland collected 8,287 answers from a representative sample (provided by the Federal Office of Statistics) during the parliamentary debate on the energy law in spring 2016. Respondents received an invitation by post to participate in an online survey while parliament was drafting the policy.[4] Later, in May 2017, citizens confirmed the policy solution the government and parliament drafted (Swiss Confederation, 2016). The demographic and structural composition of the sample correspond quite closely to the Swiss population when compared to the full sample of potential respondents or the 2015 national election study (see supplemental material for discussion of the sample characteristics). The survey included two conjoint modules: respondents randomly answered one of the two, one of which I analyse here. From the 4146 initial respondents, I excluded the fastest 5% (210 respondents) due to their being 'speeders,'[5] which yielded a final sample of 3936 respondents considered in the following analyses. As each individual responded to seven paired concepts, this results in $n = 55\,104$ responses (7 x 2 x 3936) which I will analyse.

3.3.2 Measures

The study focuses on the results of the conjoint experiment, whereby the main dependent variable is support for energy policy, measured on a scale from 0 to 100% in steps of 10%, recoded as 0 to 10 in the analysis. The attributes of the conjoint experiment are the independent variables influencing this support. In other words, they are the treatments that serve as conditions or qualifications for respondents to either support or reject the policy. However, in addition to the results of the conjoint experiment, i.e. the support for the presented policies, the models consider several other variables for the analysis of opinion formation.

First, the present study measures systematic processing or opinion formation through the variance of responses per individual. Since each respondent stated his support for 14 policy proposals

[3]The survey was administered in German, French, and Italianthe three most prominent of the four national languages of Switzerland. Respondents used the following languages: 65.4% filled out the survey in German, 26.0% French, and 8.6% Italian. Romansh individuals used the German version.

[4]The LINK Institute in Lucerne conducted the data collection process for the Institute of Political Science of the University of Bern. The Federal Office of Statistics provided the sample from the "Stichprobenrahmen für Personen- und Haushaltserhebungen" (SRPH). The collection period was March 2016 to mid-May 2016. The response rate after three invitations was 41.7%.

[5]'Speeders' answer the survey as quickly as possible and it is not guaranteed they actually consider the questions, i.e., they could be engaging in satisficing behaviour, which is also suggested by the lower heterogeneity in responses.

that varied randomly, those who consider policy information to form an opinion likely report varying support depending on the attributes of the policies – reacting to conditions which they rate more or less favourably. I consider within-individual treatment effects on support for policies and thus observed heterogeneity based on policy information as indications of systematic processing. The larger the individual variance in responses, the more the respondents reacted to stimuli and thus considered policy information in forming their opinion.

To evaluate how the processing of policy information varies by individual, the analysis considers the following characteristics. With respect to involvement, political interest and participation frequency serve as indicators of general involvement with politics. Moreover, I consider specific involvement through environmental beliefs (environmental protection and climate change scepticism), whereas more extreme responses on those scales represent higher issue-involvement (values further away from the middle point of the scale in either direction). Lastly, I include education to reflect knowledge, similar to Kriesi (2005). Unfortunately, there is no other measure reflecting specific political knowledge or efficacy in the survey. The left-right scale measures ideological predisposition, which positions individuals in the left, middle, and right of the political spectrum. The models further include control variables – i.e., language region, age (categorized), gender, and income (categorized). The Supplementary material offers further detailed descriptions of all variables.

3.4 Results

Does support for energy policy depend on the specific design of a policy and thus on the policy information of a proposal? The opposite expectation would be that the design of a policy has no influence on support for policies, in which case one might expect that principally environmental attitudes would drive the support for and rejection of environmental measures (Bornstein and Thalmann, 2008; Halbheer, Niggli and Schmutzler, 2006; Stadelmann-Steffen, 2011). However, a bivariate comparison of support for the random policies presented to the respondents and their environmental attitudes shows that a favourable attitude toward the environment does not strongly predetermine support for all possible policies ($r = 0.05$). Rather, as Fig. 3.1 shows, respondents with a high valuation of the environment (high scores on the x axis) also rejected policies deemed intolerable, while respondents with low scores on the same scale also supported some policies. Thus, policy design does matter – voters reject insufficient policies or those with controversial elements (i.e., keeping

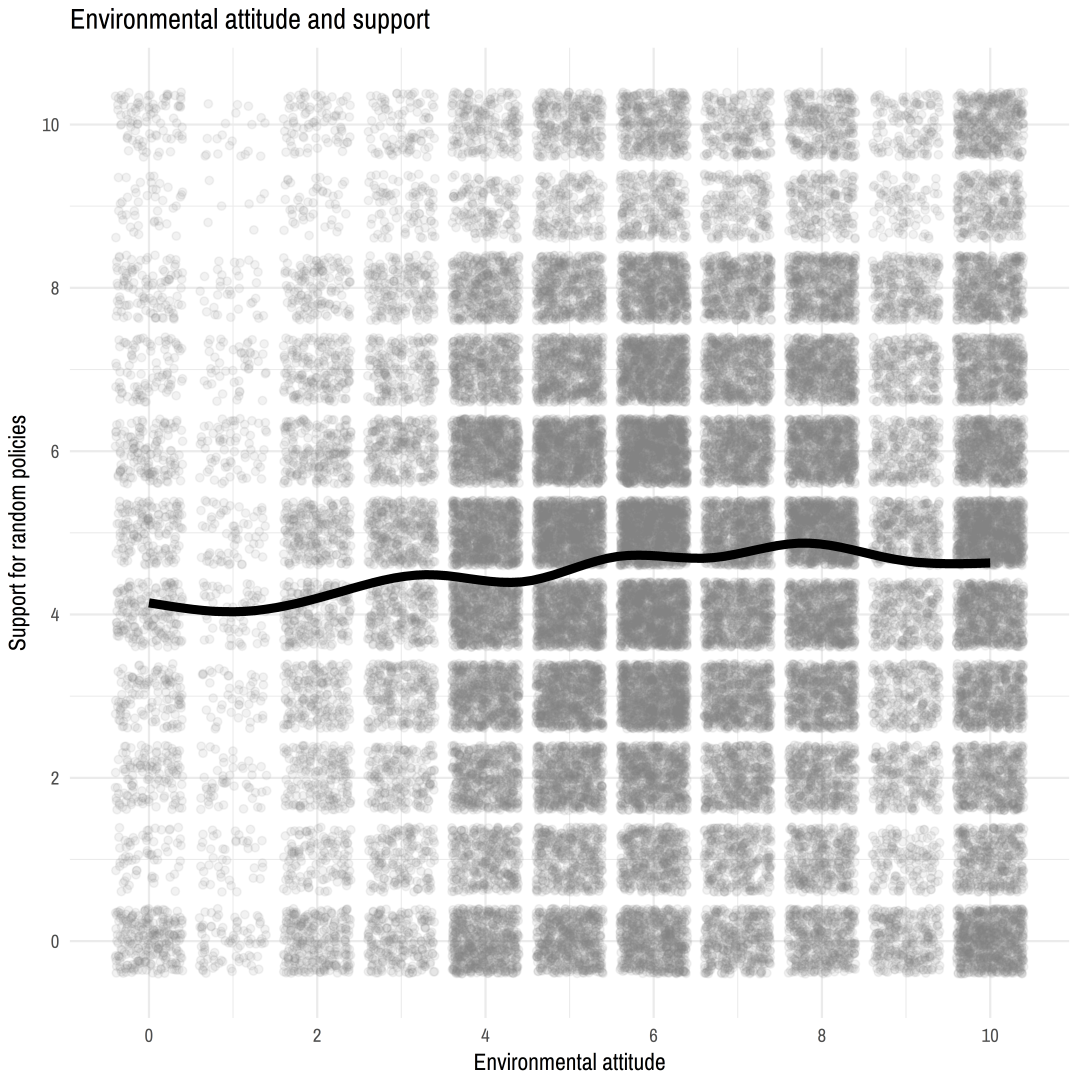

Figure 3.1: Support for policies and environmental attitudes. Line: smoothed conditional means with local polynomial regression fitting. *Note*: The figure represents jittered/scattered points to illustrate frequencies, i.e., the actual values are always full numbers.

nuclear power plants up and running). The specific design of a policy is therefore a pivotal element in environmental decision-making; it explains why general attitudes and specific voting behaviour might diverge, which confirms the qualified support thesis (Bell, Gray and Haggett, 2005).

3.4.1 Influence of policy information on support

The question therefore arises as to what elements of a policy incite rejection and what elements increase support. To answer this, Fig. 3.2 presents the average marginal component effects (AMCE, see Hainmueller, Hopkins and Yamamoto, 2014) depicting the influence of the described policy attributes on the support for policies intended to promote renewable energies. Indeed, support

is dependent on the design of the policy: high costs significantly reduce support, while explicitly prioritizing renewable energy (with an advantage of solar power and renewables in general) and including a provision for the shutdown of nuclear power plants have a positive effect on support. The policy measure, a quite technical provision of the policy, has no significant influence on support, which is similar to the source of funding, where the weak effects suggest a preference for energy-related taxes instead of general taxes. More administrative aspects – i.e., exceptions for energy-intensive industries (significant, but small marginal effect) and the sunset provision of the policy (nonsignificant) – also seem to lack salience in decision-making. However, in the first step of the analysis, the results corroborate previous research on voting on environmental measures by highlighting the relevance of costs in lowering support (Bornstein and Thalmann, 2008; Halbheer, Niggli and Schmutzler, 2006; Thalmann, 2004). For expectations about policy instruments, the results are less unambiguous, although respondents seem to prefer targeted tax measures over general income and value added taxes (Halbheer, Niggli and Schmutzler, 2006; Stadelmann-Steffen, 2011). From the formulated assumptions, I accept hypothesis 1a on the negative influence of costs, while I reject hypothesis 1b stating that policy instruments have an effect through perceived costs.

Conceptually, the results in Fig. 3.1 and 3.2 corroborate the general expectation that the design of a policy has an influence on support as well as Bell et al.'s (2005) suggestion that support is conditional on the specifics of a proposal. Indeed, compared to Hainmueller, Hangartner and Yamamoto (2015), qualifications seem more influential in environmental questions than in ballot decisions on naturalization of immigrants. Moreover, ex ante assumptions about which qualifications are relevant for people are difficult. The policy measure, for example, which defines the promotion of renewable energy technologies, does not seem to be relevant for individuals, although policymakers would likely consider this aspect of the policy to be highly relevant since it defines how the state intervenes in the economy. Two main conclusions are thus possible. First, the results confirm the multidimensional decision-making process; several aspects of a policy are relevant for decision-making rather than only individual aspects of information. Research on environmental decisions should thus include the details of a policy if the researchers want to obtain more valid responses from citizens, addressing the issue of qualified support (Bell, Gray and Haggett, 2005), and getting closer to actual judgment situations (Dermont et al., 2017). Indeed, individuals do reach decisions based on the elements of a policy and systematically process the policy information presented to

them in the analysed experiment (Boudreau and MacKenzie, 2014; Bullock, 2011). Second, it is necessary to consider varying types of policy information rather than only economic aspects (such as costs), policy instruments (such as the type of tax), and administrative questions (such as exceptions). Related policies, illustrated by the salience of the provision on nuclear power in a policy targeted at renewable energies, and soft factors, such as which renewable energy source policymakers prioritized, influence decision-making. The latter also highlights how positive aspects can serve as a 'selling point' in policymaking when combined with less favoured provisions.

3.4.2 Individual characteristics and opinion formation

Is it possible to determine which individuals react to policy details and discriminate more in their policy support? From a theoretical point of view, an answer to this conundrum would identify which individuals engage in systematic processing and are therefore qualified supporters in the field of environmental politics.

In Switzerland, involvement in politics and attitudes about issues increases systematic processing (Kriesi, 2005; Nai, 2010). In the experimental setup, I consider individuals who reacted to the policy information and reported varying support in the 14 repeated tasks as engaging in systematic processing. Within-individual variance of support indicates that individuals react to the treatments in the different tasks, as the displayed attributes vary in each task. The more variance in support a respondent reports, the more she reacts to the policy information treatment and considers elements of a policy as qualifications that lead to higher or lower support of a (hypothetical) policy. For low variance, there are two possible explanations. First, individuals persistently support the status quo (reject all policies) or any change (support all policies) and thus report very similar support regardless of the design. Second, individuals who are less involved with the issue or politics in general resort to less engaging responses that do not reflect the design of the presented policies.

Initially, the variance of support per respondent suggests substantial within-individual treatment effects in responses. In statistical terms, the mean standard deviation is 2.03, and the mean variance is 5.32 (on a scale from 0 to 10; refer to the Supplementary material for further analyses and figures). In order to observe whether this variance is explainable, Fig. 3.3 presents the results of two standard linear regressions. As dependent variables, I use two measures of heterogeneity: distance (the difference between the highest and lowest reported support, reflecting how respondents

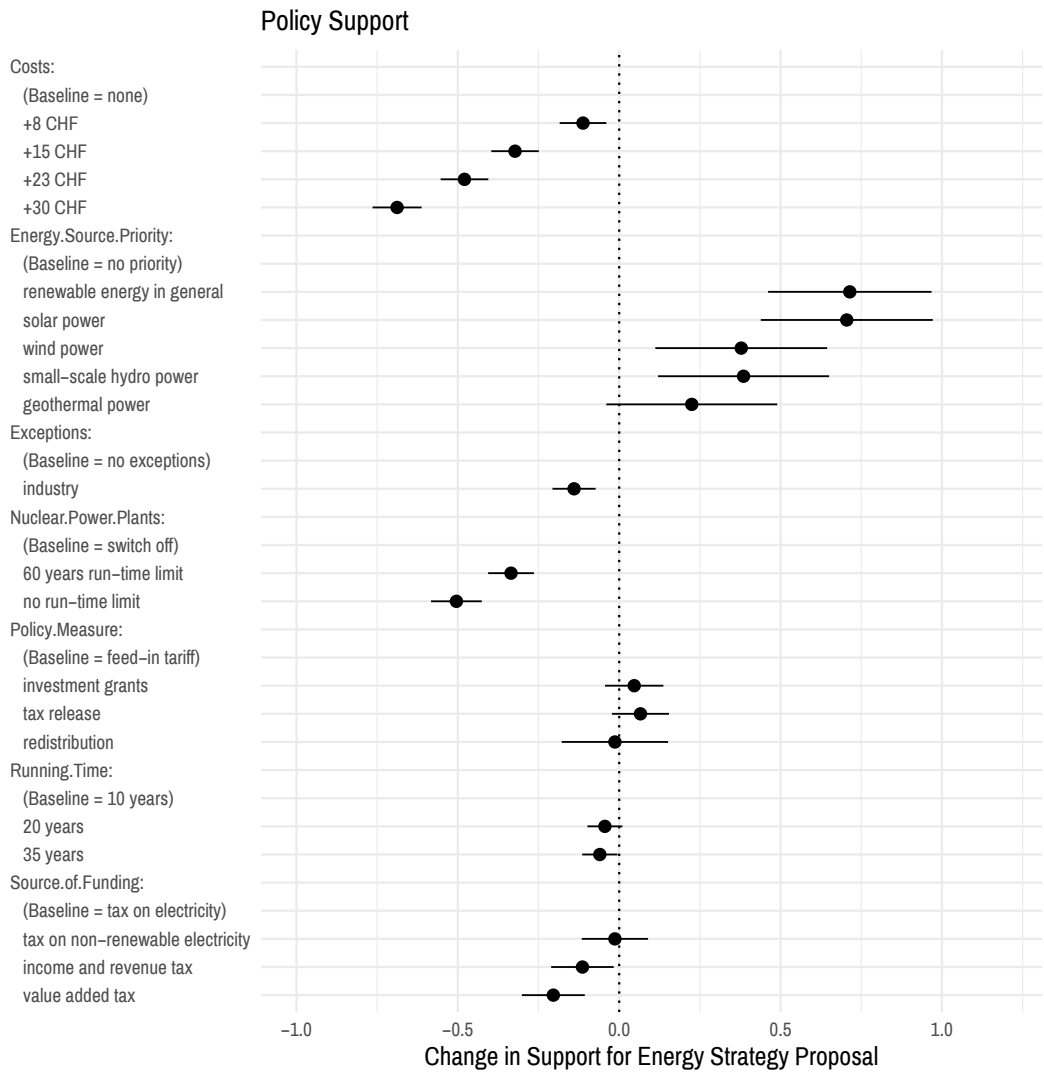

Figure 3.2: Model 1, Average Marginal Component Effects (mean and 95% confidence interval, Hainmueller, Hopkins and Yamamoto, 2014) of policy details on support for energy policy (DV). Reading example: Support for a policy including additional costs is for all values rated lower than a policy without additional costs. A raise in 23 Swiss Francs is therefore in average changing support by -0.5 points on a scale from 0 to 10. *Notes*: clustered standard errors, line ranges denote 95% confidence intervals, CHF = Swiss Francs (approx. 1US$). The Supplementary material provides full results.

used the scale) and the individual standard deviance of support. The independent variables are involvement with politics and the issue at hand as well as demographic characteristics, as described in the measures section. The estimates thus reflect how individual characteristics correlate with more variation in support for environmental measures.

Both with and without individual control variables, respondents with a strong interest in politics and who have more polarized attitudes on the issue at hand are more likely to engage in systematic processing based on the policy details presented to them.[6] However, the results also showed that, contrary to expectations, education and frequent political participation do not influence individual variance. In addition, the results show that language region (i.e., cultural aspects) and age influence the variance of support and that women report less varying support than men.

In other words, individuals with high involvement with an issue are particularly attentive to policy information. This corroborates previous findings on specific involvement (Chaiken, 1980; Kriesi, 2005; Nai, 2010); however, general involvement with politics and education is not unequivocally related to more systematic processing. I therefore reject hypothesis 2a, although the results offer support for the aspect of specific issue involvement leading to more systematic processing, which suggests that qualified supporters are primarily those individuals concerned about the issue at stake.

Since environmentally concerned respondents are more engaged with the decision-making situation than others, the question arises as to whether the marginal effects of policy details are consistent for all individuals or whether they vary according to individual characteristics. Based on the results of models 2 and 3, strong political interest and strong opinions on climate change and environmental protection seem to be the driving factors of more involvement with policy proposals and thus of systematic processing. Therefore, for each of these three characteristics, Fig. 3.4 includes an interaction effect, i.e. Conditional AMCE (Hainmueller, Hopkins and Yamamoto, 2014).[7] Additionally, a split of left, middle, and right across the political spectrum enables the observation of ideological differences.

While the conditional marginal effects are predominantly consistent throughout the different categories included as interaction effects, the most obvious difference by subgroup is in the treatment

[6] Most importantly, the significant effect of strong prior attitudes leading to more heterogeneity in support eliminates the speculation that strong attitudes could lead to accepting or rejecting everything. In contrast, the results indicate that respondents with strong attitudes differentiate more and therefore are more critical and susceptible to qualifications.

[7] With respect to political interest, I separate the sample into strong interest and all the lower levels of political interest; with respect to attitudes toward climate change and environmental protection, I use the median to split the sample into two groups.

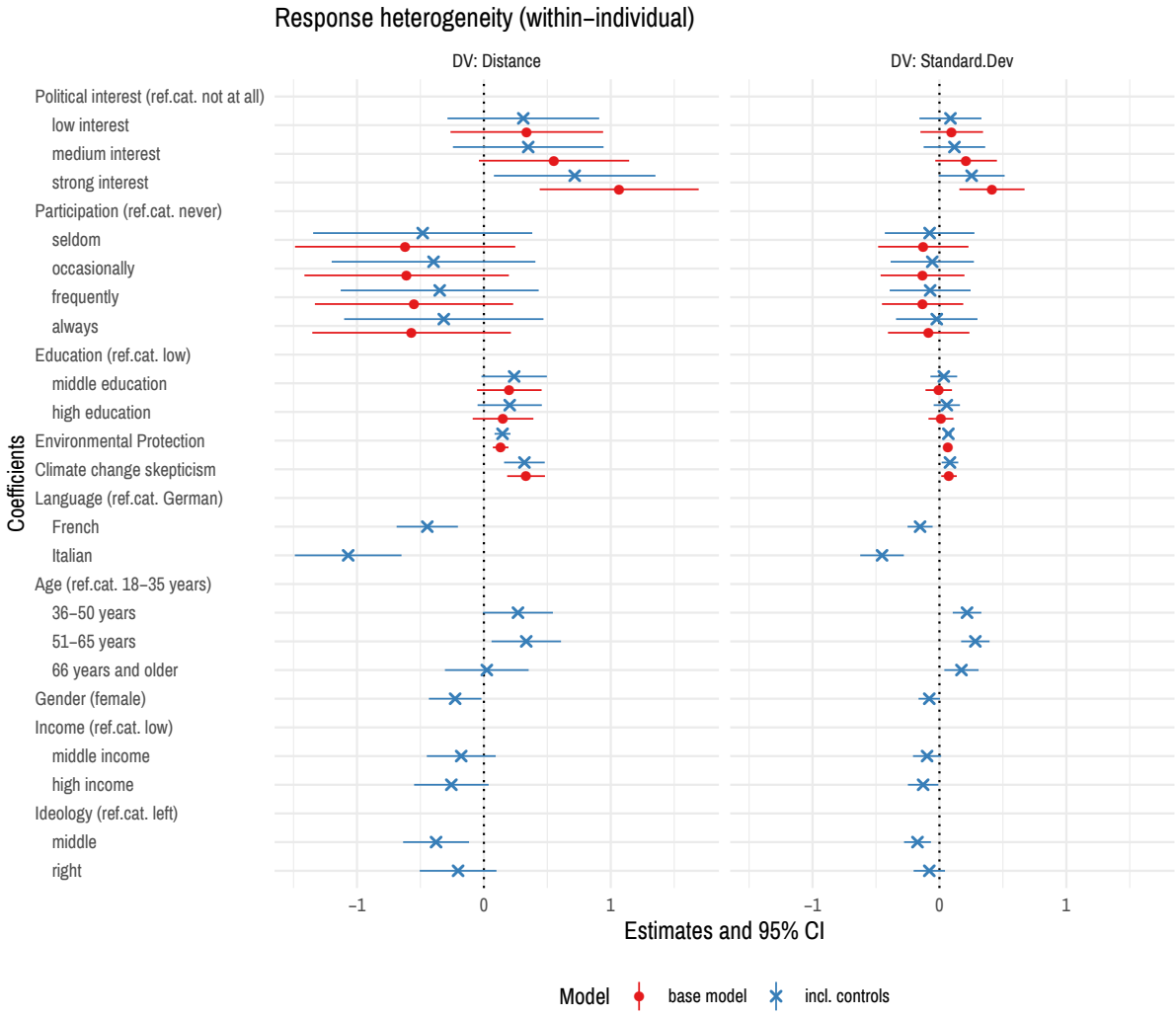

Figure 3.3: Models 2 and 3, hierarchical linear models estimating response heterogeneity for distance and standard deviance as dependent variables, repeated observations nested within individuals. Reading example: Both with and without control variables in the model, individuals with high political interest have a higher heterogeneity as denoted by the point estimate and the line range (95% confidence interval). *Note*: the Supplementary material provides full results.

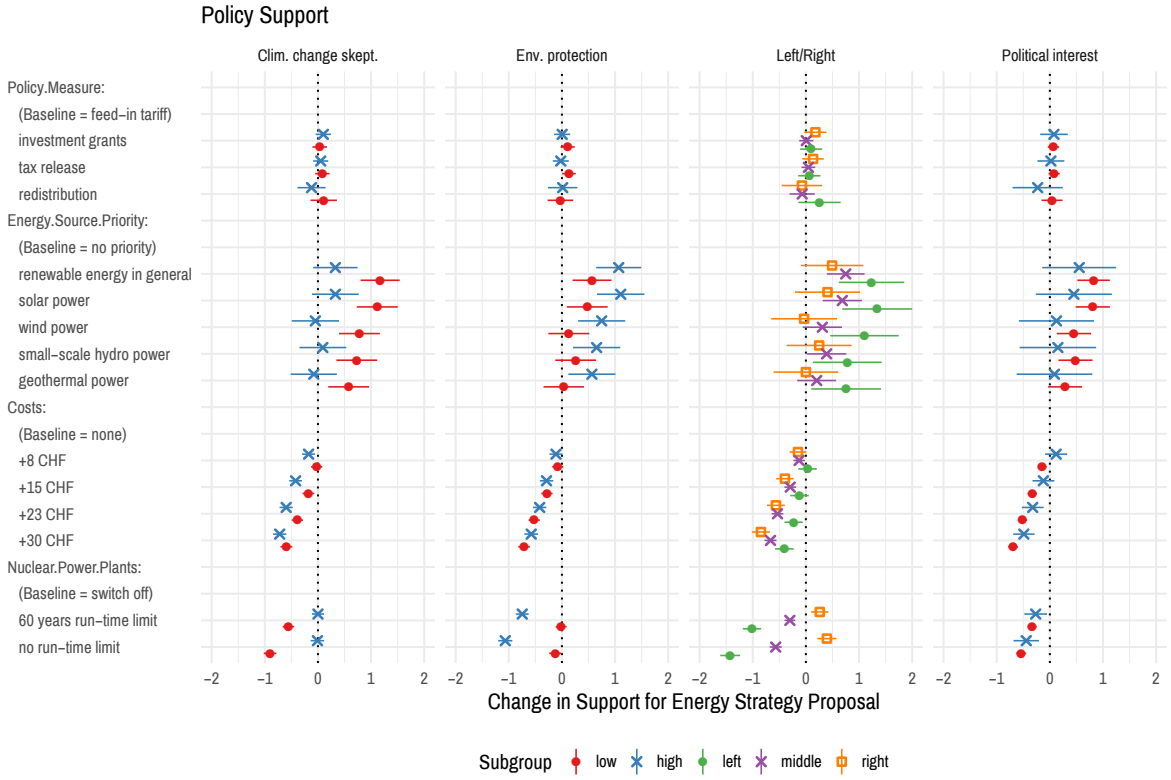

Figure 3.4: Model 4, Conditional Average Marginal Component Effects (mean and 95% confidence interval, Hainmueller, Hopkins and Yamamoto, 2014) of selected policy details on support for energy policy (DV) with interaction effects for climate change scepticism, environmental protection attitudes, political interest, and political ideology. *Notes*: clustered standard errors, line ranges denote 95% confidence intervals, CHF = Swiss Francs (approx. 1US$). The Supplementary material provides full results.

of nuclear power plants. With respect to this policy aspect, not limiting the run-time of nuclear power plants only significantly lowers the support of individuals who are convinced that climate change is humanly induced or who prefer environmental protection rather than the use of nature's resources. For right-wing citizens, the effect is the opposite: not restricting nuclear power leads to higher support. Also, in contrast to the citizens who care about climate change, citizens who are sceptical about climate change do not systematically discriminate according to which energy source a policy measure prioritizes. A similar picture is observable for political interest, which highlights the differences in certain subgroups' consideration of policy information.

Hypotheses 2b and 2c anticipated that lower involvement would moderate the effects of certain attributes on policy support. However, as the marginal effects are largely consistent across groups for costs and the policy instrument, I reject the hypotheses. Low involvement does not lead to a stronger effect of costs on support, and policy measures are not more salient for individuals with high involvement. Nevertheless, the differences in attitudes and political interest show how some policy details are more relevant for subgroups, albeit not the details that previous related research suggest. In contrast, Fig. 3.4 shows that differences in preferences are relevant for two aspects of environmental measures that the public regularly discusses: nuclear power plants and the new renewable energy technologies toward which the public expresses greater acceptance.

3.5 Conclusion

In this analysis, I investigated how public support for energy policy depends on the specific design of a policy. Specifically, using a conjoint experiment for simulation purposes, I examined how voters consider detailed policy information in environmental decision-making. In summary, the analysis illustrates that citizens do indeed consider policy information in forming their opinions. Providing voters with the specifics of a proposal allows us to analyse which elements of a policy incite opposition among voters who would generally be in favour of a target (Bell, Gray and Haggett, 2005), while individuals who are more concerned with the environment and climate tend to react to such qualifications. The results suggest that costs are particularly influential, while policies toward the promotion of new renewable energy sources still closely link to nuclear power. The specific type of policy instrument used to promote renewable energies, in contrast, seems less salient in individual decision-making.

The results show that policy design is a pivotal element of evaluation of policies. Just because an individual is generally in favour of environmental protection does not automatically lead to support for any promotional measures for renewable energies (Bell, Gray and Haggett, 2005; Dermont et al., 2017). The results demonstrate that citizens consider the presented policy information when making decisions, which illustrates that unfavourable aspects of a policy that do not meet the conditions that individuals set for supporting a policy cause the gap between general attitude and specific voting behaviour (Bell, Gray and Haggett, 2005). Moreover, from a conceptual point of view, it is both possible and necessary to provide respondents with varied policy information, as it reflects the multidimensional character of decision-making and allows respondents to focus on the aspects they consider relevant. As Mondak (1994, 170) pointed out, the "contexts in which actual political judgements are made differ from the isolation of the laboratory". Presenting respondents with only one policy detail or a few vague aspects of a policy suggests an artificial information environment where citizens are not exposed to contradictory information. Giving individuals comprehensive information about policies in surveys and allowing them to decide on which aspects of these policies they want to focus better reflects the context of decision-making and campaigns in direct democracy, thus leading to more valid results and insights into public opinion.

This more substantiated approach of a conjoint experiment, as distinct from those of Bullock (2011) and Boudreau and MacKenzie (2014), provides a more thorough account of the use of policy information and the relevance of policy design in forming an opinion. It therefore offers more detailed feedback on public preferences for policymakers designing future policies that need public support. Insights into acceptance of renewable energies specifically and new technologies generally are thus more valid if researchers present respondents with comprehensive information, and include, especially, possible negative conditions of policies that might incite opposition.

However, several questions remain. Most importantly, this analysis has not considered alternative paths of decision-making besides systematic processing. For instance, it did not consider heuristics such as party cues or attempt to include local, social and personal determinants or consequences in the analysis. Moreover, the debate in Switzerland on renewable electricity and nuclear power plants is ongoing. Researchers should consider the campaign before a vote to arrive at a more comprehensive overview of policy information and its effect on opinion formation in environmental policy (Bolsen, Druckman and Cook, 2015; Chong and Druckman, 2007; Kriesi, 2012). Lastly,

researchers should implement conjoint experiments in other countries with similar and divergent settings to assess the generalizability of the results from a strong direct-democratic country such as Switzerland. Also, confirming or rejecting the results with other political issues would enable a clearer assessment of the external validity of the results.

Although this study prompts the need for further research, the use of a multifactorial survey experiment to research voters' behaviour has advantages compared to more traditional approaches of voting research generally. Primary among these advantages is that multifactorial results capture decision-making and reasoning in a more nuanced way. I have therefore described a suitable approach to address the puzzle of social acceptance as a substantial hurdle to the success of policies and for the understanding of individual behaviour.

3.A Appendix

To promote electricity production from renewable energies (small hydro power, solar power, wind power, geothermal power), the federal government wants to provide new means. This could be implemented in different ways.

Characteristics	Variant 1	Variant 2
Energy source to be promoted		
Financed through		
Measure		
Costs per household		
Exceptions		
Existing nuclear power plants		
Running time		

Which of the two variants do you prefer?

How likely is it that you would approve the variants in a referendum?

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Variant 1											
Variant 2											

Figure 3.5: Experimental Design: Exemplary setup of the question with the choice and support answers. For each respondent, attribute order was randomized, and for each repeated presentation the attributes displayed were randomized individually, i.e., no respondent received the identical version of the experiment. *Note*: Description of the attributes in the Supplementary material.

Chapter 4

The unpopularity of incentive-based instruments: what improves the cost-benefit ratio?

Whereas ecological economists argue strongly in favor of incentive-based approaches to promote renewable energy sources and reduce energy consumption, those instruments have been shown to be particularly difficult to implement politically. We begin with a recognition that cost perceptions that inherently characterize incentive-based policy instruments are a fundamental reason for their unpopularity. We therefore argue that the crucial question that policymakers need to address is how the benefit-cost ratios of incentive-based instruments can be altered in ways such that their inherent costs become acceptable. By focusing on the various features of these instruments, we propose three strategies for answering this question theoretically: objectively reduce the costs, reduce the visibility of the costs, and identify compensation strategies, i.e., strengthen the benefit side of the equation. Based on a conjoint analysis for Switzerland, our results demonstrate that reducing objective and perceived costs may indeed strengthen support for incentive-based policy instruments, whereas cost compensation does not seem to work as well. We show, moreover, that the latter can be explained by the fact that substantial numbers of voters do not understand or are not convinced by the commonly proposed mechanism of environmental taxes. Given that voters do not believe in the usefulness and efficacy of incentive-based policy measures, no cost compensation is feasible.

Note This chapter is the accepted manuscript of an article co-authored with Isabelle Stadelmann-Steffen and published in *Public Choice* as Stadelmann-Steffen and Dermont (2018*b*), doi:10.1007/s11127-018-0513-9.

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4.1 Introduction

Transitioning from fossil fuels and nuclear energy to a renewable energy age is a challenge for many industrialized countries. In addition to scientific progress, one of the main concerns is how to implement and promote new technologies and solutions politically. In this context, many countries have introduced "soft policies" (Carattini et al., 2017), for instance, voluntary self-regulation (Baranzini and Thalmann, 2004; Ingold, 2008) or traditional subsidies for renewable energies (Marcantonini and Ellerman, 2014), which, however, are either not effective enough in terms of goal attainment or financially very expensive. By contrast, incentive-based steering mechanisms (e.g., incentives or environmental taxes) are widely acknowledged to be the most effective and economically efficient instruments, since they generate continuous and long-term incentives for environmentally friendly innovation and practices (Carattini et al., 2017; Deroubaix and Lévèque, 2006; Jaffe, Newell and Stavins, 2002, 2005; Parry and Williams, 1999; Rausch and Karplus, 2014; Vollebergh, 2007).

However, policymakers only recently have given more attention to such incentive-based approaches, whereas conventional environmental regulations (i.e., rules and bans) tend to be more popular with respect to practical implementation (Felder and Schleiniger, 2002; Kirchgässner and Schneider, 2003). One important reason for the difference is that the introduction of incentive-

based policy approaches is particularly difficult, mainly owing to problems of social acceptance and political feasibility (Dresner et al., 2006, 896). In fact, voters seem to prefer regulation and prohibition to market-oriented policies (Deroubaix and Lévèque, 2006; Kirchgässner and Schneider, 2003, 375; Stadelmann-Steffen, 2011). That aspect of the policy problem is particularly relevant in political contexts that integrate citizens directly into the policy-making process by means of direct democracy. Previous research has 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). Typically, this dilemma has been attributed to the 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., 2017).[1]

The present study aims at gaining a better understanding of why citizens do not support incentive-based policy instruments promoting renewable energy and reductions in energy consumption, and also whether and how their popularity might be increased. Previous research has demonstrated that the cost perceptions related to incentive-based policy instruments are one of the main reasons why those instruments are so unpopular (Kirchgässner and Schneider, 2003, 375; Oberholzer-Gee and Weck-Hannemann, 2002; Stadelmann-Steffen, 2011). However, since the costs, i.e., typically new or higher taxes, are a fundamental and inherent feature of such policies, they cannot be avoided when attempting to increase their popularity. Hence, in this paper, we argue that the crucial question that policy makers need to address is how the unpopular costs of a policy proposal can either be reduced or compensated for. In other words, the following is the main research question of the present study: *Which features of incentive-based policy instruments can alter the cost-benefit equation in a way that inherent costs become acceptable?*

Incentive-based instruments, in this article, are conceptualized as incentive packages that contain a tax and/or a subsidy. From the citizens' perspective these instruments therefore have a cost side (generating some revenues for the state) and a benefit side (related to how the revenues are spent/redistributed by the state). Thus, our main interest is on the specific design of a policy, i.e., the elements of a policy instrument (Howlett, Ramesh and Perl, 2009). *Policy instruments* have been defined as the measures of state action adopted to solve a political problem (Cairney, 2011). In the

[1] In a similar vein, also some (usually large) firms in the energy industry prefer command and control regulations to taxes because the former can be influenced to gain competitive advantages over their smaller rivals.

literature, in addition to persuasive measures, the main distinction is between incentive-based and regulatory policies (Vedung, 1998). In the following sections, we argue that to explain policy support (by citizens), we need to go beyond this dichotomy and consider the various elements of a policy proposal more specifically (see also Kemp and Pontoglio, 2011; Vollebergh, 2007, 3). For example, the design of an energy tax has many possibilities. First, the question arises as to *what* is taxed, i.e., fuels and combustibles, electricity coming from non-renewable sources or electricity in general. Second, a tax can vary as to *whom* is taxed, i.e., consumers and/or producers. Third, the tax rate can be *higher* or *lower*. Fourth, the revenues collected through such taxes can be *spent* differently: the money can be allocated to promote renewable electricity production, or it could be redistributed to citizens (in different ways). These brief examples show that one policy proposal contains myriad dimensions, out of which some may be more popular, whereas others may be contested.

The present study contributes to the existing literature in three respects. First, *theoretically*, it combines public choice reasoning about individual cost-benefit calculations with an understanding of policy support as involving multidimensional choices. That approach not only helps to provide an understanding of an instrument's low popularity, but also involves some strategies for policy design that may help to increase public support for these instruments. Second, and relatedly, the present study *conceptually* proposes a decomposed perspective on incentive-based policy instruments by focusing on their various elements. Such a strategy accords with previous research concluding that the impact of environmental policy instruments may depend more on design features than the general instrument type itself (see also Kemp and Pontoglio, 2011, 34). We expand that reasoning to the social acceptance of incentive-based instruments. Third, *empirically*, we present the results from a novel, large-scale representative survey from Switzerland. A forced-choice paired conjoint analysis (Hainmueller, Hopkins and Yamamoto, 2014) enables us to evaluate how specific aspects of an incentive-based policy proposal influence individual support for or rejection of a whole proposal. Our approach helps us to identify the drivers and red lines for the popular support of a proposal. The Swiss case is particularly suitable in this respect, since citizens – owing to the frequency of direct-democratic ballots – are familiar with this kind of personal decision-making and with indicating their support or rejection of (alternative) policy solutions. Furthermore, by using 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 in the near future.

The remainder of the present study is structured as follows. In the following section, we present our theoretical framework by discussing different mechanisms that may alter the benefit-cost ratio of incentive-based renewable energy policy instruments. Next, we introduce the methodological approach, the data and their operationalization. In Section 4.4, we present our empirical findings. The study ends with a summary of the most important results and conclusions.

4.2 Theory

As mentioned in the introduction, the starting point of this study is a puzzle regarding the choice of policy instruments for environmental policy in general and energy policy in particular. In that context, environmental economists argue strongly in favor of incentive-based approaches (Carattini et al., 2017; Deroubaix and Lévèque, 2006; Jaffe, Newell and Stavins, 2002, 2005). What is most important, incentive-based policy instruments are considered to be most effective for environmental protection in the long-run, since they generate continuous and long-term incentives for environmentally friendly innovation and practices.[2] Moreover, some researchers have argued for the economic advantages of incentive-based approaches (Carattini et al., 2017; OECD, 2008; Rausch and Karplus, 2014). However, such policy instruments have been shown to be particularly difficult to implement politically, whereas conventional regulatory approaches (i.e., rules and bans) tend to be more popular for purposes of practical implementation (Felder and Schleiniger, 2002; Kirchgässner and Schneider, 2003). Moreover, voters seem to prefer policies of regulation and prohibition over market-oriented policies; so, too, do regulated firms (Deroubaix and Lévèque, 2006; Kirchgässner and Schneider, 2003, 375; Stadelmann-Steffen, 2011).

Scholars have demonstrated that the cost perceptions that characterize incentive-based policy instruments are a fundamental reason for their unpopularity. Based on the public choice approach, (Kirchgässner and Schneider, 2003, 375) have argued that with respect to environmental policy, voters generally must choose between a better quality environment (in the future) and a higher real income today, and they tend to prefer the latter (see also Bornstein and Lanz, 2008). In general, that preference may lead to an insufficient supply of environmental policies. Moreover, the individual cost-benefit calculation may be biased towards traditional regulatory policies in which costs are less

[2]However, empirically, the superiority of incentive-based instruments is less clear. For example, it has been shown that the effectiveness of incentive-based instruments may be limited regarding large-scale innovations (e.g., Kemp and Pontoglio, 2011) and, more generally, because of a rather inelastic demand for energy in the short-run (OECD, 2006, 50).

visible to voters compared to incentive-based instruments: "voters may have the impression that an improvement of the environment could be reached by means of regulations and prohibitions without costs, i.e., without reducing the income of the average citizen" (Kirchgässner and Schneider, 2003, 375). That "cost-illusion" (Schulz, 2001) implies that traditional policies are perceived to be more equitable and fairer (Deroubaix and Lévèque, 2006, 947).

To put it bluntly, the nature of environmental policy in general and incentive-based instruments in particular lead to a situation in which the costs related to a policy proposal are immediately tangible and visible for individual households, whereas the potential benefits of the policy are much less so. In the following section, we begin with a recognition that the costs, i.e., typically new or higher taxes, are an inherent feature of such policies. Thus, the crucial question that arises is how the individual benefit-cost calculation related to incentive-based instruments can be altered to raise support for those instruments. By focusing on the various elements of such instruments, we propose three strategies for answering that question: objectively reduce the costs, reduce the visibility of the costs, and offer compensation, i.e., strengthen the benefit side of the equation.

4.2.1 Reducing objective costs

The most obvious way to reduce the visible costs is to *really* reduce the costs. Thus, lower tax rates bring the personal costs of the policy down and increase the probability that the individual benefit-cost ratio will be positive. Previous research has demonstrated that popular support for green taxes is greater when the tax is small and many exceptions are available, e.g., for energy-intensive firms (Buchanan and Tullock, 1975; Thalmann, 2004). Although that strategy may make incentive-based instruments more socially acceptable, it also may reduce the environmental impact of those instruments, a tradeoff that typically characterizes environmental policy instruments (Goulder and Parry, 2008; OECD, 2008, 13). Nevertheless, we formulate the following hypothesis:

H1 The lower the objective costs are for households, the greater will be public support for incentive-based policy instruments.

4.2.2 Reducing perceived costs

The cost factor in the individual benefit-cost calculation also could be altered by changing the *perceptions* of cost, which are related to their visibility (OECD, 2006, 152). Although we have argued

previously that incentive-based policy instruments are characterized by very visible costs, visibility is still a matter of degree. Variations in incentive-based instruments may create varying individual perceptions of the costliness of individual instruments. Incentive-based instruments typically involve taxes, which can be used to provide incentives to reduce non-desired behavior (e.g., taxes on electricity consumption), or to finance policies that stimulate desired behavior (e.g., grants-in-aid or feed-in tariffs, i.e., guaranteeing prices for fixed periods of time for electricity produced from renewable energy sources; see Goulder and Parry, 2008; Howlett, 2005; Howlett and Ramesh, 1993; Windhoff-Héritier, 1987). In that context, Gingrich (2014) has argued that direct taxes (on income or revenue) are more salient to citizens than indirect taxes (on consumption). In other words, direct income and revenue taxes are perceived as costlier and more inescapable than indirect ones. Moreover, regarding the latter, a consumption tax that follows the 'user pays' principle may not only appear avoidable to a certain extent, i.e., my personal behavior can influence how much I have to pay, but also better represent the norms of fairness and equality. Those latter aspects have been shown to be important triggers for public acceptance, mainly with respect to implementation processes ((OECD, 2006), 151; Wolsink, 2007), willingness to pay (Ajzen, Rosenthal and Brown, 2000) and compliance with such measures (e.g., Hartner et al., 2008) – which implies that the arguments concerning fairness and equality also can be used to support policy measures:

H2 Incentives funded by indirect taxes that follow the 'user pays' principle rather than by direct (income) taxes are more likely to be supported by citizens.

4.2.3 Compensating the costs, or how to strengthen the benefit side

The third strategy is to alter the benefit side of the benefit-cost equation. In other words, incentive-based policy instruments need to provide some (perceived) benefits to voters that compensate for the instruments' costs. In other policy areas, particularly regarding welfare state reforms, compensation has been identified as a crucial mechanism for increasing public support of a proposal (Bonoli, 2000; Häusermann, 2010; Häusermann, Kurer and Traber, 2016). Structurally, however, as previously discussed, incentive-based policy instruments are dominated by (short-term) costs, whereas a benefit, i.e., better environmental quality, tends to materialize only in the long-run and remains to a certain degree uncertain. In this context, we suggest two mechanisms by which compensation may occur.

On the one hand, a measure may provide some material benefit. For example, when implementing an environmental tax, the revenues collected from taxes on electricity or energy consumption may be redistributed to the taxpaying public. According to Kirchgässner (1997; see also Thalmann, 2004), fully redistributing revenues from green taxes might be an important trigger for popular support. From a personal cost perspective, redistribution means that electricity-saving behavior may result in a financial benefit. In contrast, another classic example of an incentive-based policy instrument is the provision of economic incentives for technological innovation (e.g., investment funds, feed-in tariffs). From a household's perspective, such policies are dominated by the cost side: households pay through taxes, whereas the main beneficiaries are business enterprises (and maybe also a small group of consumers, i.e., so-called prosumers). Hence, taking the cost compensation argument seriously, citizens should prefer redistribution over investment- or a performance-based instrument:

H3 Citizens prefer incentive-based instruments that redistribute tax revenues to the taxpayers rather than spending the revenue on promoting the production of renewable electricity generation.

A second compensation mechanism works when voters are convinced that a policy instrument will have a future benefit, and when they hold a favorable attitude towards the target of that instrument. Put simply, if an individual thinks that a policy measure will be useful and effective for reaching a goal she/he supports, he/she will be more likely to be willing to bear the costs. Quite clearly, believing in the usefulness of renewable energy policies is contingent on environmental and ideological attitudes (we discuss this relationship in more detail below). However, we argue that the perception of how useful and effective an incentive-based instrument will be also depends on policy design, i.e., the measures that an incentive-based instrument contains. During the last decade, for example, feed-in tariffs have been considered to be the most effective tool for promoting the acceleration of renewable energy production (Couture and Gagnon, 2010). In contrast to investment-based policy measures, feed-in tariffs reward actual performance. However, most recently and against the background of the German experience, feed-in tariffs also have been criticized for being inefficient and too expensive owing to the over-market prices paid to the producers of renewable electricity.[3]

[3] For example, see "Are the Legacy Costs of Germany's Solar Feed-In Tariff Fixable?", http://www.greentechmedia.com/

This discussion may have influenced some citizens' perceptions of feed-in tariffs' usefulness.

H4 Citizens prefer incentive-based instruments that they perceive to be useful and effective means for achieving a formulated target.

4.2.4 The logical extension: differences based on ideological predisposition?

As mentioned previously, and even from a public choice perspective, citizens' decisions on renewable electricity policies can be expected to be influenced by political and environmental values. Most generally, it has been show in various contexts that a left-green ideology, i.e., rating environmental protection as important, corresponds with a greater likelihood of voting environmentally friendly (Bornstein and Lanz, 2008; Bornstein and Thalmann, 2008; Deacon and Shapiro, 1975; Halbheer, Niggli and Schmutzler, 2006; Kahn and Matsusaka, 1997; Sciarini, Bornstein and Lanz, 2007; Stadelmann-Steffen, 2011). However, and most important in our context, ideological factors might not only affect the general electoral support for energy policies that promote renewable energy production and lower energy consumption, but also *affect* the costs and benefits of the voting decision (Bornstein and Lanz, 2008, 431). For instance, given that center-right individuals tend to have weaker pro-environmental values (Bornstein and Thalmann, 2008; Sciarini, Bornstein and Lanz, 2007), the cost argument should particularly matter for their voting behavior. In contrast, left-wing voters may not only support more strongly the goal of renewable energy policies, but also be more inclined to believe in the usefulness and efficacy of these policies. Hence, a favorable attitude towards cost compensation may be more likely to occur in the latter voter group.

In accordance with (Bornstein and Lanz, 2008, 431), considering ideological factors in an analysis of vote choice is not only a "logical extension" of the public choice approach, but also is important for capturing potential varying cost and benefit effects. Hence, to grasp the potentially different perceptions and evaluations of benefit-cost considerations by different voter groups, we examine whether the role of specific policy instrument features vary contingent on a citizen's ideological predisposition.

articles/read/germany-moves-to-reform-its-renewable-energy-law (retrieved on August 4, 2016) or "Ineffizient und zu teuer", http://www.nzz.ch/mei-nung/kommentare/ineffizient-und-zu-teuer-1.18657976 (retrieved on August 4, 2016).

4.3 Research design

4.3.1 The methodological approach: a conjoint analysis

From the literature and the specific research question at hand, two major issues arise when investigating citizens' support for proposals to promote renewable energy production and reduce energy consumption. First, support needs to be captured in a way that actually reflects voting behavior and not only mere opinions; second, we should recognize that support for incentive-based policy measures at the ballot box involves multidimensional choices, i.e., a specific ballot proposal consists of various elements out of which a voter may like some while rejecting others. Therefore, an individual vote decision is the result of balancing the pros and cons of a proposal.

Both issues can be approached methodically by implementing a factorial survey experiment in which respondents are asked to rate various policy proposals (see Fig. 4.1). In contrast to single-item questions (e.g., "Would you support an incentive tax to reduce energy consumption?"), the results of a factorial survey experiment reflect preferences for various designs of energy policy proposals and thus get closer to a realistic vote decision for which not a single attribute but a combination of multiple factors is relevant to the vote choice. Methodologically, this paper follows Hainmueller, Hopkins and Yamamoto (2014) and Bechtel and Scheve (2013) by applying a randomized conjoint design. Since each respondent is exposed to seven paired policy proposals, we were able to collect enough information on all of the different attribute combinations.

To contextualize the stated preferences experiment, we explicitly asked respondents to envisage their decision as a vote that would be cast on the following Sunday. For each paired policy variant, respondents had to indicate which one she/he would choose in a confrontational vote (*choice answer*) as well as for both proposals individually, i.e., "how likely they would approve the variant in a referendum" on a scale from 0 to 100% in decimal steps (*support answer*). Such a design corresponds to a realistic ballot situation in Switzerland when the government presents a counterproposal to a popular initiative. In that case, citizens are asked (1) whether they are in favor of the two presented proposals individually and (2) which proposal they prefer if both receive a majority of votes. Thus, the electorate can accept both proposals on the ballot (i.e., both proposals can receive more than 50%). If so, the proposal that receives more votes breaks the tie and will be implemented. More generally, the frequency of direct-democratic ballots in Switzerland implies that Swiss respondents are quite familiar with the decision situation mimicked in the conjoint analysis, which can be expected

To promote electricity production from renewable energies (small hydro power, solar power, wind power, geothermal power), the federal government wants to provide new means. This could be implemented in different ways.

Characteristics	**Variant 1**	**Variant 2**
Energy source to be promoted		
Financed through		
Measure		
Costs per household		
Exceptions		
Existing nuclear power plants		
Running time		

Which of the two variants do you prefer?

How likely is it that you would approve the variants in a referendum?

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Variant 1											
Variant 2											

Figure 4.1: 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 increase the validity and consistency of their responses.

Although an experiment never has the same consequences as a real-world vote and therefore by definition has advantages mainly with respect to internal rather than external validity, we argue that the chosen conjoint design offers ideal conditions for analyzing voter decisions at the ballot for several additional reasons. First, we argue that deciding based on a conjoint table (see Fig. 4.1), i.e., the key elements of a proposal, corresponds quite closely to voters' real-world decision-making. On the one hand, many citizens are likely not to be informed at a profound level about the proposal at stake, but rather take several key points mentioned in the pre-ballot campaign (and party positions) as cues for voting yes or no (Kriesi, 2005; Kriesi, 2012; see also Chong and Druckman, 2007; Lupia, 2015). In that sense, the effect of the abstract content in a conjoint table (for example, compared with a vignette design) plausibly corresponds to mentioning the main issues that arise during a campaign, which eventually are weighed by citizens in making their decision. Second, the factorial survey experiment approach captures a citizen's behavioral component by asking for his/her likely support (voting yes) instead of how she/he feels about a certain policy instrument without providing the context of a specific policy proposal. Hence, we argue that the factorial survey design not only enables us to at least partly overcome the value-action gap (Bell et al., 2013; Kollmuss and Agyeman, 2002), but also brings us closer to measuring actual support (van Rijnsoever, van Mossel and Broecks, 2015; Dermont et al., 2017) for the energy policy proposals studied. Third, a conjoint choice experiment perfectly fits our theoretical argument in that the support for policy instruments depends heavily on their specific components and how important it is to identify the combinations of those components that are most popular among citizens (Hainmueller, Hopkins and Yamamoto, 2014, 3). Fourth, environmental policy questions are prone to a social desirability bias, i.e., people pretend to be more environmentally-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.).

4.3.2 Data

The analyses presented herein are from Switzerland, the home of the most direct democratic decision making in the world. In the discussions about a transition from nuclear and fossil fuels to renewable sources of energy, the Swiss government in its *Energy Strategy 2050* proposed, among other things, a

steering scheme that minimizes state intervention as a long-term aim (Swiss Confederation, 2015). Although a first set of measures that focused on the promotion of renewable energy production and greater energy efficiency was supported in a popular vote on May 21, 2017, still up for debate are whether and how to introduce such a steering system.

The data set used in this contribution was collected between March and May, 2016. The trilingual survey[4] on future energy provision in Switzerland contains 8287 responses 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 41.7%. The demographic and structural composition of the final sample corresponds quite closely to the Swiss resident population (see Tab. 4.2 in Appendix 4.A). This is particularly true with respect to gender, civic status, and education. Foreigners living in Switzerland as well as citizens over 75 years of age had lower response rates, which likely is explained 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 exceptions being that support for the larger parties is comparatively stronger in our sample, and the ideological positions of the respondents on the left-right scale is somewhat less polarized.

The survey comprised two conjoint modules, whereby respondents were assigned randomly to one of the two. The module on policy support used in the present paper was answered by 4146 individuals.

A second data source on which we relied for the empirical part of our study is a survey that was conducted after a vote on a popular initiative called the "Green economy" in September 2016. That initiative, which was rejected clearly by the citizenry, aimed at committing the country to achieving a sustainable use of natural resources by 2050. The survey included five items (see Tab. 4.4 in Appendix 4.A) relating to the economic modeling assumptions of environmental taxes to capture respondents' agreement or disagreement with those assumptions. The sample representative of Switzerland was provided by Qualtrics, and also was conducted in three languages.

[4]The survey was conducted in German, French, and Italian, the three most frequently spoken of Switzerland's four national languages. Participants filled out the survey 65.4% in German, 26.0% in French, and 8.6% in Italian. Romansh individuals likely used the German version to respond to the survey.

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

4.3.3 Operationalization and implementation

The main dependent variable indicates support for a given combination of attributes presented to individual survey respondents. 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 proposal at the ballot box (see Fig. 4.1).[6]

The conjoint setup varied on seven attributes (for a detailed description of the attributes, attribute levels and weights see Tab. 4.4 in Appendix 4.A), whereby – according to our hypotheses – we focus on three attributes for our analyses: the policy measure, how the measure is funded, and additional monthly cost per household. Moreover, four other attributes accounted for varying energy sources, the measure's running time, whether exceptions are provided for energy intensive industries, and how to treat nuclear power plants. We presented the policy proposals at random, i.e., reflecting random combinations of attribute levels. The exceptions were for some illogical combinations of attribute levels, which we excluded. We used weights to account for these constraints in the estimations.

The seven attributes were defined based on 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. Since some of the elements of the presented policy proposals were less well known by the electorate (given that no political campaign on those issues was being carried out at the time of the data collection), we tried to provide some basic information on issues mentioned in the survey (explanations of the different energy sources and feed-in tariffs, among others). In addition to pop-up information, we placed a module with single-item questions on energy policy before the conjoint module to encourage respondents to reflect on these issues before answering the conjoint questions. In this vein, we compensated to a certain extent for the lack of a publicity campaign that usually precedes individual decision making.

Owing to the experimental setting and randomized presentation of attributes, and since our interest is in the marginal effects of policy features, the models do not consider control variables.

[6] Although the question format differs from a ballot context in which citizens must cast either a yes or no vote, similar rating questions typically are used in pre-poll surveys in Switzerland. It seems to be a suitable way of reducing the number of 'don't know' answers in a situation in which citizens may not (yet) be totally sure about whether to approve or reject a proposal. To test the robustness of our results, we also estimated the model using a binary coding specification, i.e., individuals who indicated a high probability of voting yes (values of 8 or more out of 10) were assigned a 1 ('support'), whereas all others were coded as 0 ('not support'). The results can be found in Fig. 4.8 in Appendix 4.A, and are almost identical to those presented in the main part of this paper.

However, to test whether the average marginal component effects (AMCEs) vary between societal groups, we estimated further models that considered the interaction effects of demographic and socio-economic characteristics (age, gender, education and language region). Those models, which are available in the Supplementary material, demonstrate that the results presented in the next section are quite consistent across groups.

4.4 Results

In this section, we present our empirical findings. First, we discuss the mean support rates across all policy packages – i.e., all possible policy combinations that were shown to the respondents – so as to estimate the actual (un)popularity of the different variants of incentive-based proposals. In the second step, we focus on the specific elements of the policy combinations to test our hypotheses empirically. Finally, in a third empirical step, we consider the differences in support for incentive-based policies that depend on voters' ideological predispositions.

Fig. 4.2 documents the mean support rates across all possible policy proposals. Initially, it can be seen that the variance in mean support is considerable, ranging basically from almost zero to almost complete support. That finding must be considered against the background that the random combination of the seven policy attributes generates a lot of reasonable policy alternatives, but also produces some very extreme ones (e.g., a very expensive, long-lasting consumption tax whereby revenues would be spent primarily on geothermal power) and some that would barely change anything compared to the status quo (e.g., a feed-in-tariff for renewable energy sources at no additional cost).

However, the most important observation is that a majority of the proposals reaches a mean support of less than 50% (the plot has its highest density below a 50% support rate), which confirms that, on average, incentive-based policy proposals cannot build on broad popular support. Nevertheless, Fig. 4.2 also illustrates that a potential exists for incentive-based instruments to be accepted at the ballot box: for a considerable number of the incentive-based proposals (35%), a majority of the respondents indicated that they would (more) likely cast a yes vote. Hence, the question arises as to the characteristics of these potentially successful policy proposals.

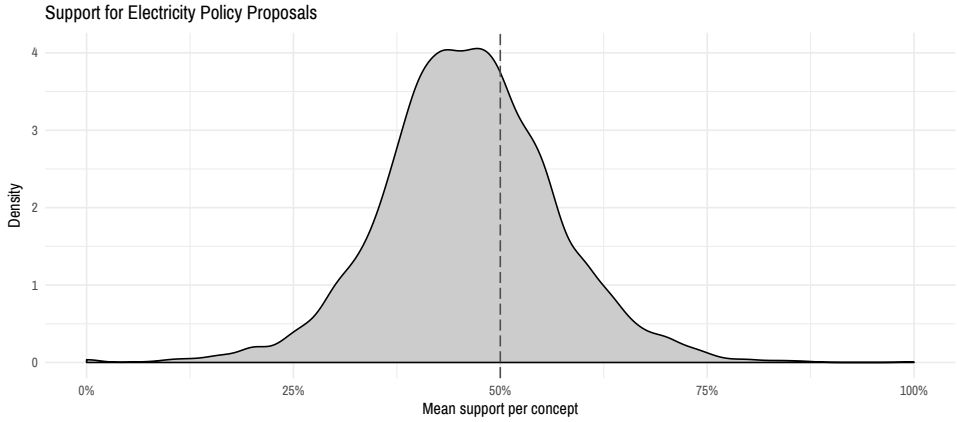

Figure 4.2: Support of electricity policy proposals; mean reported support per proposal.

4.4.1 Varying components of an electricity proposal: what improves the cost-benefit ratio?

To test which attributes hinder or boost support for a proposal, we rely on the so-called AMCE, which represents the "marginal effect of attribute averaged over the joint distribution of the remaining attributes" (Hainmueller, Hopkins and Yamamoto, 2014, 10). Fig. 4.3 depicts the results of the conjoint analysis of the three attributes on which we focus.

Initially, we indeed observe that individuals rely heavily on the cost argument. As soon as a proposal involves *any* additional costs for households, the likelihood that an individual will support the proposition declines. These results strongly corroborate our crucial assumption that the cost factor is an inherent hurdle to citizens' supporting incentive-based policy instruments. Moreover, the level of costs matters: a more or less linear and negative relationship exists between rising costs and the probability that a proposal will be supported by respondents. In other words, and in accordance with Hypothesis 1, the lower the costs involved, the more likely citizens are to support an incentive-based policy proposal.

According to Hypothesis 2, the role costs play in benefit-cost calculations also depends on the visibility of costs, and more precisely on how the money is collected. The analyses show that on the funding side, a consumption tax on electricity is preferred by citizens over proposals funded through general direct taxes or a value added tax (VAT). Put differently, policy measures that are funded by taxes on (non-renewable) electricity consumption are more likely to be supported by respondents than proposals that aim at funding measures financed by direct taxes or the VAT. Hence, these findings can be interpreted to mean that Swiss citizens generally support the 'user pays' principle, which

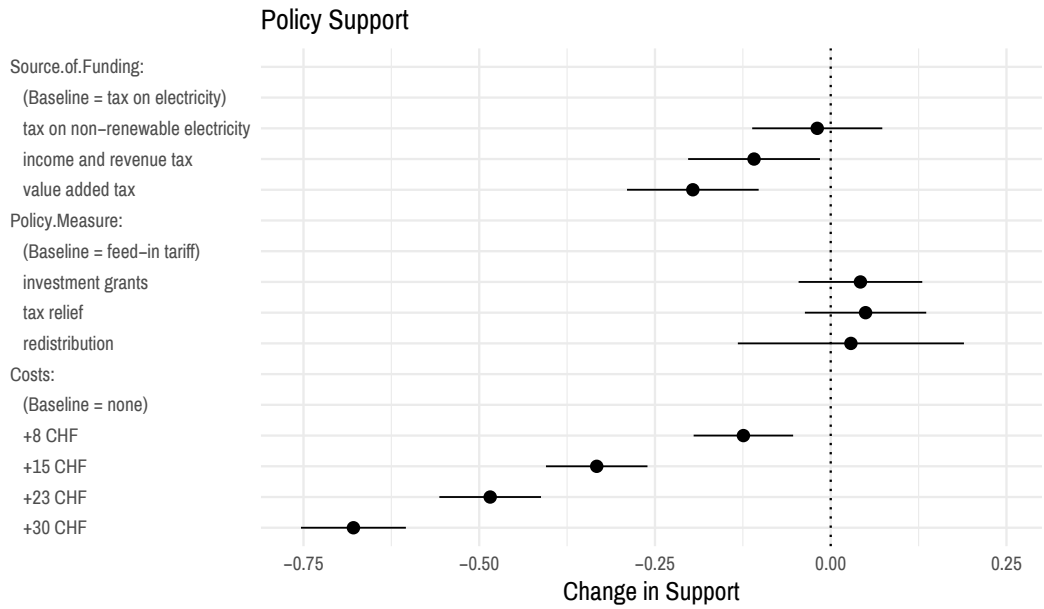

Figure 4.3: Policy attributes and the probability that a proposal is chosen, continuous coding. *Note*: Average Marginal Component Effect (mean and 95% confidence interval). Full results can be found in Tab. 4.4 in Appendix 4.A.

might be seen as fairer compared to general taxes. That result fits our theoretical expectations that less visible and more 'escapable' costs receive stronger support from citizens (Hypothesis 2). However, the probability that respondents will support a specific proposal does not depend significantly on their choosing between the alternatives of taxing electricity consumption in general (i.e., from renewable and non-renewable sources) or electricity consumption generated only from non-renewable sources.

With respect to cost compensation (Hypotheses 3 and 4), we argued that citizens would prefer incentive-based instruments that involve some material benefits (e.g., redistribution of tax revenues) or perceived gains, i.e., the usefulness and efficacy of a policy measure. However, the estimation results initially demonstrate that citizens seem largely to be indifferent about the policy measure on the spending side. Their support is independent of whether the tax revenues are redistributed to the population or used to promote renewable energy production more specifically (e.g., through feed-in tariffs, investment grants, or tax relief).[7] Thus, the empirical evidence does not support Hypothesis 3, which suggests that citizens would – based on a benefit-cost calculation – prefer a redistribution of tax revenues, which may even imply a material benefit for those who consume less

[7]Further analysis not presented here, moreover, revealed that indifference between policy measures persists if the policy measures are interacted with the source of funding.

energy. Similarly, the results also do not imply that citizens would be more supportive of measures aimed more directly at the target of a policy, e.g., investment grants or feed-in tariffs, which would make the effect (i.e., a benefit) more tangible and salient, as stated in Hypothesis 4.

The explanation for this non-finding is at least twofold. On the one hand, the insignificant AMCE for the policy measures could just reflect a real and informed indifference to them. On the other hand, the indifference to the policy measures also could imply that citizens have difficulties understanding the varying incentive-based possibilities for reaching environmental targets, and in particular the logic of environmental taxes (Carattini et al., 2017; OECD, 2006; Thalmann, 2004). If citizens do not understand or acknowledge a measure's intended benefits, it may not be considered in individual decision-making (statistically speaking, that attribute is not relevant to explaining policy support). Since a lack of information about a policy instrument could thus be an important reason for rejecting the unknown, support for incentive-based instruments could be strengthened by informing citizens about the economic assumptions underlying such instruments.

With respect to our research question, the latter interpretation is particularly relevant. From the perspective of Hypothesis 4, it is quite clear that if people do not know or believe in the usefulness and efficacy of an environmental policy measure, any compensation related to its cost burden will not be made. Based on our original data, similar to previous research (e.g., Carattini et al., 2017; Thalmann, 2004), we could not test whether citizens actually understand and believe in the effectiveness of environmental taxes. For that reason, we integrated a five-item question into another population survey that focused on the popular initiative "Green economy," which the Swiss people voted on in September 2016. The results are presented in Fig. 4.4.

As Fig. 4.4 illustrates, a plurality (rather) agrees that redistributing revenues from an energy tax to the taxpaying population does not lead to a reduction in energy consumption, and puts additional strain on public finances. These two findings demonstrate clearly that the economic assumptions of redistributive environmental taxes were not acknowledged by roughly half of the respondents. Interestingly, the opinions on the mechanisms of environmental taxes largely are independent of ideological predispositions (see Fig. 4.7 in Appendix 4.A). However, that pattern has one exception: voters on the left side of the political spectrum are more strongly convinced that a steering tax, i.e., a scheme where revenues from an environmental tax are redistributed to the taxpaying population, actually reduces consumption. Overall, the findings support the conclusion that a substantial number

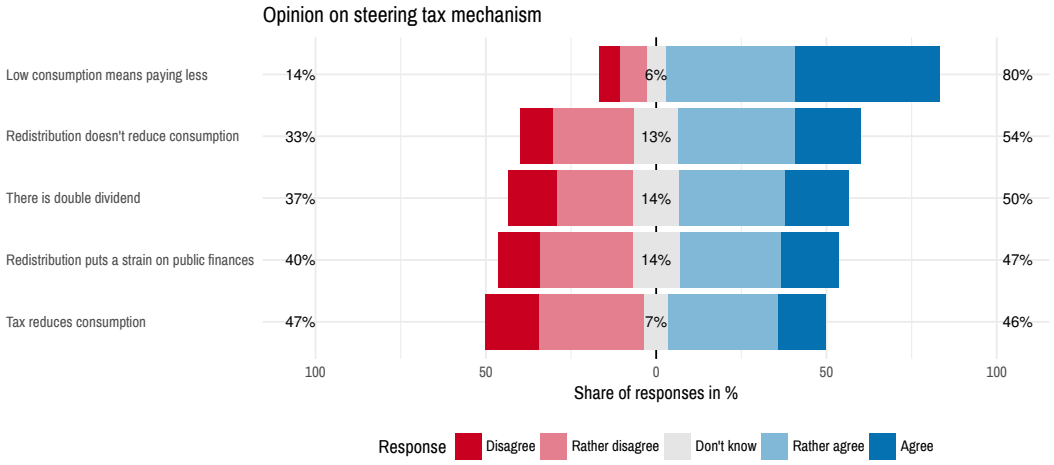

Figure 4.4: What citizens think about elements of environmental taxes and modes of revenue recycling. *Note*: Share of respondents per category in percentages. Source: Our own data collected in the context of the vote on the popular initiative "Green economy," September 2016. Representative national sample $n = 1024$. The precise formulation of the items can be found in Tab. 4.3 in Appendix 4.A.

of Swiss citizens do not believe in the neoclassical economic model and the assumptions underlying steering taxes, or do not understand their economic implications. Hence, this finding further corroborates the conclusion that Hypothesis 4 fails to be supported based on its fundamentals: given that citizens do not understand or believe in the efficacy of incentive-based policy instruments, a perceived benefit does not exist that could compensate for the costs.

4.4.2 The influence of predisposition

In a last analytical step, we examine the extent to which political ideology influences citizens' decision-making on renewable energy policies, and in particular benefit-cost considerations. Fig. 4.4 depicts conditional AMCEs for respondents with left, middle, and right political predispositions as measured by their self-reported political ideologies. As discussed in the theoretical section of the present study, we particularly expect that voters from the political center and right will weight cost arguments more heavily than those from the left, whereas the latter may be more inclined to believe in the usefulness and efficacy of renewable energy measures.

However, the main message we take from Fig. 4.5 is that the patterns across the political left-right spectrum are astonishingly similar. Most importantly, voters across the political spectrum do not have clear preferences on environmental policy measures (i.e., feed-in-tariff, investment grants, tax relief or redistribution). For example, right-wing voters do not support more strongly a pure steering

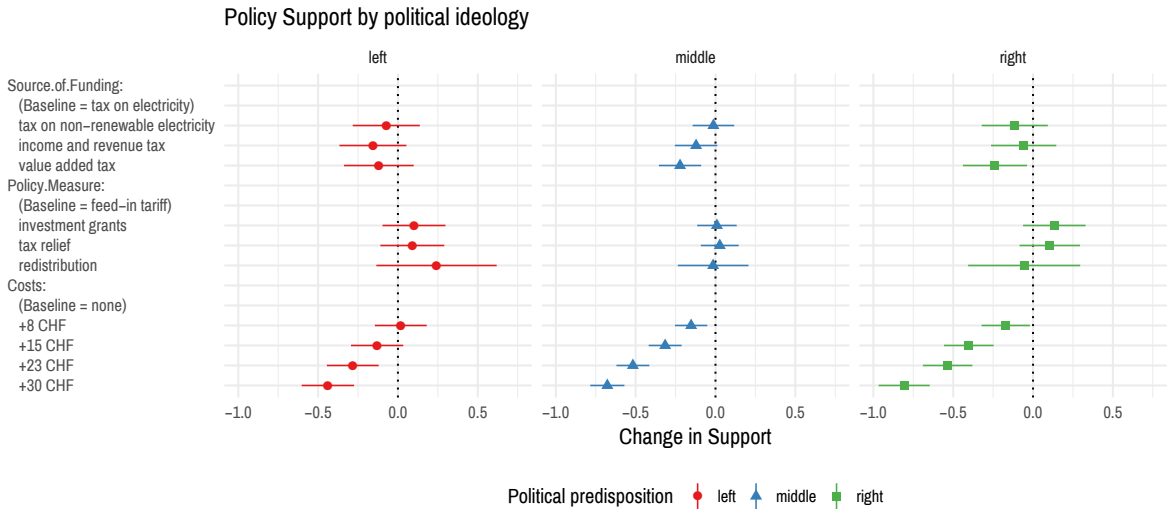

Figure 4.5: The effect of policy components by party-ideological voter groups. *Note*: Average marginal component effect (mean and 95% confidence interval).

system that would go along with limited state intervention, and left-wing voters do not express stronger support for measures that explicitly promote renewable energy production. However, Fig. 4.5 does indicate that left-wing voters tend to be slightly less averse to additional costs than voters from the political center and right, even though the general pattern does not differ. In addition, centrist and right-wing voters show stronger preferences for funding renewable electricity through an energy tax rather than by levying general direct or indirect taxes, whereas for leftist voters, no significant differences exist between the sources of funding.

Thus, voters with different ideological predispositions do not vary much in their weighting of different policy components. However, Fig. 4.6 illustrates that the mean support across all possible policy combinations does differ between the ideological groups. As expected, support for policies to promote renewable energy and reduce energy consumption is greatest for leftist voters, whereas voters in the middle and the right of the political spectrum are less likely to support such proposals in a popular vote (the means, represented by the dashed lines in each density plot, drop from 49.5 to 46.3% and to 43.9% for voters in the middle and the right, respectively). Also, those differences show that approval rates for all ideological groups vary between total opposition to total support. As mentioned previously, the sample of proposals contains a very diverse set of policy combinations, including both very far-reaching proposals as well as policy combinations that would not contribute much to achieving environmental policy targets. Therefore, this diverse set of policy combinations gives both environmentally friendly (typically left-wing) respondents and those

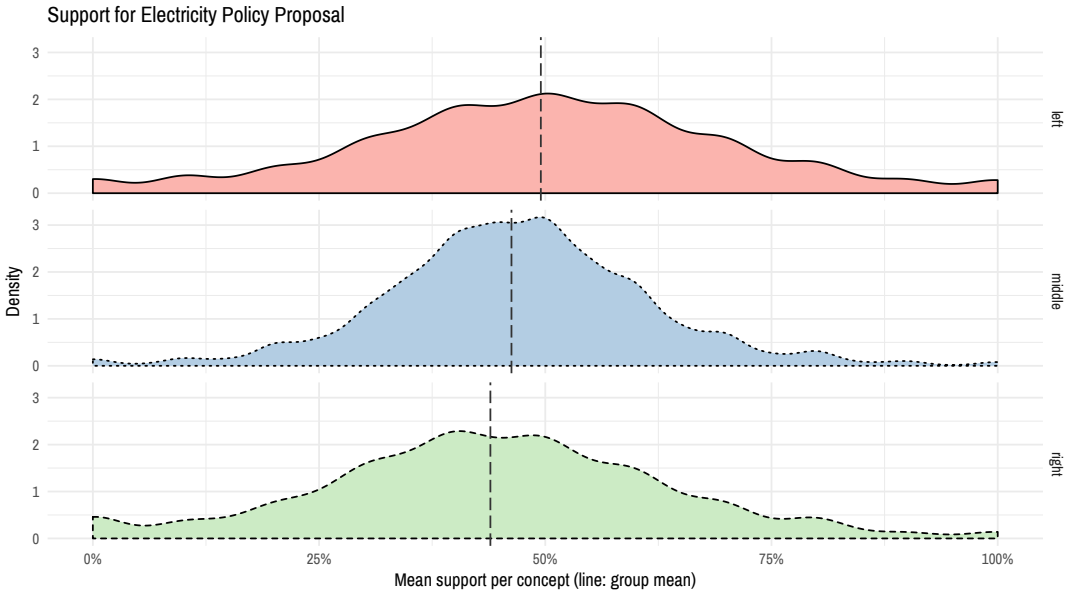

Figure 4.6: Support of electricity policy proposals by political predisposition. *Note*: Mean reported support per proposal. The dashed line represents the mean for each group, which is at 49.5% for left voters, 46.3% for the middle, and 43.9% for voters on the right.

who are more reluctant to support environmental policies (typically rightist individuals) reasons to (strongly) support some policies and (strongly) reject others. Considering all the combinations, the average still exhibits a small but relevant difference for support for all possible policy proposals to promote renewable energy generation.

4.5 Conclusion

The starting point of the present study was the puzzle about why citizens are reluctant to accept incentive-based energy policies even though such instruments are widely acknowledged by economists and policy makers to be the most effective means of attaining the goals of environmental policy in general and energy policy in particular. We argued that to learn more about the political difficulties of implementing incentive-based policy instruments, we should go beyond the traditional distinctions between incentive-based, regulatory and persuasive instruments, and look more closely at the varying elements of which specific incentive-based instruments consist. Most importantly, we showed that incentive-based policies are characterized by a particular cost structure, i.e., those instruments inherently involve some costs that typically are visible to voters. Hence, the main question that arises – which is the focus of the present study – is what features and mecha-

nisms could compensate for or reduce those inherent costs and thus increase citizens' support for the policy instruments. Thus, we proposed and empirically tested three mechanisms that may alter the benefit-cost ratios of incentive-based instruments: reducing the objective costs, reducing the perceived costs, and increasing the benefits. Based on a conjoint analysis conducted in Switzerland, the main findings of our analyses are summarized in the following paragraphs.

Most importantly, our results demonstrate that reducing objective and perceived costs may indeed strengthen voter support for incentive-based policy instruments, whereas cost compensation does not seem to work as well. More precisely, our findings suggest that costs are still the most relevant factor influencing individual decision-making with respect to incentive-based instruments. The analyses reveal that the negative relationship between costs per household and policy support essentially is linear. In other words, designing an incentive-based policy instrument in a modest way, i.e., limiting the visible costs, will increase its level of support. That finding not only accords with previous research suggesting "gradual implementation" of these instruments (Dresner et al., 2006; OECD, 2006), but also is in line with recent findings from Switzerland, which identified low household costs as an important factor underlying the success of the new energy law accepted by Swiss citizens in May 2017.[8] Of course, the downside of that policy mechanism is that a lower energy tax, for example, also will limit its efficacy. Moreover, and regarding the perception of costs, the analyses in the present study support the view that incentive-based policy instruments are more likely to be supported if they involve taxes perceived as fair and to a certain degree avoidable. In that context, the 'user pays' principle is widely accepted by citizens and is clearly preferred over general income taxes or the VAT.

In contrast, the results suggest that no policy measure has a clear positive effect on the support for incentive-based instruments. Thus, we found no evidence that a particular measure to promote renewable energy could increase the perceived benefit of a policy proposal and thus compensate for higher costs in the benefit-cost ratio. Most interestingly, an instrument that redistributes tax revenues back to the taxpaying population, and thus most clearly involves a material benefit, seems not to increase support more than proposals requiring the state to invest in the promotion of renewable energy production. Based on additional data, we were able to show that substantial numbers of voters, sometimes even a majority, do not understand or are not convinced by economic arguments

[8] http://www.defacto.expert/2017/07/18/das-ja-zum-energiegesetz-breite-zustimmung-zur-energiestrategie-oder-hart-erarbeiteter-erfolg/ (retrieved: November 22, 2017).

favoring environmental taxes, an aspect of such policy measures that often has been assumed, but never has been tested explicitly before (see also Carattini et al., 2017; Clinch and Dunne, 2006). That phenomenon imposes tight constraints on popular support for those policy instruments. To put it bluntly, since citizens do not understand or believe in the usefulness and efficacy of incentive-based instruments, why should they be ready to pay for and thus support such proposals? Thus, in the context of environmental measures that may provide benefits to society in a general way (i.e., as public goods), but not necessarily to individuals specifically,[9] policy makers need to better explain and suggest to voters why incentive-based instruments can deliver benefits in the longer-run.

Furthermore, when taking into account political ideology, our findings demonstrate an astonishing similarity amongst voter groups. Whereas, theoretically, we expected differences in benefit-cost considerations between voter groups, our analyses show that, across all parts of the political spectrum, voters seem to focus heavily on cost arguments, whereas a measure's specific elements are much less relevant. *Ex ante* support for incentive-based energy policies is in general, and across the full political spectrum, rather lukewarm, which points to the crucial importance of pre-ballot publicity campaigns. Although our survey has been carried out in a non-campaign context, future research could look profitably at whether and how preferences for various policy proposals change during a public debate.

Although the present study focused on Switzerland and cannot necessarily be generalized to other contexts, we argue that our main results are relevant beyond the Swiss case. Taxes and steering systems vary between nations and across sub-national jurisdictions, but they are based on "universal" economic models and generally consist of rather complex bundles of policy measures. Hence, it can be assumed that a lack of understanding about, and acknowledgment of, the economic assumptions of incentive-based policy instruments are also realities in other contexts and, hence, also may be important factors for the broader unpopularity of such instruments (also see OECD, 2008, 25). A lack of popular support for incentive-based policy measures also may hinder their implementation in purely representative political systems in which governments might be reluctant to promote such unpopular policies owing to fear of electoral punishment. Still, more research is needed to clarify these results and, most importantly, to investigate their policy implications. First, it remains an open question whether incentive-based instruments are victims of their own non-success. In fact, according to economic models, incentive-based instruments would be most effective if the disincentives

[9] However, exceptions, such as increases in property values, are possible (see Deacon and Shapiro, 1975).

for non-desired behavior (e.g., energy consumption) were strong. However, because of the political challenges of introducing such effective instruments, existing taxes typically are rather low. Thus, even if economic models were right, their real-world benefits (e.g., reduced energy consumption) may currently be limited because incentives are too weak. In turn, that lack of success can further hinder citizens' support for economic models. Moreover, and coming back to the question of whether and how the popularity of these instruments could be strengthened, our results imply that information and communication may play important roles in increasing public support for incentive-based measures. In this vein, further research should reflect on when and how to inform citizens so to fill their knowledge gaps, and also to convince them that economic models can meet their expectations in the real world.

4.A Appendix

Table 4.1: Attribute list and levels used in the conjoint analysis. *Note*: The attributes and levels were assigned to each task in a randomized way (see Hainmueller, Hopkins and Yamamoto, 2014). [a] These combinations were excluded from the conjoint designs, since they do not represent reasonable variants of renewable electricity proposals.

ATTRIBUTES	LEVELS	WEIGHTS / CONSTRAINTS
Energy Source Priority	Renewable energy in general	26/100
	Solar power	16/100
	Wind power	16/100
	Small-scale hydro power	16/100
	Geothermal power	16/100
	No specific target	10/100
Source of Funding	General tax revenues	1/4
	Added-value tax	1/4
	Tax on electricity (VAT)	1/4, != Redistribution, exceptions[a]
	Tax on electricity from non-renewable sources	1/4, != Redistribution, exceptions[a]
Policy Measure	Investment grants for the construction of a new plant	27/100
	Feed-in tariff for renewable electricity	27/100
	Tax reductions for firms that produce renew-able electricity	26/100
	Redistribution to the population	20/100, != General tax rev., VAT[a]
Costs	No additional costs	1/5
	Around 8. CHF additional monthly costs	1/5
	Around 15. CHF additional monthly costs	1/5
	Around 23. CHF additional monthly costs	1/5
	Around 30. CHF additional monthly costs	1/5
Exceptions	No exceptions	1/4
	for energy intensive industries	3/4, != General tax rev., VAT[a]
Nuclear Power Plants	Close down within 5 years	1/3
	Maturity restriction of 60 years	1/3
	No maturity restriction	1/3
Running Time	for 10 years	1/3
	for 20 years	1/3
	for 35 years	1/3

Table 4.2: Data and descriptive statistics. *Note*: Summary statistics refer to the subsample of individuals who answered the conjoint module

VARIABLE	VALUES
Individuals	4146 for conjoint on policies
Conjoint Ratings	7 tasks * 2 concepts * 4146 individuals = 58 044
Support	
from 1 (no support) to 11 (full support)	mean = 5.573
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	
low (no education, mandatory, pro-fessional)	47%
middle (middle/higher professional)	22%
high (tertiary)	31%
Income	
low (< 4999 CHF)	26%
middle (5000-8999 CHF)	40%
high (>= 9000 CHF)	34%
Left/Right	
left	23%
middle	52%
right	26%

Table 4.3: Citizens understanding of environmental taxes and modes of revenue recycling – the five items. *Source*: Own online survey in the context of the vote on the popular initiative "Green economy," September 2016. $n = 1020$. Response categories: Agree, rather agree, rather disagree, disagree, don't know.

No.	**Question**
1	An energy tax decreases energy consumption because it makes the consumption of energy more expensive.
2	If revenues from an energy tax are redistributed to the population, energy consumption will not decrease.
3	An energy tax is a means to make those pay more who consume more energy. Saving energy means paying less.
4	If revenues from an energy tax are redistributed to the population, this puts an additional strain on public finances.
5	If revenues from an energy tax are used to reduce employers' contributions to a pension fund, the energy tax has a double positive effect: reduction of energy consumption and an increase in employment.

Table 4.4: Full results of model 1.

	AMCE
Source of Funding (Baseline = tax on electricity)	
Tax on non-renewable electricity	−.02
	(.05)
Income and revenue tax	−.11*
	(.05)
Value added tax	−.20***
	(.05)
Policy Measure (Baseline = feed-in tariff)	
Investment grants	.04
	(.04)
Tax release	.05
	(.04)
Redistribution	.03
	(.08)
Costs (Baseline = none)	
+8 CHF	−.12***
	(.04)
+15 CHF	−.33***
	(.04)
+23 CHF	−.48***
	(.04)
+30 CHF	−.68***
	(.04)
Exceptions (Baseline = no exceptions)	
Industry	−.14***
	(.03)
Running Time (Baseline = 10 years)	
20 years	−.04
	(.03)
35 years	−.06*
	(.03)
Energy Source Priority (Baseline = no priority)	
Renewable energy in general	.75***
	(.13)
Solar power	.75***
	(.13)
Wind power	.44***
	(.13)
Small-scale hydro power	.43**
	(.13)
Geothermal power	.28*
	(.13)
Nuclear Power Plants (Baseline = switch off)	
Switch off	.48***
	(.04)
60 years run-time limit	.16***
	(.03)
Number of obs.	58 100
Number of respondents	4146

*** p <.001, ** p <.01, * p <.05

Table 4.5: Full results of model 1 – depending on ideological predispositions.

	AMCE	left	middle	right
Source of Funding (Baseline = tax on electricity)				
Tax on non-renewable electricity	−.05	−.09	−.01	−.12
	(.05)	(.12)	(.07)	(.11)
Income and revenue tax	−.11*	−.17	−.12	−.06
	(.05)	(.11)	(.07)	(.10)
Value added tax	−.21***	−.13	−.22**	−.25*
	(.05)	(.11)	(.07)	(.10)
Policy Measure (Baseline = feed-in tariff)				
Investment grants	.06	.10	.01	.13
	(.05)	(.10)	(.06)	(.10)
Tax release	.06	.09	.03	.10
	(.05)	(.10)	(.06)	(.10)
Redistribution	.02	.24	−.01	−.06
	(.09)	(.19)	(.11)	(.18)
Costs (Baseline = none)				
+8 CHF	−.12**	.02	−.15**	−.17*
	(.04)	(.08)	(.05)	(.08)
+15 CHF	−.30***	−.13	−.32***	−.40***
	(.04)	(.08)	(.05)	(.08)
+23 CHF	−.47***	−.28***	−.52***	−.53***
	(.04)	(.08)	(.05)	(.08)
+30 CHF	−.66***	−.44***	−.68***	−.81***
	(.04)	(.08)	(.05)	(.08)
Exceptions (Baseline = no exceptions)				
Industry	−.15***	−.22**	−.16***	−.05
	(.04)	(.08)	(.05)	(.07)
Running Time (Baseline = 10 years)				
20 years	−.04	−.09	.00	−.04
	(.03)	(.07)	(.04)	(.06)
35 years	−.05	−.05	−.05	−.02
	(.03)	(.06)	(.04)	(.06)
Energy Source Priority (Baseline = no priority)				
Renewable energy in general	.79***	1.17***	.79***	.55*
	(.13)	(.30)	(.17)	(.28)
Solar power	.78***	1.26***	.75***	.52
	(.14)	(.32)	(.18)	(.29)
Wind power	.42**	1.01**	.38*	.06
	(.14)	(.31)	(.18)	(.29)
Small-scale hydro power	.45**	.70*	.45*	.31
	(.14)	(.31)	(.18)	(.29)
Geothermal power	.29*	.71*	.28	.07
	(.14)	(.32)	(.18)	(.29)
Nuclear Power Plants (Baseline = switch off)				
Switch off	.48***	1.34***	.53***	−.37***
	(.04)	(.09)	(.05)	(.08)
60 years run-time limit	.18***	.37***	.26***	−.16**
	(.03)	(.07)	(.04)	(.06)
Number of obs.	51 618			
Number of respondents	3683			

*** p <.001, ** p <.01, * p <.05

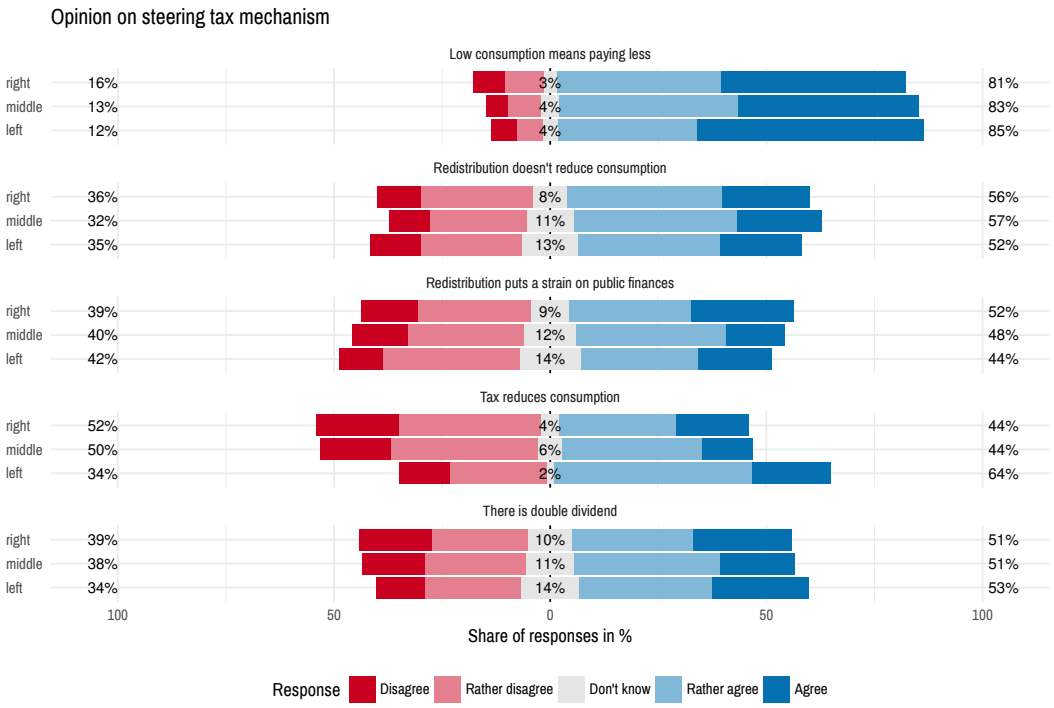

Figure 4.7: What citizens of different political predispositions think about the elements of environmental taxes and modes of revenue recycling. *Note*: Share of respondents per category in %. Source: Own data collected in the context of the vote on the popular initiative "Green economy," September 2016. Representative national sample, $n = 912$. The precise formulation of the items can be found in Tab. 4.3 in Appendix 4.A.

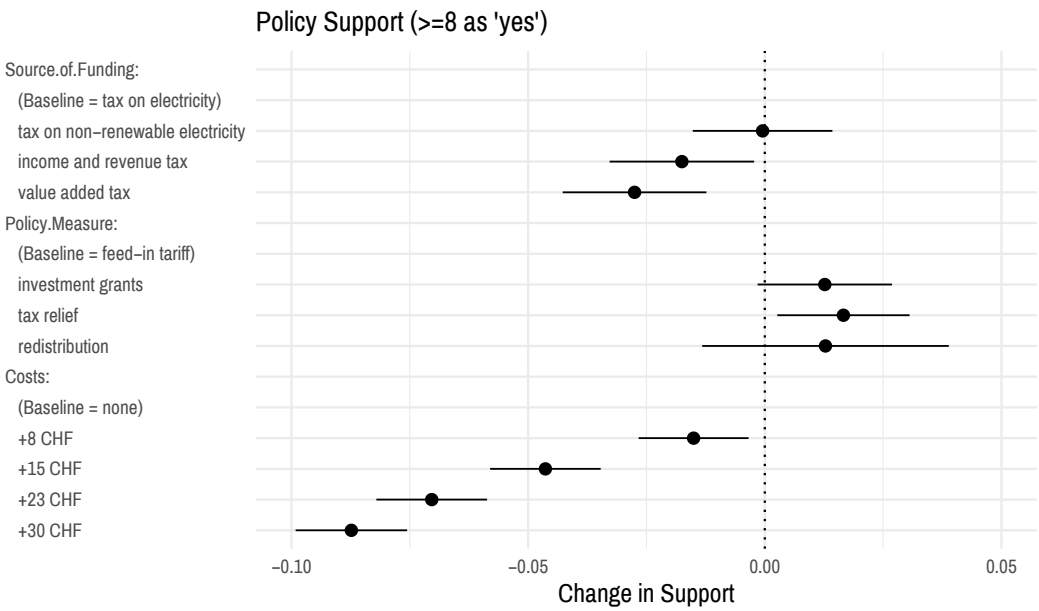

Figure 4.8: Policy attributes and the probability that a proposal is chosen. Dependent variable: support as a dummy, coded '1' for values higher than or equal 8, and '0' for lower values. *Note*: Average Marginal Component Effect (mean and 95% confidence interval). Full results can be found in the Supplementary material.

Chapter 5

How beliefs of the political elite and citizens on climate change influence support for Swiss energy transition policy

This paper analyzes factors that lead to opposition towards policies in Switzerland that promote a clean energy transition. During legislative processes, both the elite and general citizens can develop resistance towards such policies. The article considers those two perspectives and determines, on both levels, factors that explain opposition. We also specifically take into account whether climate change skepticism, i.e., questioning that climate change is real and human-induced, is a key factor that leads to opposition. Furthermore, we employ structural equation models to account for interactions between the elite and general citizens. The results show that political actors who reject the idea of man-made climate change also oppose the promotion of a clean energy transition, and more generally that elite actors influence how citizens think about the issue. At the citizen level, an increase in climate change skepticism has a negative impact on levels of support for clean energy policy. The link is mainly determined by party affiliation. We conclude that potential strategies for achieving a clean energy transition should focus on motivating citizens because they generally seem to be less polarized and partisan, and thus less opposed to new solutions, than the elite, who tend to be more constrained in their actions.

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5.1 Introduction

Most nation states need to adopt ambitious policies and substantially increase low-carbon energy production to achieve their climate goals and to reach a more sustainable long-term energy supply. Many experts of the field view state intervention as necessary for enabling a renewable energy transition because market failures as well as commitment and time inconsistency problems have thus-far limited the transition towards clean energy in areas without government support (Kern and Howlett, 2009; Lodge and Wegrich, 2012). Another factor impeding the transition to renewable energy includes the fact that parts of the political elite (political parties, E-NGOs, administrative offices, interest groups etc.) oppose policies that promote or implement clean energy, especially if they find clean energy neither desirable nor necessary (see also Fraune and Knodt, 2018 in this special issue). Moreover, on a systems level, scholars find that well-established socio-technical (Bijker, Hughes and Pinch, 2012; Geels, 2002; Sovacool, 2016; Sovacool and Geels, 2016) and regulatory systems (Stirling, 2014; Thelen, 1999), like the ones governing energy production and use, tend to be stable and hard to change over time. Finally, political actors and citizens alike are often unsure about what specific policies to implement, because of the diversity of options and the lack of clarity about policy outcomes (Kern and Howlett, 2009). All these factors may lead to substantial delays in the implementation of promotional measures and the deployment of new technologies,

which could mean that countries struggling with these issues miss their respective climate and clean energy targets (Karlstrøm and Ryghaug, 2014; Kuzemko, Keating and Goldthau, 2015).

Transition studies have paid considerable attention to the stability of socio-technical systems. Public policy and environmental economics have mostly explored the uncertainty in policy selection. However, few studies explicitly analyze why certain groups of citizens or elite actors oppose policies supporting the transition towards a more sustainable energy system. The paper therefore asks: *What drives elite actors and general citizens to oppose policies that support a clean energy transition?*

To achieve a clean energy transition, it is crucial that states and governments develop and work towards goals that include targets for clean energy production or lower greenhouse gas emissions. Simultaneously, researchers investigating reasons for success or failure of energy transitions need to focus on studying specific policies to better understand where opposition or support from the public comes from, similar to the value-action gap regarding the local siting of technologies (see also Graff, Carley and Konisky, 2018 in this special issue; Bell et al., 2013). This paper, therefore, focuses on understanding the opposition to clean energy policies and uses it as a proxy for understanding support for the idea of a clean energy transition more broadly (Kern and Howlett, 2009). This study adopts an actor-centered perspective and considers the beliefs and preferences of both the political elite as well as general citizens because both play important roles in the legislative process as well as in the later implementation of clean energy policies, as (e.g.) Delina and Janetos (2018) or Komendantova, Riegler and Neumueller (2018) show. We thus consider the previous findings and expand the literature by explicitly combining research on both the elite and general citizenry. Understanding the root of opposition towards a clean energy policy is important to identify hurdles and solutions for states in achieving or reformulating their targets in accordance with the preferences of the political elite or citizens. Moreover, even when a productive policy does pass, when the public or political elite do not support it, compliance can still be low and undercut the policy's efficacy (see also Trotter and Maconachie, 2018 in this special issue; Dermont et al., 2017; Ingold, Stadelmann-Steffen and Kammermann, 2018).

By exploring the root cause of opposition to clean energy policies from both the public and political elite, we expand current social science research on energy transitions. Stokes and Breetz (2018) as well as Carley, Evans and Konisky (2018), for example, assessed the attitudes and culture specific to people affected by the expansion of RE and the decline of conventional power sources.

They found that both attitudes and culture could drive people's opposition to policies that promote sustainable energy. To develop a unique perspective on the subject, we combine their insights with literature on climate change skepticism (see e.g., McCright et al., 2016; Reiner et al., 2006; Tranter and Booth, 2015), which also seems to be a driving factor in determining whether the public and elite actors oppose a clean energy transition. Climate change skepticism is the belief that climate change either is not as problematic as the scientific community says it is, an altogether denial of anthropogenic climate change, or somewhere in between. Therefore, people can use their skepticism as grounds for rejecting tangible solutions to solving climate change, including supporting a clean energy transition. In addition, political parties and thought-leaders can continue fostering this skepticism by exploiting growing public distrust towards the scientific community and the government for political gain. Therefore, rhetoric that promotes the distrust of scientific facts and sows doubt in anthropogenic climate change can play into a populist mindset. If the frame used by the opposition is that "the government" and "scientists" are trying to force "the people" to live their lives a certain way with no true benefit to them, the result can be deep-seeded antagonism (Mudde, 2004) and further distrust not only of climate change but also of the government and scientific community more broadly. In Switzerland and other countries, the right-wing and populist parties tend to promote climate change skepticism and harbor deeper opposition towards clean energy than their more progressive counterparts. Populist parties, therefore, could be exploiting skepticism to further undermine public and political support for clean energy policies (Tranter and Booth, 2015).

By combining insights from these strands of research, this paper expands on the current debate and increases the understanding of the complex and multi-level participatory processes concerning the clean energy transition. This paper focuses on Switzerland, which is ideal for three reasons: first, Switzerland is often seen as a laboratory for popular votes. This paper thus offers insight for other countries and regions that may rely on similar participatory processes involving both elite actors and citizens, especially when these processes are generally new or specific to the energy sector (Linder, 2010; Szulecki, 2018). Second, Switzerland's direct democratic system allows citizens to actively participate in the political decision-making process regarding the deployment of low-carbon technologies. There is a balance of power between the political elite (e.g., parties, interest groups, or environmental non-governmental organizations (E-NGOs)) and citizens. That, in turn, allows us to investigate the political relevance and relative influence of both entities (Vatter, 2016). In

our case, the elite is mainly in charge of the drafting phase, however, the citizens are later able to express their opposition or support for the new energy strategy in a popular vote. Third, the pressure to transition the electric power supply towards more low-carbon technologies is high in Switzerland because, in 2017, the country set ambitious short-term policy measures to support the transition (Swiss Confederation, 2016). By voting in favor of the 2017 energy act, the Swiss people accepted two primary policies regarding the production of electricity: a ban on constructing new nuclear power plants, and a gradual increase of taxes levied on electricity consumption to be used for subsidizing RE (among the more general goals within the policy were to increase RE production and energy efficiency). In order to achieve these goals, however, Switzerland needs to adopt additional policies. Because this first slate of policies, as well as the idea of bringing on additional policies, is both controversially discussed, Switzerland is an ideal test-case for exploring opposition towards the clean energy transition. On the theoretical level, we consider the attitudes and policy preferences of both elite actors and the citizenry as they pertain to clean energy policies (Converse, 2006). We also consider literature on social acceptance (Dermont et al., 2017; Jegen and Philion, 2017). For the elite actors, we apply cluster analyses (Everitt et al., 2011; Murtagh and Legendre, 2014). Cluster analyses allow us to identify not only single actors and their opposition to the promotion of energy transitions, but also the attitudes of whole groups of actors based on their central beliefs. On the individual level, we apply structural equation modeling to assess and identify the factors that influence opposition to clean energy policies (Beaujean, 2014; Rosseel, 2012). The data used for the analysis is based on a survey conducted among elite actors in the energy policy domain as well as on data from a nationally-representative survey questioning citizens about their preferences regarding RE policy. By combining both sources, we present a comprehensive account of why elite actors and citizens alike often oppose clean energy policies.

5.2 Theory

5.2.1 Policy supporting energy transitions

This paper focuses on the drivers behind opposition to renewable energy policy by both the political elite and general public. Most experts agree that a clean energy transition can only be successful when supported by state intervention (Kern and Howlett, 2009; Lodge and Wegrich, 2012). The

range of policy options to accomplish such a goal is broad: they range from highly regulated, like banning nuclear power or implementing a feed-in tariff scheme, to those that are less prescriptive and more targeted such as subsidizing research and development of clean energy options (for an extensive list of measures see Sovacool, 2009). Public support, as well as the support of the political elite, is a central prerequisite for success. Political parties, interest groups, and E-NGOs play an important role in the drafting phase of most energy policies, as do administrative entities and local governments. Political parties make the final determination about policy selection, unless a policy makes it to a public vote (at least in the Swiss case under investigation in this study). Although policy selection and a potential public vote are sequentially independent from each other and follow different rules, they are interrelated (Vatter, 2016). For instance, policymakers are susceptible to public opinion, and political parties play a role in shaping public opinion by providing heuristics (Kriesi, 2005).

Most studies that have attempted to analyze the development of clean energy policy have been conducted under the frame of 'social acceptance.' Dermont et al. (2017) further emphasize the political nature of social acceptance, since most processes used to promote clean energy policies are inherently political in nature. Policy decisions follow the rules of political institutions such as parliaments, citizens' assemblies, or popular votes (Jegen and Philion, 2017; Scherhaufer et al., 2017). Elite stakeholders are crucial during the process of designing policies, but citizens become important actors later in the process when, in a direct-democratic setting, a public vote is triggered on the issue.

5.2.2 Opposition by elite actors

The policy preferences of elite actors are determined by two major factors (among others): their beliefs (e.g., Converse, 2006), and the preferences of the people or entities they represent (especially their political parties) (e.g., Schneider and Ingram, 1993). The beliefs of elite actors build the basis for their actions, influence with whom they collaborate, and determine what policies (if any) they choose for solving a problem (in this case the promotion of clean energy) (Converse, 2006; Weible and Sabatier, 2005). Their policy preferences more detailed expressions about what specific policies should be used and which shouldn't, as compared to whether or not any renewable energy policies should be pursued in the first place tend complement these beliefs (Weible and Jenkins-

Smith, 2016). Weible (2007) showed, in an empirical study, that even when political players are making choices about protecting marine areas, their decisions are impacted by their more general beliefs outside of the conservation realm. Kriesi and Jegen (2001) further show that beliefs also play a crucial role in the selection of energy related policies in the consensus oriented system of Switzerland. The paper thus adopts this hierarchical beliefs structure and considers actors to be boundedly rational in line with other frameworks such as the Advocacy Coalition Framework (Weible, 2007).

Other factors besides beliefs and preferences also influence the decisions of political elite. For instance, political elite may express opposition to a policy as a quid-pro-quo exchange with other actors (e.g., Ingold, Fischer and Cairney, 2017), or because of other political priorities in tight budgetary situations (Howlett and Lejano, 2012). While we acknowledge the importance of these other aspects, however, this paper focuses primarily on the two previously described factors.

5.2.3 Opposition by citizens

Many studies have analyzed citizen support for environmental issues at the polls, both in Switzerland (Bornstein and Thalmann, 2008; Stadelmann-Steffen, 2011), and in the U.S. (Deacon and Shapiro, 1975; Kahn and Matsusaka, 1997). Those studies offer insights into the factors that affect public support for clean energy policies. For instance, the public is generally sensitive to whether or not they will be personally impacted by a certain policy. In direct democratic processes, citizens can directly influence policy outcomes by voting against such policies, therefore asking to consider the specific context of popular votes if interested in the reaction of citizens towards the policies implementing (Dermont et al., 2017). Similar to elite actors, the individual attitudes of citizens influence their voting behavior. For example, if a citizen values environmental protection and public goods, they are more likely to vote for conservation-minded policies. In California, Deacon and Shapiro (1975) and Kahn and Matsusaka (1997) found such findings and reported that alignment with the Republican Party depressed voter support for conservation policies. By contrast, in Switzerland, a left-green ideology has been shown to significantly increase the probability that a citizen will vote in favor of an environmentally-friendly proposal (Bornstein and Thalmann, 2008; Sciarini, Bornstein and Lanz, 2007). Similar results were found for more general environmental attitudes as well (Stadelmann-Steffen, 2011).[1] These insights from literature referring to popular votes inform us about possible determinants of reactions by citizens towards proposals by the government where

[1] In the following, we use 'beliefs' for the elite level and 'attitudes' for the citizens' level.

they have a say in voting decisions, and therefore quite explicit political process of acceptance, which does not necessarily reflect the multitude of determinants to other forms of acceptance in the literature (Dermont et al., 2017; see also Bell, Gray and Haggett, 2005; Huijts, Molin and Steg, 2012; Fast, 2013). Besides the focus on such political decisions for individuals, the next subchapter introduces a new perspective towards votes not discussed in the literature on voting on the environment so far, that is gaining in urgency and trending in political debate, as new aspect.

5.2.4 Climate change perception

In recent years the research community has honed in on the fact that climate change skepticism and especially doubt in anthropogenic climate change in particular is very likely to correspond with an individual's view that a clean energy transition is unnecessary (McCright et al., 2016; Capstick and Pidgeon, 2014; Engels et al., 2013; Lee et al., 2015; Shi, Visschers and Siegrist, 2015). As aforementioned, both the political elite and citizens are likely to evaluate an issue like a specific energy policy based on their pre-existing beliefs, political ideologies, and environmental attitudes. Notably, a person's perception and knowledge of climate change significantly impacts their judgment about the importance of phasing out conventional energy sources and investing in renewable energy, as well as their willingness to support environmental policies (Lee et al., 2015; Shi, Visschers and Siegrist, 2015). Most importantly, as (Shi, Visschers and Siegrist, 2015, 2194 & 2197) found in Switzerland, the more citizens recognize the causes and impacts of climate change, the more likely they are to support and accept climate-friendly policies. Moreover, public opinion on climate change is heavily influenced by the political elite, as Brulle, Carmichael and Jenkins (2012) have shown in the U.S. In fact, compared to several other factors like the prominence of extreme weather events and more scientific information, cues from the political elite, like policymakers, advocacy groups, and the media, are the most prominent drivers of public opinion on climate change issues (Brulle, Carmichael and Jenkins, 2012, 182). The political elite, therefore, are a relevant factor in determining public opinion and thus public support (or lack thereof) for clean energy policies (see Kriesi, 2005, for direct democratic voting heuristics). This is even truer given that recent research demonstrates that simply stating that climate change is man-made is likely to increase opposition from individuals who doubt the scientific consensus (Bolsen and Druckman, 2018). A similar reaction is conceivable for skeptic political actors when presented with additional scientific information (Cairney, 2016).

Therefore, an individual's pre-existing attitudes towards the environment and climate change are strong factors as to whether or not they will support specific clean energy policies, for both the political elite and the general citizenry (Shi, Visschers and Siegrist, 2015). Brulle, Carmichael and Jenkins (2012) show that the political elite influence public support for climate change issues, and beg the question of whether or not political parties deliberately use climate skepticism to reinforce opposition to clean energy policies. As climate change skepticism refers to questioning scientists and their work, it also reflects a skepticism or distrust towards "the elite" and "the educated". This distrust of the elite or a group different from the own, in this case highly educated scientists, reflects the essence of populism establishing an antagonism between the people and an elitist group (Mudde, 2004). In this analysis, we will therefore take a closer look at how beliefs in climate change, both for the elite and for the general public, influences thinking around energy policy, and how this new explanation fares in comparison to older explanations.

5.2.5 Hypotheses

Based on the theoretical understandings, we formulate three assumptions that guide our analysis (see Fig. 5.1). Multiple studies show that general beliefs about an issue influence the policy preferences of both the elite and the citizenry (Kriesi and Jegen, 2001; Weible, 2007). Recently, research also highlights that beliefs, attitudes, and concerns about climate change have an effect on the public's support and acceptance of policies supporting a clean energy transition (Capstick and Pidgeon, 2014; Engels et al., 2013; Shi, Visschers and Siegrist, 2015; Tranter and Booth, 2015). Therefore, our first hypothesis is that for both the elite and for citizens, climate change skepticism drives opposition to renewable energy policies:

H1a For political elite, skepticism about anthropogenic climate change coincides with opposition to clean energy policies.

H1b For general citizens, skepticism about anthropogenic climate change coincides with opposition to clean energy policies.

We also take into account that political actors and citizens have different tasks to accomplish during a political process (Dermont et al., 2017). Political actors, and especially political parties,

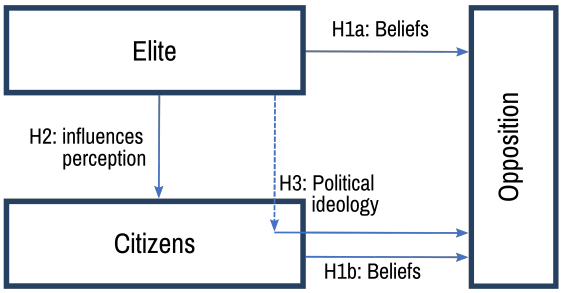

Figure 5.1: Graphic presentation of the hypotheses. H1a, H1b symbolize the connection between the elite's and citizens' beliefs and opposition towards policies supporting an energy transition; H2 indicates the connection between the elite (especially political parties) and citizens' perception; H3 indicates how the elite (especially political parties) influence citizens' opposition through party ideology.

are in charge of drafting policy and formally adopting them in parliament. If a referendum is later triggered, citizens have to vote on that policy. However, we recognize that those two processes do not develop independently. Rather, political parties and citizens interact during both the policy development and a public vote (Brulle, Carmichael and Jenkins, 2012; Kriesi, 2005) With this in mind, and acknowledging that political ideology and heuristics about climate change impact support for new policy, we will test two additional assumptions: First, we assume that the political elite, namely political parties, influence how citizens perceive climate change; hence, H2 supposes that political parties skeptic about climate change transfer those beliefs to their voters. Second, we assume in H3 that political parties influence their voters' opposition to clean energy policies by offering decision heuristics.

H2 The political elite, namely political parties influence how citizens perceive climate change.

H3 Political ideology influences the public's support or opposition to clean energy policies.

5.3 Research design

5.3.1 Case

Since the early 2000s, Switzerland has had a strong climate mitigation strategy that was reinforced when they signed the COP21 treaty (Ingold, Fischer and Cairney, 2017). In 2017, Switzerland adopted an ambitious new energy strategy that contained additional goals regarding renewable

energy production and energy efficiency standards. From a policy perspective, the most impactful piece of the new energy act is a ban on new construction of nuclear power plants, which was first proposed shortly after the Fukushima incident (Sager, 2014; Swiss Confederation, 2016). This ban effectively prevents energy companies from replacing their current nuclear power plants and is equivalent to a nuclear phase-out by 2035. The other major piece of the new energy act is an increase in the tax levied on electricity consumption, which then goes towards funding renewable energy promotion (feed-in tariff). Further implementation is partly delegated to the sub-national level (cantons) due to the federal setup (Sager, 2014; Vatter, 2016). The investigation both on elite and individual level is embedded in this context of the new energy act and its further implementation. Thus both the elite (drafting) and the citizens (popular vote) are confronted with the issue of the Swiss energy transition.

5.3.2 Data

We collected data for this paper by two means. First, we conducted a survey among the political elite after the completion of the consultation for the new energy act. The consultation procedure is a process where all political actors (parties, cantons, E-NGOs, economic associations etc.) can formally issue their support or opposition for a specific legal act and suggest modifications to the proposed legal text. To structure this process, the federal department in charge of the respective consultation procedure distributes a preliminary version of the new act among all actors relevant to the process and requests the actors to respond. Based on the participants in the consultation process, 42 actors were selected for the survey based on the approaches (reputational, decisional & positional) suggested by Pappi and Henning (1998): First, we assessed all actors participating in the consultation procedures whether they were in a formal position during the decision process and were able to actively vote on the output (positional approach) and whether they tried to enter their ideas and interests into the decision process (i.e. participation in the consultation procedure; decisional approach). Furthermore, with the questionnaire we asked all actors who they consider important in the process (reputational approach). We then cross-referenced all three approaches and received a final list of relevant actors.

In the survey, elite actors were asked to express their general beliefs and preferences about how to achieve a more sustainable energy system.[2] The survey participants included all political

[2] A list of all survey items is included in Tab. 5.3 in Appendix 5.A.

parties that were able to form a faction in the national parliament on their own in 2014 (at least five representatives are needed), relevant economic interest groups and interest groups specific to the energy sector, E-NGOs and utilities, and actors from science and administrative entities. The response rate to the survey was 79%. Actors that did not answer the survey responded that they did not have an official position towards the new energy act or had their interests represented by another actor.[3]

Second, we gathered data from the public using a representative survey conducted in spring 2016 in Switzerland in three languages (German, French and Italian). Individuals were invited by postal mail to participate in an online survey, whereby 8287 individuals accepted the invitation (42.7% response rate). From this group, a random subsample of 1985 respondents were prompted to answer questions about policy measures they would support to help the cantons implement the newly adopted energy targets. These measures ranged from financial support for renewable energy production, to restrictions on non-renewable energy sources, to supporting information and consultation opportunities, to no measures at all. The measures are detailed in Tab. 5.4 in Appendix 5.A. The survey sample populations did not deviate from the general population in demographic, structural, or political composition, which is likely due to the high-quality representative sample provided by the Federal Office of Statistics.

5.3.3 Methods

Elite level

First, we used a cluster analysis to identify actor groups with shared beliefs. Actors are divided into clusters that within themselves are as homogeneous as possible, whereas the different clusters should be as heterogeneous as possible (Murtagh and Legendre, 2014). Cluster analysis is well suited to capture different groups of actors within the sector based on their beliefs and preferences. With clustering, we are furthermore able to distinguish between subgroups of actors that may oppose or support policies for a clean energy transition based on different reasons. We thus applied agglomerative hierarchical clustering using the complete linkage method. Even though the data is not strictly hierarchical, we believe that hierarchical clustering is an adequate approach because it is a good system for handling small data sets. Moreover, hierarchical clustering generates a 'tree'

[3] A list of all participating actors including their actor type is depicted in Tab. 5.2 in Appendix 5.A.

(displayed in a dendrogram) that allows for a comprehensive assessment of the structures within the clusters. We preferred the complete link method over single links because the former is less prone to outliers that occur due to actors' distinct beliefs regarding a single subject (Fonseca, 2013). The stems/heights of the hierarchical model are unweighted because the selected beliefs are considered equally relevant for the differentiation of the clusters. We determined the final number of clusters based on case knowledge (Everitt et al., 2011). We then tested cluster validity by partitioning the data in subsets to check whether the clusters stay the same with less actors, and by checking whether single variables disproportionately affected the assignment of specific actors to any given cluster (Halkidi, Batistakis and Vazirgiannis, 2001). We later aggregated specific beliefs and policy preferences by cluster in order to assess what beliefs about renewable energy the actor groups were trying to assert. We also briefly discuss the validity of the clusters using different approaches. The Supplementary material includes more detailed information regarding the internal and external validity and robustness of the analyses.

Citizen level

On the individual level, we estimated opposition towards policies that support a clean energy transition, including tax reductions, subsidies, bans on non-RE, public interventions, or information dissemination. We used structural equation modeling to analyze both how political ideology impacts beliefs and attitudes towards nature and climate, as well as how those impact an individual's support (or lack thereof) for corresponding policies (Beaujean, 2014; Rosseel, 2012). A structural equation model allowed us to estimate two things. First, the estimation of latent variables based on several observed items. For example, climate change skepticism, which is a score compiled from four items reflecting several aspects of climate change skepticism, is such a latent variable representing a theoretical construct measured through four items. The same approach applies for opposition towards the promotion of energy transitions (six items) and environmental attitudes (two items). Second, a structural equation model runs multiple regressions at the same time, thereby allowing us to simultaneously analyze the influence of ideology on climate change skepticism, and the influence of those two concepts on opposition towards policy. We fully documented the empirical analysis in the Supplementary material, in which we also listed additional measures of the validity of items, comprehensive model results, and test scores in detail.

5.3.4 Operationalization

The dependent variable for the elite as well as the citizenry is opposition towards clean energy policies. The measures included in this paper were selected based on a qualitative analysis of the policy process that led to the adoption of the new energy law. During the process of the new energy law being adopted, multiple policies were discussed, including a nuclear phase-out, increasing support for energy research, increasing a pre-existing electricity tax, or putting in place a CO_2-tax compensation. The most relevant measures were then included in the elite survey, in which actors were able to specify whether they agreed, rather agreed, rather disagreed, or disagreed with the adoption of a policy. On the individual level, respondents were asked which policy should be introduced in order to promote a clean energy transition, and they had the option to check all policies of which they approved.

The beliefs used for clustering the elite actors were compiled by asking them whether they agreed, rather agreed, rather disagreed, or disagreed with certain statements regarding the transformation of the electricity sector. The statements included those that corresponded with the following values: economic efficiency, free market, social justice, environmental concerns and prioritization of RE over landscape protection, security of supply, and energy independence. The beliefs/values were then coded on a scale from 1 to 4 where 1 corresponded to 'disagree' and 4 to 'agree.' The preferences of each actor were then aggregated for each previously-identified cluster. A full list of beliefs used for clustering can be found in Tab. 5.3 in Appendix 5.A.

For the individual data, the models considered party preference, i.e., the party the individual voted for in the 2015 election, climate change skepticism and general environmental attitudes as main independent variables. The model included several control variables such as age (both linear and quadratic), gender, language, region, education, and income. The variables are described in more detail in Tab. 5.4 in Appendix 5.A. For more details on the operationalization conducted in this paper, see the extended documentation.

5.4 Analysis

5.4.1 Opposition on the elite level

Our first analysis sought to understand whether opposition to policies supporting a clean energy transitions from members of the elite coincides with climate change skepticism. We used the complete linkage method and agglomerative hierarchical clustering to identify four clusters among the elite actors working in renewable energy policy in Switzerland. The first cluster includes a rather large group of actors centered on the center-right Christian Democrats (CVP), the Social Democrats (SPD), and the Green-liberal Party (GLP). Also included in the cluster are the responsible ministry of Environment and Energy (UVEK) as well as most actors representing science and parts of the RE industry. This group of actors has been supportive of a clean energy transition but also showed restraint in that they did not promote particularly strict policy instruments during the drafting or advocacy process ('pro' cluster). The most supportive group of actors came from the Green Party (GPS) and all questioned E-NGOs, as well as the business association representing the solar industry (SSOLAR). These actors mostly favored an extensive promotion of clean energy and a rather short-term nuclear phase-out ('very-pro' cluster). The dendrogram identifies another rather large group of actors led by the Liberal Party (FDP) that contains the major electricity producers (BKW, VSE) and the largest economic interest association, economiesuisse (ECON). Most of these actors were split on the matter of promoting a clean energy transition, as well as on whether to support the final version of the new energy act. The FDP came very close to opposing the act during the referendum, whereas economiesuisse stayed neutral, as it was not able to identify a position that satisfied a majority of its members. Both organizations remained skeptical of the policy and opposed major parts of the act during the parliamentary phase, primarily due to their economic concerns ('semi-anti' cluster). The fourth cluster contains the populist right-wing Swiss People's Party (SVP) and actors from the nuclear energy sector. These actors were the most likely to oppose the nuclear phase-out, the promotion of renewable energy, and more generally the transition towards a more sustainable energy sector ('anti' cluster). This last cluster is also the only group of actors that did not believe that climate change is man-made, although they did not question the idea that the climate is changing, per se. All other groups of actors consider anthropogenic climate change to be real. The different clusters identified are depicted in Fig. 5.2.

Choosing four clusters for analysis allowed us to be the most accurate both theoretically and

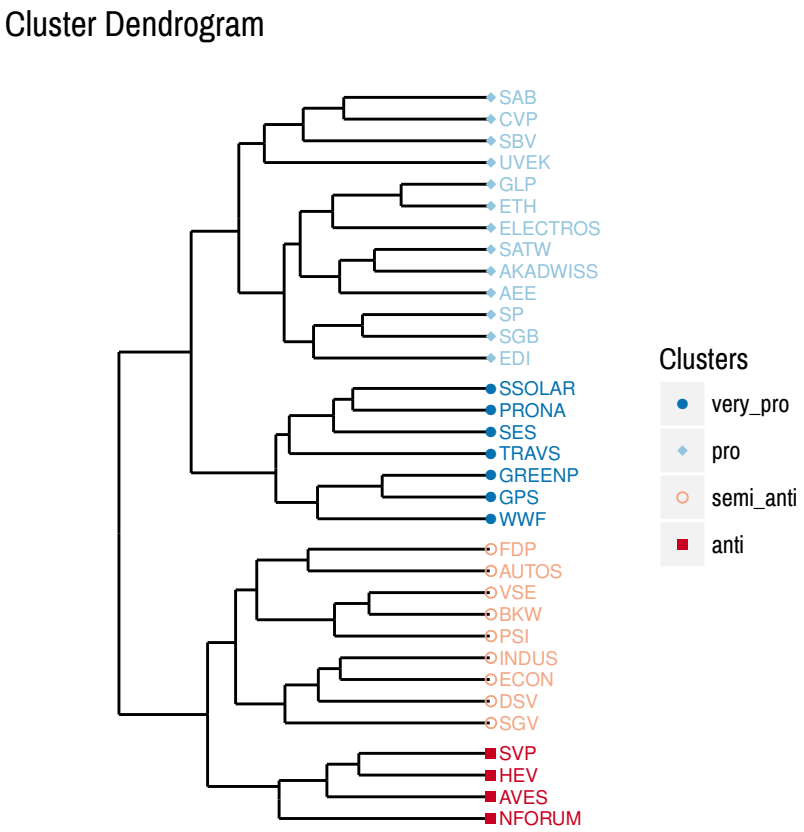

Figure 5.2: Elite actor clusters based on hierarchical agglomerative clustering. A list of actors is presented in Tab. 5.2 in Appendix 5.A.

contextually. Raising the number of clusters to five or six would have artificially complicated the interpretation because the additional clusters would not have been clearly distinguishable from the four we presented. Similarly, if we had lowered the number of clusters to three or two, important contextual differences between actors would have been omitted. We also tested the clusters for their validity by randomly splitting the actors into two different subsets and conducting the same analysis (see Supplementary material for documentation). Furthermore, beliefs were removed one-by-one from the model in order to check whether a single belief was able to alter the assembled clusters. Neither checks for validity returned significantly different results.[4]

The analysis showed that only one cluster of the four prescribed to the idea that climate change is not caused by human activity. This 'anti'-cluster also opposed most measures promoting a clean energy transition. As depicted in Fig. 5.3, the anti-cluster is the only group of actors that clearly opposes a nuclear phase-out, whereas all other groups of actors fully or partially support a phase-out. The second major measure adopted within the new energy act was the increase of a tax levied on electricity used for a feed-in tariff for renewable energy. Here the preferences of the semi-anti cluster differed in comparison to their preferences for the nuclear phase-out; the semi-anti cluster opposed a raise of the current tax, in sharp contrast to the two pro-clusters. No other distinct preferences could be identified that separate the clusters as starkly as did these policies.

Based on our analyses, we were able to validate Hypothesis 1a, which assumes that, on the elite level, climate change skepticism coincides with opposition towards a clean energy transition and related policies. We also determined that other beliefs, such as economic concerns (especially in the case of the semi-anti cluster) might also have an impact on opposition to clean energy policies.

5.4.2 Opposition on the citizen's level

In this section, we first analyze whether the elite do, in fact, have an influence on the public's perception of climate change (H2). Second and third, we assess whether climate change skepticism and political ideology influence the public's support or opposition for renewable energy policies (H1b & H3).

Before addressing these hypotheses, we must answer the question of whether or not the elite and individuals share the same preferences regarding energy policies yet to be developed. Based on

[4]More detailed information regarding the internal and external validity as well as further checks for robustness such as (e.g.) item sampling, and the use of different clustering algorithms can be found in the Supplementary material.

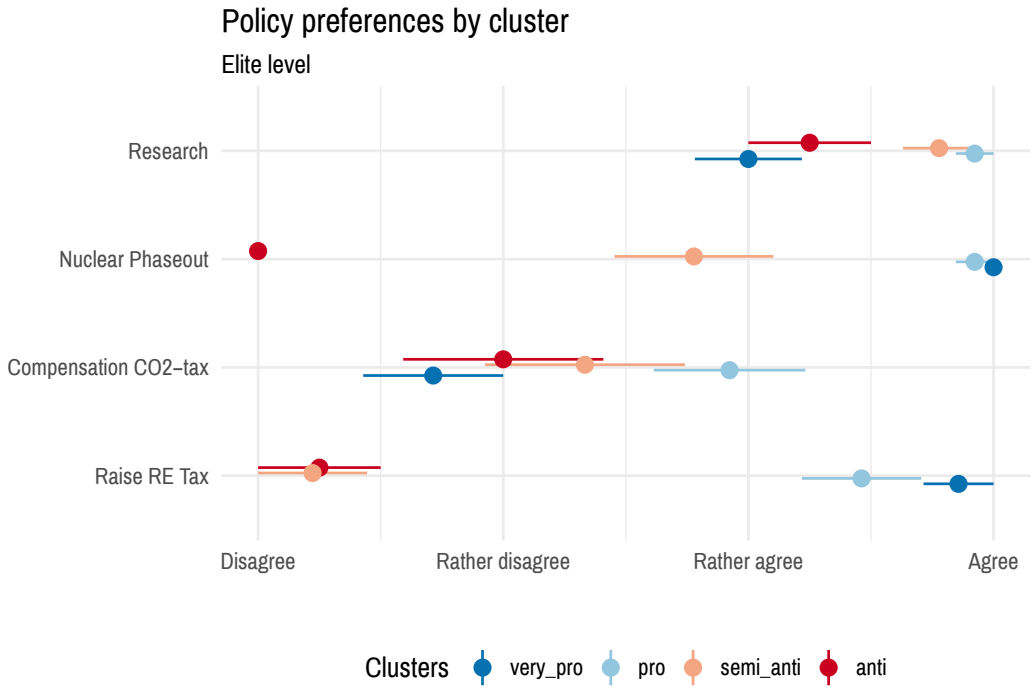

Figure 5.3: Elite preferences for policies considered in the new energy act including standard deviations. Reading example: The 'anti' cluster of the elite completely disagrees with nuclear phase-out, but supports research on renewables, with some actors more in favor than others are. *Note*: The point denotes the group mean, the interval the mean +/- the standard error per group.

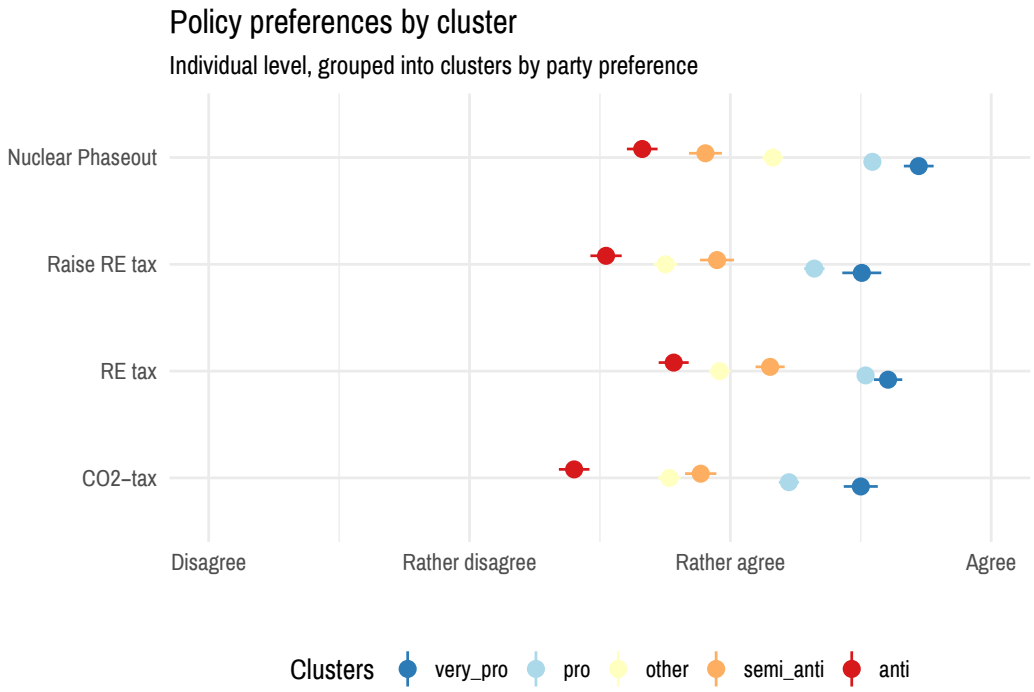

Figure 5.4: Policies in the new energy act and support by individuals, grouped by clusters based on elite belief. Reading example: see Fig. 5.3. The point denotes the group mean, the interval the mean +/- the standard error per group.

the clusters presented in Section 5.4.1, individuals are grouped in the same clusters based on the party they voted for in the last national election. Fig. 5.4 shows their support for four main policies, which were a part of the new energy act. Notably, Fig. 5.4 shows that agreement with the policy goals is relatively consistent with more environmentally-friendly beliefs by elite clusters. Therefore, individuals and the elite are exhibiting similar and parallel preferences. However, in direct comparison with Fig. 5.3 in Section 5.4.1, individuals show less opposition towards policies across the board than the elite, and are generally less polarized than their elite counterpoints. Therefore, individuals seem to exhibit more willingness to compromise and recognize both the benefits and drawbacks of energy policy as compared to the political elite.

However, does elite positioning on subjects such as the environment and climate change also influence how individuals perceive these issues, such as Brulle, Carmichael and Jenkins (2012) find for the U.S. and as stated in H3? To answer this question, we estimated a structural equation model, which also addressed how political ideology influences beliefs and attitudes about the environment generally and climate change more specifically. Fig. 5.5 demonstrates how the model was constructed (without control variables). Structural equation modeling allows for multiple simulta-

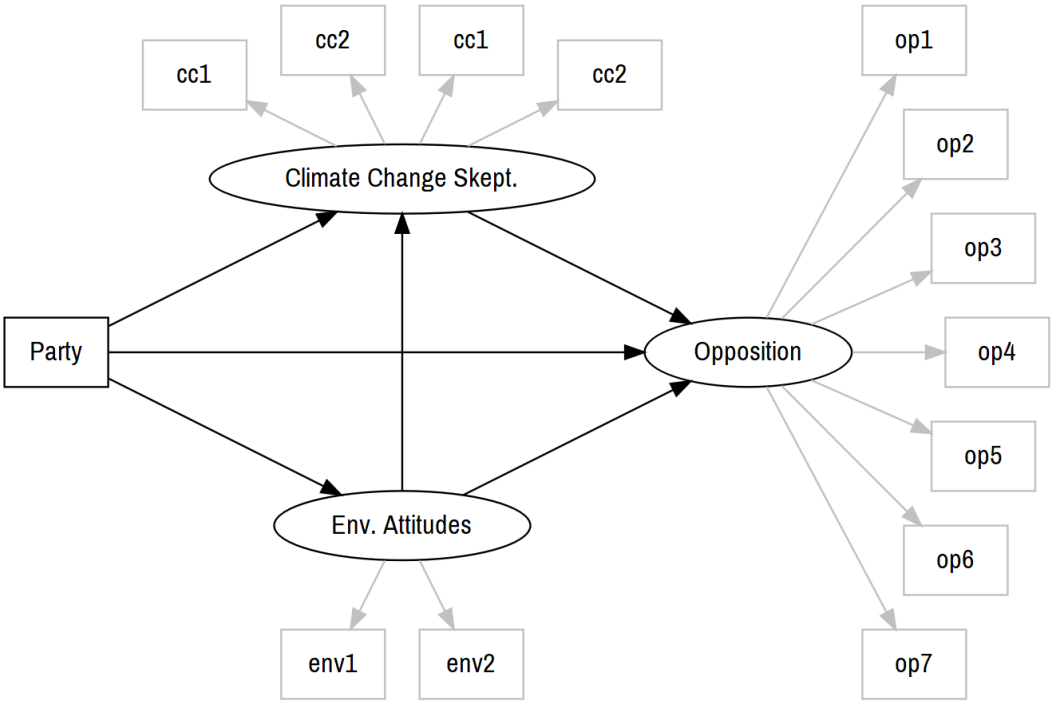

Figure 5.5: Setup of the structural equation model, including the latent variables (ellipses) and the observed values (rectangles). Reading example: climate change skepticism, a latent variable as per the elliptic representation, is estimated by four items, represented by the four rectangles cc1-cc4. Climate change skepticism is considered a dependent variable in a regression, with party preference and environmental attitudes as independent variables (the incoming arrows), and is considered an independent variable in a regression estimating opposition.

neous regressions, considering that some variables are both dependent and independent variables in those regressions. For example, in the present analysis, climate change skepticism is regressed on party preference and environmental attitudes, while also serving as an independent variable in a regression estimating opposition.

The results are documented in Tab. 5.1, Tab. 5.5 in Appendix 5.A, and depicted in Fig. 5.6. The indicators ($RMSEA = 0.032$, $SRMR = 0.032$, $CFI = 0.908$) suggest a satisfactory fit of the model. Regarding the results of the model, first, political ideology reflected through party preference correlated with all three latent variables environmental attitudes, climate change skepticism, and opposition. Compared to the reference category without party preference, Left-Green political ideology (preference for SP, GPS or GLP) is positively correlated with higher concern for the environment, while liberal and conservative respondents (FDP, SVP) have lower levels of conservation-mindedness. Preference for the CVP, currently the leading party in energy policy as they hold the office of the energy minister, does not coincide with environmental attitudes significantly different

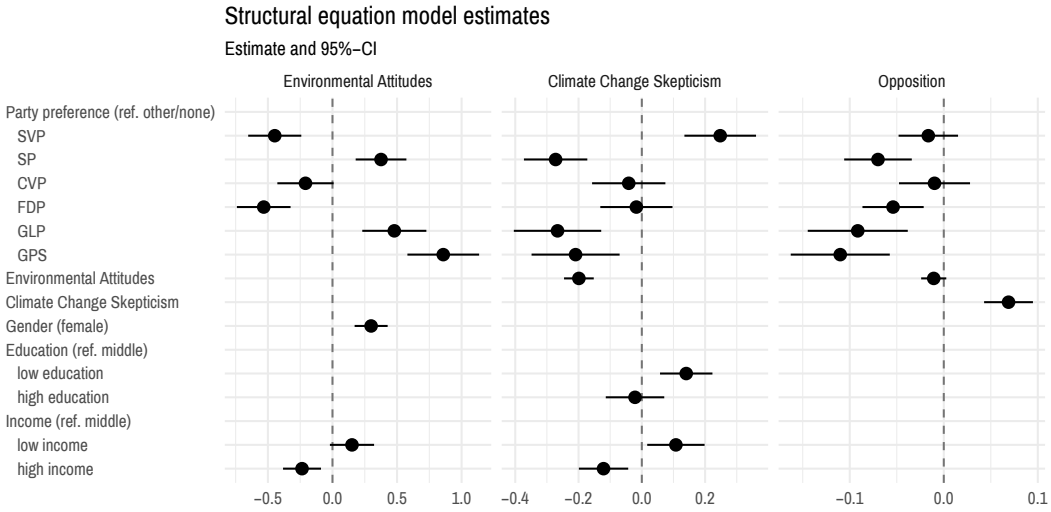

Figure 5.6: Regression results of the structural equation model estimated with *lavaan* (Rosseel, 2012), with each column of results representing one regression within the structural equation model with the dependent variable denoted at the head. Full results in Tab. 5.1, Tab. 5.5 in Appendix 5.A. Reading example: the last column depicts the estimation of opposition towards clean energy policies. The mean effect, depicted as a point, in the regression for climate change skepticism on opposition is at 0.069 and therefore demonstrates a positive correlation between higher skepticism and more opposition towards clean energy policy. The line represents the 95% confidence interval.

from the general population. Both party preference and environmental attitude are linked with climate change skepticism: again, Left-Green political ideology goes hand in hand with lower climate change skepticism. On the other hand, respondents with a preference for the SVP have significantly higher climate change skepticism. Conservation-minded and pro-environmental attitudes are negatively correlated with climate change skepticism.

The results suggest that climate change skepticism is influenced by political ideology, as argued by Brulle, Carmichael and Jenkins (2012). In addition to the influence of political ideology, individuals with lower educational background and income are more skeptical about climate change. Lastly, respondents from the French-speaking part of the country are more skeptical about anthropogenic climate change than those from German-speaking areas (see Tab. 5.1).

Having established a relationship between political ideology, represented by party preference, and climate change skepticism, the next step is to look at how both could be heuristics that inform attitudes towards clean energy policies. As the results in Fig. 5.6 also show, climate change skepticism does indeed increase opposition towards new clean energy policies. In fact, the final regression suggests that climate change skepticism is significantly correlated with higher opposition to these policy instruments, corroborating Shi, Visschers and Siegrist (2015). How individuals think

Table 5.1: Structural equation model, regressions. *Note*: estimated in R with *lavaan* (Rosseel, 2012). Latent factors are presented in Tab. 5.5 in Appendix 5.A. Full results in the Supplementary material.

Regressions	**Estimate**	**Std. Err**	**z-value**	**P >|z|**
Environmental Attitudes ~				
Party preference (ref. other/none)				
SVP	-.447	.105	-4.261	.000
SP	.376	.100	3.752	.000
CVP	-.209	.111	-1.882	.060
FDP	-.532	.106	-5.024	.000
GLP	.479	.127	3.781	.000
GPS	.858	.142	6.057	.000
Gender (female)	.299	.065	4.585	.000
Income (ref. middle)				
low income	.151	.087	1.731	.084
high income	-.236	.075	-3.147	.002
Climate Change Skepticism ~				
Party preference (ref. other/none)				
SVP	.248	.058	4.292	.000
SP	-.272	.051	-5.331	.000
CVP	-.041	.059	-.700	.484
FDP	-.017	.058	-.295	.768
GLP	-.266	.070	-3.781	.000
GPS	-.209	.071	-2.949	.003
Environmental Attitudes	-.199	.024	-8.299	.000
Education (ref. middle)				
low education	.140	.042	3.322	.001
high education	-.021	.047	-.456	.648
Income (ref. middle)				
low income	.108	.046	2.329	.020
high income	-.121	.040	-3.041	.002
Opposition ~				
Party preference (ref. other/none)				
SVP	-.016	.016	-1.020	.308
SP	-.070	.018	-3.814	.000
CVP	-.010	.019	-.511	.609
FDP	-.054	.017	-3.247	.001
GLP	-.091	.027	-3.371	.001
GPS	-.110	.027	-4.097	.000
Environmental Attitudes	-.011	.007	-1.569	.117
Climate Change Skepticism	.069	.013	5.199	.000
N				1627
Degrees of freedom				180
P-value (Chi-square)				.000
Robust Comparative Fit Index (CFI)				.908
Robust Root Mean Square Error of Approximation (RMSEA)				.032
Standardized Root Mean Square Residual (SRMR)				.032

about climate change and whether they believe in it is related to their opposition for pro-renewable policies; the more skeptical the respondent, the more strongly opposed they were to clean energy policies. Although anthropogenic climate change is scientific fact, respondents' beliefs still coincide with their readiness to oppose renewable energy, which suggests that climate change skepticism influences voting behavior on these issues.

We noticed one distinct discrepancy, however, while more closely examining the relationship between party predisposition, climate change skepticism, and support for clean energy policies: for the populist right, party preference and opposition towards renewable energy policy did not correlate, i.e., no direct correlation. Respondents who preferred the SVP did not differ from the general citizen in their support for energy policy. However, we did find that those respondents are more skeptical about climate change, which is linked with a significantly higher opposition, i.e., an indirect correlation. Climate change skepticism, which is strongly influenced by the political elite, according to Brulle, Carmichael and Jenkins (2012), could thus serve as a tool for this party to incite opposition to renewable energy policy. On the other side, though, a pre-existing belief in climate change can benefit the Left-Green party and reinforce an individual's support for both the party and clean energy policy.

To summarize, the political parties and their voters share similar attitudes towards environmental policies intended to mitigate climate change. Moreover, the results of our analysis suggest that political ideology shapes how citizens perceive climate change and its causes, corroborating the findings of Brulle, Carmichael and Jenkins (2012) for the Swiss direct democratic context. Generally, we can assume that climate change skepticism does not influence which political party individuals associate with, but rather that party affiliation influences the strength of climate change skepticism or the belief in anthropogenic climate change. There are two reasons for this argument because parties and affiliations with them are older than specific concerns about climate change, and because of the multi-issue reality of politics and voter concerns. For example, voters who associate with the Swiss Peoples' Party, who show the strongest climate change skepticism, prescribe to a party that built its strength on immigration issues, not environmental concerns. In short, hypothesis 2, which suggests that the political elite influence how citizens think about climate change, can be supported in accordance with Brulle, Carmichael and Jenkins (2012), and is most evident in the case of the populist right which is sowing skepticism about both climate change and science more broadly.

Our research also validates hypotheses 1b and 3, which line up with the conclusions of prior research as well. Skepticism about the man-made nature of climate change, as postulated by Shi, Visschers and Siegrist (2015), does indeed correlate with opposition to clean energy policy, the result being that the most skeptical people are also the most oppositional to climate action, which supports hypothesis 1b. Political ideology itself, as suggested in hypothesis 3 and represented through party preference, is also directly linked with opposition, most evidently in the reduced opposition to clean energy policy for those that associate with liberal or Left-Green ideologies.

5.5 Discussion

The models reveal that beliefs and attitudes, and climate change skepticism in particular, are important factors in explaining opposition to clean energy policies for both the political elite and citizenry. For the elite, this can be attributed to the belief that an RE transition is not desirable or necessary because climate change is not the top priority, or a priority at all, among actors voicing opposition. In Switzerland, the populist Swiss People's Party SVP is the only major party skeptic of climate change, and is the sole outspoken party opponent of the new energy act. The nuclear industry and the Swiss Homeowner Association (at the time of the survey presided by an MP of the SVP) are the other strong opponents of the policy. All other major political actors, including the current electricity producers and free-market FDP, accept human-made climate change as a fact and support a general transition towards RE. However, the results have to be taken with caution, as the analysis applied to better understand the political elite does not allow for direct causal conclusions.

For individuals within the citizenry, the results suggest that the political elite do influence notions regarding climate-change skepticism, which in turn influences the public's support for environmental policy. Moreover, climate change skepticism does seem to be a tool that the political elite can use to depress support for clean energy policy. The political elite, and especially those with close ties to industry, are very cautious to support policies that may affect the economy. This conclusion is well illustrated by the 'semi-anti' cluster's general approval of a nuclear phase-out but its rejection of a tax increase on electricity consumption. Because economic arguments against renewable energy may not be as impactful in discouraging support for climate policies, political actors within the elite are able to spread doubt about the necessity of clean energy by spreading doubt about climate change as a concept.

The findings suggest that elite actors not only influence how citizens think about climate change, but also that political ideology is an important heuristic as to whether or not citizens reject clean energy policy more broadly. This suggests that climate change skepticism serves as a proxy influenced by political ideology, most substantially for the populist right. Speaking to the necessity of an energy transition and questioning the reality of climate change emotionalizes the debate and allows the party to not only undermine scientific consensus but also to push for less or no state-intervention at all. In this sense, nurturing climate skepticism pushes the public's attention away from policy options to treat climate change, and instead focuses it on questions about whether climate change is even real in the first place.

Given our results, more thorough investigations into the link between a party position with regards to climate change and its influence on the respective voters need to be conducted. The approach with an SEM establishes this link and also suggests, together with the theoretical discussion and insights from earlier literature, the influence of parties on climate change skepticism. However, the data structure at hand and the model can not go into the depths or the mechanisms of the relation between a parties' position and a voters' attitudes. As such, more research with regards to this relation could built on interviews with voters to highlight how this process of perception and attitudinal alignment works.

5.6 Conclusion

This paper investigates factors that explain opposition in both the political elite and the public towards policies clean energy policies that support a renewable energy transition. The paper furthermore questions whether the attitudes of the political elite, notably political parties, influence the way citizens support climate and energy issues. In the analysis, climate change skepticism is identified as a sufficient but not necessary condition for the rejection of policies supporting clean energy. We also show that elite stakeholders project their beliefs and specifically their aversion to RE onto their voters and are an important source for decision heuristics.

The paper's findings are important to understanding the steps necessary to transition to a primarily renewable energy system. The public relies on cues received from elite actors (most notably parties). This gives the elite a major opportunity to influence public opinion and, therefore, votes. Moreover, climate change skepticism has been a trending issue within populist parties on the right

(but not only, according to Brown, 2014). With the denial of climate change, populist parties are thus able to rally opposition against clean energy policies, similarly to the way in which they established political strength on immigration issues. Climate change skepticism can thus become an important and strong tool for political parties and elite to transfer their opposition to clean energy to voters.

Because elite actors play a central role in policy selection and influencing public opinion, they can be a massive hindrance towards pursuing a renewable energy transition. Elite actors and especially political parties that oppose the promotion of clean energy and promote climate skepticism are probably one of the most important hurdles to overcome if we are to transition to renewable energy. More generally, and independently from the Swiss direct-democratic system, some political actors seem to be exploiting climate change skepticism to incite public opposition to clean energy policy. It is, however, highly questionable whether these actors nourishing skepticism can be convinced to stop. In order to facilitate the process, political actors clearly in favor of a RE transition need to rethink how they approach citizens and what arguments they use to convince citizens that do not have strict preferences (see e.g., Stoknes, 2014). Motivated reasoning could potentially provoke a backlash and further promote distrust in the government and in climate change (Bolsen and Druckman, 2018). At the same time, scientists also need to rethink how they present evidence for anthropogenic climate change to political actors. Time and resources to process information are almost as limited for the political elite as they are for the public, and its possible scientific evidence may not make its way into political debate (Cairney, 2016).

The differing results of our analysis for the elite and citizens illustrate how opinion is more ideologically polarized for the elite than for individuals. This might be because political actors and especially political parties need to have very distinct positions in order to capture citizens' attention and support. Individuals, however, do not need to develop clearly distinguishable beliefs and are often more ambivalent regarding a specific issue unless they are immediately impacted by it. This conclusion suggests that solutions addressing climate change could be supported by individuals even if some elite actors categorically reject the idea.

Lastly, it is important to acknowledge the interests and preferences of actors included in the 'semi-anti' cluster. As the somewhat platitudinous label for this group already indicates, these actors will probably oppose policies they consider too drastic. However, this paper also demonstrates

that while the actors may oppose specific policies, they are not principally opposed to clean energy across the board. They are more likely to define their support or opposition depending on the selected policy and its specific implications. For states advocating for a clean energy transition, it is therefore essential to gain the support of this cluster of actors, in contexts both with and without direct-democratic options.

5.A Appendix

Table 5.2: List of elite actors.

Acronym	Organization	Actor Type
AEE	Organization for Renewable Energy and Energy Efficiency	Interest group (energy)
AKADWISS	Swiss Academies of Arts and Sciences	Science
AUTOS	Swiss Automobile Association	Interest group (economy)
AVES	Organization for Responsible Energy Policy Switzerland	Interest group (energy)
BKW	BKW AG	Utility company
CVP	Christian Democratic People's Party of Switzerland	Political party
DSV	Swiss Association for Distribution System Operators	Interest group (energy)
ECON	economiesuisse	Interest group (economy)
EDI	Federal Department of Home Affairs	Administration
ELECTROS	Association for Electrical Engineering, Power and Information Technologies	Interest group (economy)
ETH	ETH Board	Science
FDP	FDP.The Liberals	Political party
GLP	Green Liberal Party of Switzerland	Political party
GPS	Green Party of Switzerland	Political party
GREENP	Greenpeace Switzerland	Environmental NGO
HEV	Swiss Homeowner Association	Interest group (economy)
INDUS	ScienceIndustries - Swiss Business Association Chemistry Pharma Biotech	Interest group (economy)
NFORUM	Nuclear Forum Switzerland	Interest group (energy)
PRONA	ProNatura	Environmental NGO
PSI	Paul Scherrer Institute	Science
SAB	Swiss Working Group for Mountain Regions	Regional association
SATW	Swiss Academy of Engineering Sciences	Science
SBV	Swiss Farmers Union	Interest group (economy)
SES	Swiss Energy Foundation	Interest group (energy)
SGB	Federation of Trade Unions	Trade union
SGV	Swiss Association for Small and Medium-sized Enterprises	Interest group (economy)
SP	Social Democratic Party of Switzerland	Political party
SSOLAR	Swiss Trade Association for Solar Energy Swissolar	Interest group (energy)
SVP	Swiss People's Party	Political party
TRAVS	Travail Suisse	Trade union
UVEK	Federal Department of the Environment, Transport, Energy and Communication	Administration
VSE	Association of Swiss Electricity Companies	Interest group (energy)
WWF	WWF Switzerland	Environmental NGO

Table 5.3: List of survey items included in cluster analysis. Support for different beliefs regarding the new energy act were measured with a four-point scale from 1 = 'fully disagree' to 4 = 'fully agree'.

Belief	**Variable**	Min.	Max.	Mean	Stdev	Var
Energy strategy 2050 in general	stratsupport	1	4	2.848	.870	0.758
General nuclear phase-out	besupport	1	4	3.030	1.185	1.405
Lower energy and electricity consumption	useredu	2	4	3.455	.711	.506
Increase share of renewables	renewincr	2	4	3.606	.609	.371
Sustaining Swiss access to international markets	maccess	2	4	3.515	.566	.320
Reconstructing energy grid	netwreconstr	2	4	3.455	.617	.381
Support for sequential nuclear phase-out	phaseout	1	4	3.273	1.126	1.267
Increase international competitions	intenscollab	1	4	3.515	.755	.570
Banning construction of new nuclear power plants	constrban	1	4	2.667	1.407	1.979
Introduction of white certificates for utilities	efftargets	1	4	2.182	1.044	1.091
Explicit right for own use of electricity for individuals	legalanchor	2	4	3.515	.712	.508
Limit duration of feed-in tariff per installation	kev	1	4	3.424	.792	.627
Increase electricity tax for individuals	cap	1	4	2.667	1.362	1.854
Partial exemption of CO2 tax for utilities	chargerelief	1	4	2.394	1.116	1.246
Increase energy research	research	2	4	3.606	.556	.309
Ensure security of supply	guarantsuppl	3	4	3.758	.435	.189
Ensure international independence of Swiss energy sector	sectautono	1	4	2.909	.765	.585
Prioritize economic efficiency of the energy mix	economix	2	4	3.182	.808	.653
Ensure competitiveness of energy sector	intcompet	2	4	3.727	.517	.267
Ensure equal access possibilities for all individuals, independent from their social status	equalaccess	1	4	3.121	.857	.735
Ecological risk of prolonging permits for nuclear power plants	lifespanext	1	4	2.424	1.324	1.752
Prioritization of RE production over increasing energy efficiency	renewpref	1	4	2.545	.938	.881
Necessity to adapt to & mitigate climate change	climtargets	1	4	3.394	.864	.746
Free choice of electricity products for consumers	consumchoice	1	4	3.273	.911	.830
Energy mix should be determined by free market	meconomix	1	4	3.030	1.015	1.030
Explicit right for own use of electricity for individuals	govparlmix	1	4	2.152	.939	.883
Nuclear phase-out is implementable in 30 years	phaseoutimpl	1	4	3.242	1.062	1.127
Urgency of energy transition is high	reconstr	1	4	3.152	1.034	1.070
Safety of current nuclear power plants is given	ppcond	1	4	2.727	1.153	1.330
Energy transition should be implemented subsidiarily	implcomp	1	4	2.303	.883	.780

Table 5.4: List of survey items included in the structural equation model. Original questions in German, French and Italian. Values and proportions reported for the full considered sample of $n = 1985$ respondents.

Variable	Values	
Party Preference		
Greens	6.60%	
SP	15.30%	
GLP	5.30%	
CVP	9.20%	
FDP	14.00%	
SVP	18.90%	
other	30.80%	
Environmental attitudes, scale 0-5 in the form of a semantic differential		
Economic welfare <->Environmental protection	66.70%	prefer protection
Use of natural resources <->Protection of nature and landscape	65.60%	prefer protection
Climate change skepticism, scale 0-3 from disagree to agree		
I'm unsure if climate change really happens	27.20%	skeptics
Climate change is primarily caused by humans (rec)	11.70%	skeptics
The consequences of climate change are exaggerated	37.20%	skeptics
Climate change is an excuse to patronize or tax people	23.50%	skeptics
Opposition, multiple choice, tick if supported		
Tax reductions for operators of renewable energy plants	37.60%	
Subsidies for building renewable energy plants	45.60%	
Bans on building electricity plants for non-renewable energy sources	27.20%	
Public tendering to find investors for building renewable energy plants	34.90%	
Public investments in the production of renewable energy	37.20%	
Energy companies shall be instructed to build renewable energy plants	25.50%	
More information, consultation and education for people considering building renewable energy plants	38.50%	
None of the above, renewable energies should not be promoted	2.60%	
Age	continuous	
Gender	49.10%	women
Education		
Low	47.60%	
Middle	22.30%	
High	30.10%	
Income		
Low	24.50%	
Middle	41.40%	
High	34.10%	

Table 5.5: Structural equation model, latent variables. *Note*: estimated in R with *lavaan* (Rosseel, 2012). Full results in the Supplementary material.

Factor loadings					
LHS	Op	RHS	Estimate	Std. Err	P >|z|
Opposition	=~	Ban on non-renewables	1.000	.000	.000
Opposition	=~	Tax reductions	.940	.151	.000
Opposition	=~	Subsidies	1.187	.162	.000
Opposition	=~	Public tendering	1.069	.152	.000
Opposition	=~	Public investments	1.038	.142	.000
Opposition	=~	Instruction energy companies	1.063	.139	.000
Opposition	=~	Information, consultation, education	1.323	.167	.000
Climate Change Skepticism	=~	Unsure if climate change happens	1.000	.000	.000
Climate Change Skepticism	=~	Primarily caused by humans (rec)	.615	.046	.000
Climate Change Skepticism	=~	Consequences exaggerated	1.118	.056	.000
Climate Change Skepticism	=~	Excuse to patronize/tax	1.055	.053	.000
Environmental attitudes	=~	Environmental protection	1.000	.000	.000
Environmental attitudes	=~	Protection of nature and landscape	.843	.049	.000

Chapter 6

Conclusion: A closer look at the citizens' perspective is necessary

One of the dominant aspects of politics is the drive to maintain the *status quo* – to keep things as they are. In direct democracy, the default answer to a new proposal is a *no* (Kriesi, 2005). The possible outcomes of changing a policy are uncertain, and citizens do not know whether they will be better off with a new political solution, which means they tend to opt for maintaining the status quo.

Change, therefore, is not what political institutions are tailored to or what all political actors aspire to. As long as everything works, political actors and citizens tend to prefer to keep things the way they are. And yet, the world does not stand still, and politics is forced to react to these changes: Globalization, for example, questions borders and reduces the power of nation states in terms of influencing economic development or protecting markets and jobs, which in turn leads to immigration across continental borders. The rapid pace of digitalization and automatization, also referred to as the "fourth industrial revolution" (Schwab, 2016), will revolutionize the economy as we know it, introducing new technologies such as algorithms and robots. Countries and international organizations are not always at the heart of change, or even involved in change at all. Cryptocurrencies, for example, are a hugely disruptive aspect of the digital era and already question the historical precedent whereby countries and central banks are responsible for currencies and control monetary politics.

In general, and not only in terms of renewable energies or environmental politics, the reaction of the population and citizens to proposals for change is significant: a lack of social acceptance could

block change, impede implementation, or create a feeling of being left behind by these developments. Therefore all large-scale transitions, whether they happen on a global, interconnected scale or mainly within the borders of one political entity, need to consider the potentially powerful barrier (Wüstenhagen, Wolsink and Bürer, 2007) of citizens in these kinds of processes.

If citizens are not taken into account, failure is not only possible, but likely. Citizens can block developments by either vetoing them directly, or by electing parties that will oppose change or at least delay the process – generating veto points (Tsebelis, 2002). For example, in the 2016 US presidential elections, coal miners were a talking point that was addressed by the Republican candidate who played on their opposition to renewable energies and climate change mitigation in order to gain their votes, helping him to get elected and thereby not only block the phasing-out of coal, but also resulting in the US withdrawing from the Paris Agreement. Moreover, if a process happens too rapidly or leaves citizens with the feeling of being left behind, which is often the case with globalization, this provides opportunities for backlash, such as the rise of populism due to peoples' dissatisfaction with the developments around them (Rodrik, 2018; Mudde, 2004). From another perspective, if a change in behavior is necessary in order to reach a target, policies or solutions that do not consider what the public wants run the risk of being ignored by the citizens and never getting off the ground.

As I argue in chapter 2, a greater understanding of the political processes behind the energy transition helps us to better grasp to what extent individuals are to be considered *political actors* in the transition process within the energy field, and therefore also in terms of climate change mitigation. Yet, this perspective on citizens as political actors who participate in the transition from fossil fuels and nuclear power to renewable energies in several ways is applicable to other transitions as well. While the concept of social acceptance (Wüstenhagen, Wolsink and Bürer, 2007) has been developed and used predominantly within the context of renewable energy technologies, the concept itself is more widely applicable.

One challenge that many countries are currently facing or will soon face is, for example, the redefinition of the welfare state. Both globalization (through immigration) and digitalization (through automatization) are changing how economies work, the make-up of the workforce, and thus the way the welfare state is able to provide security and decommodification. Together with rising inequality (Piketty, 2014), the question emerges of what the welfare state will look like in the future. In many ways, the fourth industrial revolution is a process that requires answers from the political elite in

order to mitigate its negative effects, such as guaranteeing and redefining welfare in other ways than the current setup in which access to welfare is contingent on employment or the willingness to work (De Wispelaere and Morales, 2016), and is thereby similar to the energy transition. One utopian, yet regularly discussed, solution is a basic income, whether unconditional (Koistinen and Perkiö, 2014) or conditional (Hughes, 2018). However, every attempt at redefining the welfare state, even in small steps (Ostheim and Schmidt, 2007), requires social acceptance from the public, and therefore speaks to individuals in their role as political decision-makers. The concept of social acceptance, as well as the focus on citizens' opinions and the influences on possible voting behavior in terms of citizens' general attitudes towards change (chapter 3), is therefore similarly applicable for various other issues. As such, for example, the gap between support for the general idea of a basic income, but a lack of support for the actual implementation of such an idea, can similarly be attributed to the thesis of qualified support that has traditionally been used in terms of environmental issues (Bell, Gray and Haggett, 2005): as an idea, basic income may sound promising, but the relation with other policies, the amount of income to be distributed, and the extent of inclusion define whether or not a specific version will be supported. As with other issues, support for a solution depends on a policy's specifics and the information that citizens receive about the proposal in question (chapter 3).

To return to the issue discussed in this dissertation, the four essays presented argue and illustrate why citizens matter in the energy transition. In chapter 2, I revisit and refine the concept of social acceptance from a political science perspective, discussing both how policy studies view the process behind such policies, and how citizens are to be involved in decision-making as political actors. As such, this essay on a political science framework for social acceptance calls for a stronger consideration of political processes in the energy field, which has up to now been dominated by researchers interested in the social or economic reactions by individuals towards energy or electricity technology, rather than their political role as citizens. Citizens matter, and not just as consumers, but also as participating stakeholders, and, when we take into account Switzerland's direct democracy, as central decision-makers when it comes to referenda on national and subnational levels. In chapter 3, I take a closer look at how opinions are formed, revealing what citizens care about when it comes to making decisions on energy policy. Building and developing on political science studies where they overlap with social psychology, this chapter argues for an approach that considers that policies have many aspects which could all incite opposition or bolster support. Using a multidimensional

setup that allows respondents to be presented with detailed policy information and gives them the opportunity to focus on the aspects of a policy they care about, the results suggest that costs are particularly influential in decision-making, while a positive element of a policy that could potentially generate support is the link to nuclear power, which is generally rejected by the population. The results demonstrate that the gap between general attitudes and specific voting behaviors is therefore caused by unfavorable aspects of policies that do not meet certain conditions for individuals, even if the individuals would support the overarching idea behind the policy itself. Therefore, we can conclude that the details matter for citizens, and not just general directions. Methodically, chapter 3 also presents a new approach with conjoint models to design decision situations that are closer to actual political judgments. In chapter 4, one conclusion is that the economy is *not* always the decisive factor. Citizens have a different perspective than policy makers when it comes to policy design, and are not necessarily persuaded by economic theories and models which they rarely encounter in reality. Rather, citizens seem to care about the consequences of a policy much more than the mechanisms, which are, however, at the heart of political debates in parliament. Alongside the conclusion that citizens do not show preferences towards which economic, i.e., incentive-based, instruments are used to reach a certain goal, chapter 4 moreover highlights that such instruments receive the most support if the costs of such instruments are limited, which in turn also tends to limit their efficacy. As such, we can draw two inferences: first, if policy makers believe in their models and instruments, this confidence and insight into the efficacy and goals of such instruments needs to be communicated to citizens in order to convince them as well. Second, if such models are only convincing when their impact is limited, and thus the instrument itself is rather ineffective, the question remains if there are other instruments which enjoy greater support from the population and are also better suited to indeed reach a goal, even if their economic effectiveness is theoretically lower. In both cases, studies on citizens' reactions to such proposals need to look at what citizens care about, and not what policy makers want, otherwise the public may not react as intended. Lastly, the relationship between the political elite and the citizens is discussed in greater detail in chapter 5. Focusing on upcoming promotional measures which citizens might support in order to implement the new energy law, the ways in which the political elite can influence what citizens think and support is been discussed. I have reached two conclusions: on the one hand, the political elite is much more polarized when it comes to energy policy, with notable elite actors in the opposition, even if

their voters have a less negative attitude towards certain political goals, while on the other hand, the chapter also illustrates that there is a danger of manipulation. In an era of rising populism, simple answers and climate change denial that capitalizes on skepticism towards the existence of global warming can serve as argument against greater state intervention into the economy in order to promote renewable energies. If economic arguments are unable to convince the population to reject renewable energies (as we see to a certain extent in chapter 4), catchy phrases that question scientists and climate change could do a better job at framing promotional measures as unnecessary.

Of course, a thesis in its extent has limitations. The main limit of this dissertation is its thematic focus: while the promotion of renewable energy sources for the production of electricity and the discussion of phasing out of nuclear power are part of the larger fields of environmental and energy policy, the researched subject in this thesis is nevertheless narrowed down on electricity production. The discussion of electricity policy is however embedded in the Energy Strategy 2050 of Switzerland, and replacing a large share of electricity production, such as defined within this strategy, has implications also for other fields of energy policy, which obliges to see the bigger picture. The insights provided in this work would thus need to be tested in the larger field of energy policy also when it are not renewable energies taking center stage. Moreover, the case selection of Switzerland, while providing excellent opportunities to study citizens' involvement in energy policy also represents a quite special case with a strong direct democratic tradition and culture, thus not being generalizable to all other countries directly. Rather, the case of Switzerland serves as a notable test country to discuss, e.g., what the promises of participating citizens in larger transition processes are. More insights from other countries are however needed, both from countries with extensive attempts to mitigate climate change and promote renewable energies, and countries where those goals are neglected either due to opposition by the elite or the public. Last but not least, research is always also a snapshot, in this case characterized by the public vote on the new Energy Act. Testing those insights and conclusions in the future and accompanying the following procedures of implementing and refining energy policy in Switzerland would ensure that the results are not only referring to one moment, but applicable also in developed circumstances.

Regardless of the specific issue at stake, studying the reaction of individuals to large-scale transitions such as the energy transition, globalization, or a possible restructuring of the welfare state presents several challenges. This dissertation has addressed these challenges in the field of en-

ergy policy by focusing on electricity production and debated several open questions as described by Sovacool (2014) – most importantly why citizens matter in these processes, and not just as consumers, but as political actors. It also builds on the understanding of economic models and concepts amongst the population at the intersection of political science and economics, as well as the influence of more complex, multidimensional policy information at the intersection of political behavior and social psychology.

Overcoming citizens' status quo bias on a number of issues and researching what citizens think about change presents several challenges both for policy makers trying to implement targets and for researchers interested in understanding the public's reactions to those targets and solutions. Firstly, to understand how individuals react to a proposal, the citizens' perspective on the proposal needs to be considered. Ignoring citizens or excluding them from transition processes could undermine the success of these transitions, as a central actor is disregarded. Secondly, citizens do not have the same priorities as policy makers, and might not necessarily react to the details policy makers care about, but rather are more focused on the impact a solution will have, rather than its exact (technocratic/economic) mechanisms. Citizens form opinions on issues differently than policy makers, and they have certain conditions or beliefs that can cause them to support or reject solutions. Lastly, changes always come with expectations, hope, and, most importantly, fear. Political actors can exploit these emotions either to capitalize on positive attitudes towards a solution in order to gather support or to manipulate the public by playing on their fears as well as the uncertainty of change.

However, even with this hurdle of the public's tendency to maintain the status quo, change *is* possible. Time and again, society has overcome the hurdle of social acceptance with regards to countless issues, even if it took a considerable amount of time. The relevant question is *under which conditions is change possible?* With this dissertation, I contribute to a deeper understanding of what role citizens play when it comes to effecting change, and which conditions foster the readiness of citizens in their role as decision-makers to overcome the status quo and *embrace* change. The nuclear phase-out in Switzerland is a perfect example of this process: after several unsuccessful attempts over decades and an inability to fight the opposition of the political elite, this change was finally not only embraced by the citizens, but also implemented with the support of both the Swiss government and the Swiss parliament.

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