ANONYMIZED *Pre-Analysis Plan*

PLACE, August 2022

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1. Study Design

In order to investigate these matters, central to the project is a representative, large-n population survey in Switzerland including a novel survey-experimental module to assess policy acceptance in the context of goal (dis-)alignment. In order to define and develop the questions and experiments integrated into the survey, we conducted seven expert interviews. Moreover, we had several iterations on questions, formulations and technical information within the research consortium.

We prepared the self-administered online survey using *Qualtrics* software. The survey has been approved by the an academic internal review board (ethics commission). We estimate that respondents will need around 20-30 minutes to fully complete the survey.

The questionnaire has originally been prepared in German and was then translated into the different survey languages, namely English, French and Italian. We ensured multiple rounds of proof-reading and informal pre-testing as well as a two formal pre-tests, one in a Swiss municipality with roughly 100 self-selected inhabitants and another one randomly questioning 400 respondents of the *Qualtrics* panel.

1.1 Sample

Data collection is supposed to start on September 1, 2022, and to take two months. Respondents will be recruited via regular mail invitation letters in which they receive a link (can be accessed via a QR-code) and a personal token. We aim for a sample size of 4500 people living in Switzerland. This corresponds to a response rate of 40 %.

The postal addresses were provided by the Federal Statistical Office based on a random draw from the population register and stratified along geographical areas (based on the place of residence, see below). Due to the complex nature of our survey, we restrict the respondent's age to a minimum of 18 years and a maximum of 75 years. We do not implement any other restrictions based on personal characteristics.

We both aim at collecting a sample representative for the Swiss population as well as having sub-samples large enough to conduct robust group-specific analyses. For this purpose, we divided Switzerland into nine regions, creating all possible combinations between the three major areas of Alps, Midlands, and the Jura, as well as with respect to urbanity (urban, peri-urban, rural). The resulting nine groups as well as the sampling plan are described in Table 1.

Table 1: Net sampling plan

Swiss Regions	*Main part*	*Reserve I*	*Reserve II*	*Total*
Alps-rural	550	55	55	660
Alps-periurban	550	55	55	660
Alps-urban	600	60	60	720
Jura-rural	150	15	15	180
Jura-periurban	150	15	15	180
Jura-urban	150	15	15	180
Midlands-rural	600	60	60	720
Midlands-periurban	700	70	70	840
Midlands-urban	1050	105	105	1260
Total	4500	450	450	5400

Note: We defined sample sizes proportionally to regional population samples. However, for smaller regions, we set a minimum of N=150 residents.

1.2 Structure and content of the survey

Table 2 presents the structure of the survey, namely the different survey modules.

Table 2: Survey structure

Modules	Description
Introduction	General information about the survey
A General climatic and environmental attitudes	Statements about climate change and environmental threats
B Behavioral patterns	Questions about environmental-relevant behavior
C Policy goals and preferences	Experiment on accordance of energy policy goals and policies
D Conjoint choice experiment	Personal PV project investment decisions
E Solar Adoption	Barriers and motivators of PV adoption
F Open space solar power systems	Attitudes towards open space PV plants
G Energy Policy	Questions about energy policy attitudes
H Politics	Personal political attitudes
Z Socio-demographics	Other personal characteristics
Debrief	Survey end page and further project information

1.3 The policy goal survey experiment

Please note: Updates in this document are for enhanced clarity, only, and are always indicated by red font.

In section C "Policy goals and preferences" of the survey (see Table 2), we include an experiment on individual preferences for energy policy mixes, jointly discussed with their ability to reach specific policy goals. Initially, we present the following introductory text to all respondents:

While 76% of Swiss electricity already comes from renewable energies today, the share of decentralized renewables (solar PV, small hydropower plants and biomass) is only small. According to the Swiss Federal Office of Energy, this share was only 10.3% in 2020.

In order to have more electricity available for the decarbonisation of other sectors such as transport, heating and industry and to become less dependent on energy from abroad, the share of decentralised renewables should be further increased.

After this short information on the current Swiss energy situation, we assign respondents randomly to either, one of two control groups, or to one of the two experimental groups (see Table 3). There is a probability of p=1/3 to be in either of the two treatment groups, and with p= 1/6 each a respondent is assigned to either of the control groups.

Table 3: Overview of the design of the policy goal experiment

Groups Step	(***Policy + Goal***) **Control 1**	(***No Goal***) **Control 2**	(***Goal Assigned***) **Low Involvement Treatment Group**	(***Goal Selected***) **High**
Initial information on policy goal:	No	No	Get information on one policy goal	Pick one policy goal out of three
Baseline policy decision:	Choose policy (or none) with goals presented together	Choose preferred policy mix (or none) from three policy mix options		
Feedback:	none	none	if goal not met	
Alteration:	-	-	goal or policy mix or none	
Debriefing:	-	-	policy goal reached	

Step 1: Initial information on policy goal

The first experimental group (**low involvement**, *Goal Assigned*) receives information on one of the goals after the information text. It starts with *"Therefore, the following goal is set:"* and one of the following three statements is randomly displayed:

- *90 % of electricity consumption in one year is covered by domestic renewable production from 2050 onwards.*
- *100 % of one year's electricity consumption is covered by domestic renewable production from 2050 onwards.*
- *100 % of one year's electricity consumption is covered by domestic renewable production from 2040 onwards.*

In the second experimental group (**high involvement**, *Goal Selected*), the respondents are prompted to pick one of the aforementioned three policy goals. They are prompted with *"Several concrete goals are discussed for this. Thinking of the electricity sector, which goal do you think Switzerland should pursue?"*. Then the three goals are displayed and respondents need to chose one of the options.

The two **control groups** (*No Goal* & *Policy + Goal*) do not choose or specifically see the policy goals at all. Hence, they only receive the general introductory text.

Step 2: Baseline policy decision

Both treatment groups as well as both control groups (whose members have never been informed of any of the goals) get the following next question: *"Various measures can be taken to achieve this goal. We present three packages of measures below. Please indicate which one you would support most.*

The packages of measures should be financially balanced; any deficits in the national budget will be financed through taxation of energy consumption. Unless explicitly stated otherwise, the measures are designed to last until 2050."

Then, three possible policy mixes are displayed. They are randomised in a way that at least one matches the policy goal they were assigned to or they selected. There is always also the option to abstain and not pick any of the policies. The same policies are also displayed to the first control group *Policy + Goal*), but they get additional information on which goals this policy reaches. Therefore, for all respondents the statements describing the policy mixes read as follows, with the last sentence only for **Control 1** *Policy + Goal*. The statements that are only displayed for the Control 1 *Policy + Goal* are written in grey below.

The expert assessment had been done in an iterative process involving a variety of Swiss energy researchers with multi-disciplinary backgrounds (e.g., energy economics, energy modelling). This list of policy mixes is carefully selected with the energy experts, in order to meet the three policy goals. There is always one mix that focuses more on market-based interventions (purchase price guarantees, contributions to investment costs, electricity surcharge) and one that focuses more on regulation (requirements for solar PV on buildings, and obligations for electricity suppliers, and areas where solar is permitted). From our multi-step collaborative process we ended with an expert elicitation that showed overall agreement that each policy would likely reach at least the goal they were supposed to reach but likely not the more ambitious one.

- *To promote the production of domestic renewable electricity, there is a purchase guarantee for renewable electricity. This means that anyone who builds a plant for the production of domestic renewable electricity today is guaranteed at least CHF 0,12 per kWh for the electricity produced from it during the first 10 years. In addition, the construction of such a plant is supported with an investment contribution amounting to 50 % of the investment costs. This support is financed through the taxation of electricity consumption (via a surcharge on grid usage). Finally, there are requirements in the area of renewable electricity: from 2030 there will be a solar obligation on new buildings and renovations, and from 2050 on all buildings. Electricity suppliers will also be obliged to have at least 80 % domestic renewable electricity in their electricity mix from 2030. Solar installations will be permitted on open areas and in the Alpine region. Based on the assessment of various researchers in this area, this package of measures is sufficient to achieve the goal of "100 % of one year's electricity consumption is covered by domestic renewable production from 2040 onwards".*

- *The construction of a plant for the production of domestic renewable electricity is supported with an investment contribution amounting to 40 % of the investment costs. This support is financed through the taxation of electricity consumption (via a surcharge on grid usage). Finally, there are requirements in the area of renewable electricity: From 2030, there will be a solar obligation on new buildings and renovations, and from 2040 on all buildings. Electricity suppliers will also be required to have at least 85 % domestic renewable electricity in their electricity mix from 2030. Solar installations will be allowed on open areas and in the Alpine region. Based on the assessment of various researchers in this area, this package of measures is sufficient to achieve the goal of "100 % of one year's electricity consumption is covered by domestic renewable production from 2040 onwards".*

- *To promote the production of domestic renewable electricity, there is a purchase guarantee for renewable electricity. This means that anyone who builds a plant for the production of domestic renewable electricity today is guaranteed at least CHF 0,08 per kWh for the electricity produced from it during the first 10 years. In addition, the construction of such a plant is supported with an investment contribution amounting to 40 % of the investment costs. This support is financed through the taxation of electricity consumption (via a surcharge on grid usage). Finally, there are requirements in the area of renewable electricity: from 2030 there will be a solar obligation on new buildings and renovations. Based on the assessment of various researchers in this area, this package of measures is sufficient*

to achieve the goal of "100 % of one year's electricity consumption is covered by domestic renewable production from 2050 onwards".

- *In order to promote the production of domestic renewable electricity, the construction of such plants is supported with an investment contribution amounting to 40 % of the investment costs. This support is financed through the taxation of electricity consumption (via a surcharge on grid usage). Finally, there are requirements in the area of renewable electricity: From 2030, there will be a solar obligation on new buildings and renovations, and from 2050 on all buildings. Electricity suppliers will also be required to have at least 80 % domestic renewable electricity in their electricity mix from 2030. Based on the assessment of various researchers in this area, this package of measures is sufficient to achieve the goal of "100 % of one year's electricity consumption is covered by domestic renewable production from 2050 onwards".*
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- *There are requirements in the area of renewable electricity: From 2040, there will be a solar obligation on new buildings and renovations. Electricity suppliers will also be required to have at least 75 % domestic renewable electricity in their electricity mix from 2030. Based on the assessment of various researchers in this area, this package of measures is sufficient to achieve the goal of "90 % of electricity consumption in one year is covered by domestic renewable production from 2050 onwards".*
- *I do not support any of these packages of measures.*

Step 3: Feedback on goal (dis-)alignment

In case that the goal is not met by one of the supported policy mixes, in either of the two treatment groups, there is another step informing respondents about their mismatch. The text reads as follows: *"Based on the current assessment of various researchers in the field, the package of measures you have selected is not sufficient to achieve the target regarding domestic renewable electricity. What would you like to do?"* The respondents can now either pick another policy mix, adjust the target or do neither. Depending on their choices, they receive a chance to alter the policy goal (from all of the three goals available) or the policy mix (from the same ones, they have seen before). This allows for not altering even after selecting that goal or policy mix shall be altered.

In a debriefing, all respondents from both treatment groups now receive the information which policy goal their (lastly) chosen policy mix reaches.

2. Hypotheses

2.1 Hypotheses for the policy goals experiment

The *control group 2 No Goal* serves to assess the baseline policy preferences in the population through their baseline policy choices, as we currently hardly observe policies being discussed with policy goals at the same time. Given that they receive no additional information on policy goals, they have an information deficit (Rhodes et al., 2014; Stoutenborough and Vedlitz, 2014). We expect the *control group 2 No Goal* to have, compared to all the other groups, the least support for ambitious policy measures. This is reflected

in the next hypothesis:

Hypothesis 1 *Respondents in control group 2 No Goal will pick the least ambitious polices.*

Our experimental design aims to show that following anchoring (Furnham and Boo, 2011; Tversky and Kahneman, 1974), a more ambitious goal will lead to a more ambitious mental anchor, implying that people will also likely accept more ambitious policy mixes. Hence, we formulate a hypothesis that reads as follows:

Hypothesis 2 *A more ambitious goal displayed or initially selected will make respondents more likely to accept more ambitious policies before feedback.*

Similarly, from the knowledge deficit model (Rhodes et al., 2014; Stoutenborough and Vedlitz, 2014) we can assume that information about a potential mismatch between policies and goals will increase the acceptance of more ambitious policy mixes after a mismatch was disclosed to respondents. Therefore, over all (both) treatment groups, we expect that such a *feedback* on mismatches is more likely to increase the support for more ambitious policies in comparison to reducing the ambition of their policy goals. This expectation is reflected in the next hypothesis:

Hypothesis 3a *Feedback about mismatch increases support for ambitious policy mixes rather than altering policy goals.*

When comparing both treatment groups, we expect that from attachment theory, which manifests in the endowment effect (Beggan, 1992; Morewedge and Giblin, 2015), that picking a goal leads to a higher involvement with the goal. Therefore, when respondents picked a specific (ambitious) goal (**high involvement treatment group** *Goal Selected*), they are more likely to alter their policy mixes when their goal is not met than respondents who received their Goal Assigned (either before the choice (**low involvement treatment group**, *Goal Assigned*) or during the policy selection task (*control group 1*, *Policy + Goal*). The second hypothesis of this section, reflects this:

Hypothesis 3b *Respondents who picked their goal are more likely to alter policies instead of their goals than the other experimental group, when their chosen policies did not match their goal.*

3. Data analysis

Here, we focus on data analysis building on the experimental data collected in the survey. We will generally set $\alpha = 0.05$ and will reject the null hypothesis when the p-value is less than 0.05.

References

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